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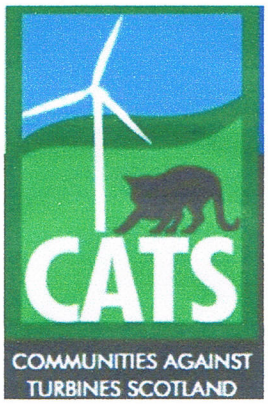
The Scottish Government's First Annual UPDATE of its 2020 Routemap for Renewable Energy

An Overview on Behalf of Communities Against Turbines Scotland

November 2012



Overview of the Scottish Government's First Annual UPDATE of its 2020 Routemap for Renewable Energy

INTRODUCTION

On 30th October 2012 the Scottish Government published the first annual update to its 2020 Routemap for Renewable Energy in Scotland. http://www.scotland.gov.uk/Topics/Business-Industry/Energy/UpdateRenewableRoutemap

Stuart Young Consulting Ltd has been engaged by Communities Against Turbines Scotland (CATS) to provide an overview of the UPDATE and its associated reports.

This overview simply identifies the key issues in the UPDATE and provides sufficient comment and reference to support the observations made. No comment has been made on Planning Issues as there will be ample opportunity when the draft revised Scottish Planning Policy comes out to consultation in Spring 2013.

About CATS

Communities Against Turbines Scotland is an umbrella group representing communities and individuals struggling against the relentless development of wind turbines.

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OVERVIEW

The Scottish Government's "**2020 Renewable Routemap for Scotland – Update"** is, like the Routemap itself, seriously flawed in a number of respects.

- It is not supported by a competent Environmental Assessment and therefore may not actually be lawful.

- It consistently conceals the magnitude of the cost of implementation of the Scottish Government's targets for generation by renewables through mistaken information and failure to reveal known and predictable outcomes.

- It assumes a market for surplus electricity which probably does not exist.

- It assumes that technologies which do not currently exist in deployable volumes will somehow become available in time to facilitate meeting the Government's generation targets.

OBSERVATIONS

Environmental Impact Assessment

The **2020 Routemap for Renewable Energy in Scotland** was published in July 2011 without an appropriate Strategic Environmental Impact Assessment having been carried out. In June 2012 Communities Against Turbines Scotland (CATS) submitted its response to the Government's retrospective **Strategic Environmental Assessment (SEA)** consultation. This response by CATS shows without a doubt that the SEA "simply does not address the requirements of EU Directive 2001/42/EC on Strategic Environmental Assessment".
http://www.communitiesagainstturbinesscotland.com/?wpfb_dl=43

Concealment of Magnitude of Cost

The examples shown below are not exhaustive, but they are shown to demonstrate just some of the instances where the reader is misled or simply not informed. The presence of any one of these examples is enough to indicate that the entire UPDATE suite of documents should be read with extreme caution.

Example 1

Under paragraph 2.8, we find:

"• The latest figures available on the Renewables Obligation (RO) show that it would have cost domestic consumers in Scotland a theoretical maximum of just over £15. Over the next few years (until 2017), estimates suggest that this will rise to £50."

It should be noted that this bulleted statement does not make it clear whether it is a single consumer or a single bill-payer, nor is it clear if the £15 and £50 figures are cumulative-to-date or per annum.

The figure of £15 is one which is frequently cited by the Scottish Government as the cost of the Renewables Obligations (RO). It assumes that only the element of the domestic electricity bill which relates to the RO is paid for by the populace. That is not so. The initial cost of the RO to industry and commerce through their own electricity bills is passed on through the price of goods and services, and ultimately the total cost is borne by the 62.5 million people in the UK.

The average household comprises 2.4 people, and the estimated cost of the Renewables Obligation in 2011-2012 was £1.764 billion.
http://www.ons.gov.uk/ons/dcp171766_259965.pdf
http://www.ref.org.uk/publications/238-the-probable-cost-of-uk-renewable-electricity-subsidies-2002-2030

Therefore:

- In 2011/2012 the £1.764 billion estimated cost of the RO was borne by 62.5 million people or 26 million households.
- That was £28.22 for every man, woman and child in the land or £67.73 per household.
- This figure is expected to nearly double for 2014/2015.

