

## Submission to the Energy Inquiry 6 August 2017

About five years ago I went to the Scottish Parliament to talk to an eminent Scottish Politician about how damaging the policy on Wind Turbines was to Scotland. I gave details of costs, who was building them and the effect it was having on the Electricity Demand Curve. After 40 minutes I realised that he had started to switch off understanding the problem. When I asked what he was thinking he told me that politicians could not be experts in all subjects and the Scottish Government left it to the Royal Society to keep them straight on this subject and politicians did not need to understand it at all. Now I have seen the composition of the Committee from the RS it brings to mind the saying about the asylum. There is nobody keeping the price down for the electric consumer or solving the problems of the Demand Curve.

In the last nine years there have been nine Ministers in charge of the Department of Energy in its different forms. Politicians keep telling me that the Old Age Pension is sacrosanct. Well my OAP in 10 years has gone up 30%, thank you very much, in the same time my private pension from a fully funded scheme has gone up 23%, but the cost of electricity has gone from 6 p/kWh to 15p/kWh a whopping 150% increase. There is nobody on the side of the electricity consumer to keep the price down. The public are being conned as shown by various politicians stating on TV that our Electricity Bills are coming down and how terrible it is with the number of people in fuel poverty. It must be the six big bad electricity companies. This reduction has nothing to do with the price of electricity dropping but all to do with the electricity consumption reducing due to more efficient appliances, LEDs, and better insulation. Only the rich can best afford to purchase lots of new equipment to reduce their consumption. I have achieved it by designing and building a new house, and changing from electric heating to oil and so my electricity consumption has dropped so dramatically that I am using only one third of the units. That sort of reduction is impossible for the average consumer let alone for those in fuel poverty.

For simplicity I shall drop the unit of electricity per kilowatt hour (/kWh) and shall refer to the price of a unit as 15p. I shall also reduce the unit of £/MWh for large plants beloved by the press because it confuses the public and quote all these in p/kWh.

Looking at various forms of electricity we have a range of prices. These will be used in the later paragraphs. It is difficult to obtain actual up to date figures for electricity as the companies make the subject so complicated. All these figures are actual based on specific examples. They thus can be used as a guide to compare the problems in the market place.

### Rates paid to Generators

Nuclear and Gas Turbine run economically 2.5p

Coal again run as base load 2.8p

Wholesale price paid to generators 4.0p

Drax wood burning chips 5.5p

Large scale PV built in 2017 7.0p

Large on shore wind 8.6p

Future Nuclear promised by the government 9.2p

Small Hydroelectric 15.6p

Biomass 15p

Farmers wind turbines 17p

Off shore wind turbines 16.8p

Domestic PV 16.5p to 52.4p

Typical Domestic prices subject to exchange fluctuations

Scottish house 15p

Germany 19p

Denmark 21p

France 12p

Cyprus 16p

USA Texas Houston 6.9p

USA Texas Country 9.2p

USA Chelan Washington State 1.75p

The Scottish Government keep calling for wealth creating industry but electricity is a service not an industry. The wealth creation part is in the design, manufacture, and sales of equipment to other countries that is so well done by Germany and Denmark. Norway has just built five floating off-shore wind turbines which are being towed to UK waters to be connected to the British Grid and pick up all the subsidies. At eight times the price for which we could generate electricity, it illustrates the distortion that the Government has created. It is not easy to know the industrial price of electricity because companies hide behind commercial confidence. But over the last decade various industrial companies have closed down. The aluminium smelter at Burntisland has lost all its jobs and been replaced by hundreds of houses. With JCB, Old Man Banford used to proudly say he sources over 90% of materials from the UK. His Grandson now says he only sources 29% from UK. The foundry in Falkirk which used to make castings for JCB was closed down and the equipment shipped to Turkey where they now make the castings and the shipping of components releases more CO2. It was new regulations that closed the factory, in other words Government interference. Texas Instruments wanted to renew all the machinery in their Glasgow factory to manufacture a new range of components. They closed the factory. Is it surprising when the domestic price of electricity in Glasgow is 15p and the Houston price is 6.9p ? How does Rolls Royce in Glasgow compete with Boeing? A Boeing worker in Washington State goes home to Chelan and his annual electricity bill is £150. The Rolls Royce worker in Glasgow using the same amount of electricity pays £1,200.

Let us look at costs that make up the domestic bills we have to pay for electricity.

