

Scotland Won't Make Money Selling Electricity

Jack W Ponton, FREng, FIChemE

April 2013

Mr Alex Salmond, has famously said that he has a vision of Scotland as “the Saudi Arabia of renewables”. Bluster and bravado aside, what he presumably means, and certainly implies, is that Scotland will make lots of money selling renewable energy to the rest of the world, as Saudi Arabia does with its oil.

Whilst it's an attractive idea, there's more than a hint of smoke and mirrors about Mr Salmond's concept of a renewables energy bonanza. Let's examine the parallels. Firstly scale. Saudi Arabia produces about 10 million barrels of oil per day. In energy terms this means that their energy output is at a rate equivalent to about 700 GW. Scotland has a population of roughly one fifth that of Saudi Arabia, so to be the renewables equivalent of that country, *a la* Salmond, we should be looking at a power generating capacity of 125 GW. In fact Scotland's total electricity generation capacity is just over 10GW, of which effective wind capacity is just over 1GW, i.e. about one hundredth of Saudi Arabia's.

Next we need to look at availability. Once an oil well has started operating production can be increased or decreased to meet changes in demand. Oil is conveniently transported world wide in pipelines and by supertankers carrying up to half a million tonnes each. It can be easily stored until required - the US keeps a strategic petroleum reserve of about 700M barrels.

In contrast, wind generated electricity is only available when the wind is blowing. It is expensive to transport: the controversial £600M Beaulieu-Denny link will have the carrying capacity of less than one hundredth of a supertanker, which incidentally would cost about half as much. Electricity is also extremely difficult and expensive to store. The only practical means of storing large quantities is by pumped storage, for which there are currently four sites in the UK with a combined capacity equivalent to just 18,000 barrels of oil.

Finally, who actually makes money from oil and how do they do it? There are two ways in which a country can make money from a natural resource such as oil. In principle, the most profitable should be to set up its own oil company. This is what Norway has done, giving it a GDP which is the highest for any “real economy” country in Europe. Alternatively, government can sell licences to private companies and charge them taxes or royalties on the oil they extract. This is what the UK has done with North Sea oil.

In terms of electricity, the UK has sold off its state-owned CEGB and so would have to adopt the licence and tax model to profit from renewable electricity. So has it auctioned licences to build wind farms and charged the companies royalties? Quite on the contrary - the consumer is paying subsidies to renewable energy operators through Feed In Tariffs and Renewable Obligation Certificates!

It is not at all clear than any country, as opposed to company, can hope to make money out of electricity unless the state owns the electricity company. True, a number of countries are significant exporters of electricity. However they all have particular characteristics which do not apply to Scotland.

For a start, their electricity is cheap to produce; it is usually hydro, but in the case of France it is nuclear. French nuclear reactors have been much cheaper than those built in the UK as the state-owned nuclear company adopted standardised designs, while the UK tried out a wide range of technologies.

Then their generation tends to be a controllable resource. Hydro is the most flexible form of generation and so can be sold when export demand is high and so attracts a high price. French nuclear is less flexible, but unlike wind it is controllable. France also has substantial hydro capacity.

Importantly, they also tend to have a choice of customers. Norway sells its cheap hydro to Sweden, Denmark and Germany, France to Germany, Benelux and the UK.

None of these conditions apply to Scotland. Our wind generated surplus will be expensive, uncontrollable, saleable only to England, and any profits will go to private companies, mostly owned by German and Spanish shareholders or the French government.

One exporter that does NOT make a profit is Denmark, which has the most expensive electricity in Europe. With 20% of its capacity in wind, at times of surplus wind it is sold at the bottom of the market. Its customers are Germany, whose own wind generation will be peaking as well, Sweden, which has plenty nuclear and hydro capacity of its own, and Norway.

Norway is a major power exporter, having several times as much hydro capacity as it actually needs. It uses this for energy expensive industries such as aluminium smelting. Norway is happy to obtain nearly free extra power at the Danish taxpayer and consumer's expense. This also makes a nonsense of the idea that we might build a link to Norway to sell them electricity at a profit.

So, contrary to Salmond's implicit assertion that Scotland will make money out of its renewables generated surplus electricity, our country will make nothing at all. In fact, we will all be worse off because we are all footing the bill, via increased electricity bills (both directly and indirectly), for the Scottish Government's current almost pathological fascination with renewables. And there's more bad news for the First Minister and the SNP; it can only get worse if Scotland's becomes independent. Why would the rest of the UK and Europe pay inflated prices for electricity when they can get it much cheaper elsewhere?