Purchase price paid to the Generator. This ranges from 2.5p to 52.4p

Transmission costs

Distribution costs

Metering costs

Capital Write Off Allowances

Administration and IT systems

Tax

Profit

The average wholesale price paid to generators is 4p and the domestic price is 15p so the difference between these two figures pays for all the above. The market is dictated by the Government and not economics. Why should we have to compulsorily buy electricity from unscheduled offshore wind at 16p and sell it at 15p? Worse is the buying of 52.4p electricity and selling it at 15p. Madness, but I will come to that later.

It is worth noting that Capital Allowances for tax purposes plays a large part. The Denny Line was estimated at £160 million and came in at £860 million. This was welcomed by the Scottish Government as they thought it was wealth creating but in fact it was money churning. There was wealth creation for quarry owners who have to produce the road stone. I met a delighted quarry owner for the Whitelees Wind Farm. A dozer driver I know worked on the project and told me he created 64 km of new tracks for phase one to get the gigantic cranes to the turbine positions. This investment can be off-set against tax of course. The Denny line is not even running at a third of its capacity and there is a further £1 billion being spent on extending the line to non-existent tidal generators.

Electricity is something that anyone can switch on and use at any time of the day and night and this results in the Demand Curve. This has to be fully understood because it governs the price structure for electricity. For the last 50 years it has hardly changed and in 1974 the expectation was that it would peak at 60 GW in the near future. In fact it took until 2016 for this to happen because so much industry was closed down due to interfering policies. We have no effective storage for electricity and the winter demand peak at about 5pm is about one and a half times the trough in the small hours of the morning. So for every two generators running at 5am another has to be run to meet the peak load at 5pm. The summer curve is similar but runs down to nearly half the winter load. In other words for every five power stations running in the winter two have to be shut down in the summer. Remember the running stations are cranked up and down which causes thermal stresses and high maintenance costs. For those off line the fixed costs are still the same with no revenue coming in. So when they do come on line they have to charge a much higher price to recover their costs. Who cares about increased costs? Just add it to the bills and blame the big six.

So when a new policy such as building Wind Turbines comes up why has a complete disregard for the effect it will have on the demand curve been allowed? Electricity from wind has to be used in priority to other forms of generation. Worse is if that power cannot be used and a Wind Turbine is switched off, a rate higher than the price it would have received is paid to the owner. Why have contracts been let to allow this - because there is no-one on the side of the consumer checking they are receiving a fair deal. Wind being intermittent and unpredictable is unable to replace any power station. There always has to be 100% back up to cover the demand when a large high is sitting on the UK and there is no wind. The Irish have proved that their back-up has reached the stage where no further CO2 reduction takes place for new wind turbines but in Scotland we are so far past this point that no-one dares look at it.

The Scottish Government has just authorised five floating turbines built and funded in Norway to be moored off our coast and supply electricity into our grid. The going rate for off shore wind is 16p and the foreign company doing this is doing it solely to make money from the UK subsidies. We have to buy this electricity when it is generated even if it is at 5am on a summers morning when Scotland's load can be matched by output of Torness. If I stood beside the milk rack in the local supermarket beside the £1 for 4 pints of milk and beside it on the adjacent shelf were identical plastic 4 pint containers showing the price of £4 each and a customer came along. If I said “You have to buy the £4 milk until the shelf has run out before you can buy the identical £1 milk”. What would they think? They would think I was absolutely bonkers but they don't realise that this is exactly what the energy policy has been set up to do. There is no other commodity in the World where the more expensive identical item has to be purchased before the cheaper one.

PV (PhotoVoltaic) has been encouraged in UK in a big way. There is more PV installed in UK than in Spain. The problem here is that the 3 months in the winter when the demand for electricity is at its highest PV produces less than a single month in the summer. In the summer on a sunny day the PV panels can produce their peak rating in the middle of the day. The following day can be cloudy and the output drops to 10 %. The electricity has to come from somewhere else. The original domestic PV panels, when the subsidy was introduced, are now paid for generated electricity at 52.4p and then it is sold to the customer at 15p. What sort of economics is that?

We are constantly fed on renewables misinformation or as a Trump adviser said the other day the Alternative Truth. It is true that subsidies are coming down, a domestic PV installation in 2011 is paid 52.4p and a 2016 PV installation is only paid 16.5p. The Deputy Chief Executive of RenewableUK had a letter in the Times that said that the latest model of offshore turbine will operate at 47.7% and onshore operate at above 30% which he equates to the load factor for gas at 30.5% and coal at 47.9%. He finishes with the claim that wind will by 2020 produce 20% of our electricity and is the clean and low cost way of reducing our carbon emissions. What this does illustrate is that the gas generator is constrained off the Grid and runs for less than a third of the time it could run, and so will require three times the price for its electricity to make it viable. This of course plays into the hands of the renewable lobby as they want the basic price to rise. They were delighted when the Government promised the Nuclear plant 9.2p.

The latest cry is storage. Our pumped storage cannot even meet the 5pm peak on the Demand Curve. The newspapers were proudly writing about a new 5MWh storage battery to store surplus wind turbine generated electricity. The costs were not published but the poor electricity consumer is paying. If you take typical efficiency costs of Transmission 97.5%, rectification 95%, inverters 95%, and Distribution at 97.5% then the Wind Turbine purchase price of 16p by the time it is sold back to the consumer is 18.6p. This of course does not include the capital costs of the batteries for Capital Allowances or the staffing , metering, maintenance, and running costs. Worse is the fact that the battery will hardly be fully charged

and can not be fully discharged so the effective capacity will only be about 70%. This battery will not even cover two wind turbines worth of electricity.

The Government now talks about all cars being electric by 2040. This will require a new electrical generator built for every one we have running now. Completely impossible, we cannot even build one nuclear power station in 10 years let alone 20 which would be needed to cover the fuel used by cars. We are spending £1 billion on Smart metering. The problem is these are not Smart meters. All they show is consumption and have no ability to control the load. As usual they have been misnamed and the public have been conned again. The novelty of seeing the actual cost of electricity in the house lasts less than a month and then it is ignored so this expensive exercise has just removed the meter reader going round. Of course without someone inspecting the meter there will be an increase in people stealing electricity.

## **The Future**

For 8,000 years wealth has been created by making things and trading them. Most civilisations have grown in wealth by using as a source of energy based on slaves. Most civilisations have flourished by bottom up development and trading. Then along comes power, dictatorship and bureaucracy which stifles the trading and the people lose their wealth and revert to subsistence living. The big change came when we discovered new forms of energy better than slaves and timber. First came coal, then oil, gas and the most convenient electricity. Energy in these forms did away with slaves in its various forms and we now live wealthier, longer and rewarding lives.

It seems that people love a pessimistic story and the media in all its forms creates a fear and then build on it. There have been so many panic stories over the last 50 years it is hard to remember them but I am sure the world and civilisation should have ended at least 15 times and I am still here! Nuclear War, famine many times, flu, global cooling and a new ice age, acid rain destroying all the trees in Europe, CJD, AIDs, running out of oil, floods, coastal erosion, melting ice, and the current one Global Warming.

Global Warming is an excellent one as it involves everyone and is nearly impossible to prove what damage it is doing or can benefit by increasing the CO<sub>2</sub> in the atmosphere allowing the greenery to grow better. It can be used to trigger all sorts of action. Of course we should develop more sustainable systems and try and use less energy to do the things we need. All predictions assume that we will continue to do the same things we do now and at the same rate of consumption. This is rubbish as history shows we change all the time. Who predicted 15 years ago the use of modern phones and the internet? I need a new piston and rings for my 1976 chain saw, I dial up the internet, find it, order it and 2 days later it arrives in the post. That saw is 40 years old and I can still repair it, absolutely amazing.

I read in the papers that in May an interesting couple of figures came out. If you leave out oil as it is so volatile, the Scottish economy is running a £9 billion a year deficit. The second figure was Germany ran a 19 billion Euro surplus in May alone. Germany encourages trading. Scotland can not rely on Whisky, Tourists and Tunnock Tea cakes. It is absolutely essential to keep the cost of energy down especially electricity. Scotland is generating the most expensive electricity it can. The English and Welsh subsidize the renewables in Scotland to the tune of £840 million per year. That on top of the extra £1200 per person per year paid for every individual in Scotland by the taxpayer south of the border. This is very unpopular. The reason for this is Politicians setting targets that they have no ability to meet and do not understand them. From this comes top down policy that is hugely damaging to wealth creation and the poor. Fuel poverty is on the increase. At the same time the wealthy are investing in these schemes and making lots of money. What is even worse is the number of investors living outside Scotland and so the money does not trickle back here.

What is now needed is to stop the present smart metering installation until a controlling smart meter can be installed. We need to reduce the cost of electricity generation by stopping all new development of wind turbines especially off shore. But most important of all is to work out how to flatten the Demand Curve and cater for the charging of future electric cars.

I am willing to attend a Committee Meeting to elaborate or support my case.

M. C. Travers CEng, FIET, MIMechE.

#### Short Resume- Mike Travers

Geodetic Surveyor

Design Engineer Hydroelectric in Pacific Northwest

15<sup>th</sup> Edition of Wiring Regulations – Member

Design Engineer for Petrochemical Plant

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