It is particularly disappointing to find the £15 figure being quoted in the UPDATE. On Saturday 22nd October 2011 the author met with Fergus Ewing MSP, Minister for Energy, Enterprise and Tourism who has responsibility for the Routemap and the UPDATE. The true RO cost was explained to him. He listened carefully. Mr Ewing left the meeting with a pre-prepared aide memoir to the topics which were discussed and which included:

"PRESENTATIONS.
The true cost to the consumer of wind power including transmission upgrades.
We are aware that the Minister has recently been briefed by Mr Colin Gibson and Members of the Royal Academy on the technical aspects of transmission and associated costs, and that he will be aware of the nature and scale of transmission reinforcement that is needed to accommodate wind energy on the grid.
The true cost of wind energy is not just the element that appears in electricity bills. The cost of the Renewables Obligation which is met by commerce and industry is ultimately paid for by the consumer.
Beauly/Denny transmission upgrade has just started and is already expected to be double its estimated cost. The Parliament Building and Edinburgh Trams spring to mind. It will deliver wind energy to Central Scotland which is already overprovided for. The consumer will ultimately pay for Beauly/Denny and all other as yet uncosted transmission reinforcements.
There is inadequate cross border capacity to export wind energy to England. It is perverse to generate energy and provide the means of transporting it only half way to its point of need. However this is resolved, the consumer will bear the cost."

Example 2

"Grid Access, Reinforcement and Charging
Overview
2.10 Early in 2012 Ofgem announced the biggest upgrade of Scotland's electricity infrastructure in 60 years, with up to £7 billion of investment from Scottish Power and SSE, quadrupling Scotland's export capacity to the rest of the UK by 2018."

It is not made clear that the £7 billion is ultimately paid for by the electricity consumer. If shared across the UK, that works out at £112 per man, woman and child (£269 per household). If it had to be paid for by Scottish consumers alone, then the *per capita* cost would be over £1,300 (£3,200 per household).

It is a harsh reality that costs of infrastructure projects tend to spiral. The Beauly to Denny Overhead Transmission Reinforcement was estimated at around £400 million when the sums to justify consent were done. That rose to around £600 million before work started. History tells us that that is likely to increase again before the work is finished.

We have recently heard that the estimated cost of the Western Isles subsea cable link has doubled to £750 million.

All overrun costs are also ultimately paid for by the consumer.

Example 3

The following is an extract from the **2012 Draft Energy Policy Statement** which accompanies the **UPDATE.**

"The Regulatory Challenge
83.
We support electricity regulatory frameworks that accelerate renewable deployment, improve grid access and remove barriers to grid connection and To address the unacceptable waiting times for renewable projects waiting for a connection, the Scottish Government worked with the UK Government to support "connect and manage" approach to give developers more reasonable connection dates ahead of reinforcement work to the transmission system, with socialisation the constraints management costs across all grid users.

84.
Since it was introduced in August 2010, 73 large generation projects, comprising approximately 26 GW, have advanced their expected connection dates as a result of the Connect and Manage regime. 58 of those projects are in Scotland given early connection and an average reduction in connection date of 6 years." (Sic)

"Connect and Manage" is the name given to a regime which has no place in an engineered transmission system. Essentially, windfarms were allowed to proceed before the transmission capability was in place. The inevitable "management" comprises making payment to windfarms to shut down when demand is low and wind output is high, thus threatening grid stability. In spite of the Scotland/England cross-border transmission capacity having recently been upgraded as part of the £7 billion investment referred to above, during the period 9th to 14th November 2012 alone just under £750,000 was paid to Scottish windfarms to shut down because there was no capacity on the grid for their output. In excess of £30 million has been paid to constrain off wind generators to date. http://www.ref.org.uk/constraints/index.php http://www.ref.org.uk/press-releases/249-ref-calls-for-transparency-over-secret-wind-power-constraint-payments

It will be at least three years before the proposed east and west coast subsea cables will be operational and that will only add 3.2GW export capacity which by that time will, in all likelihood, be swallowed up with output from newly constructed windfarms. We can only look forward to wind energy constraint events increasing in frequency, magnitude and cost.

The argument advanced by the wind industry and Government that constraint payments to wind generators is no different to payments made by National Grid (NG) to conventional generators for grid balancing purposes is a false one. NG has arrangements with multiple generators (the Balancing Mechanism) whereby it can call for more or less electricity production to balance the supply of electricity with fluctuating demand. Wind generated electricity cannot be called for on demand. There is no such control possible. The only control mechanism available with wind energy is to turn it off.

When demand is low and wind output is rising, NG will constrain off conventional generators to allow space for the wind generated electricity. It does this for two reasons: a) conventional

generation is cheaper to constrain off than wind generation, and b) NG *must* take renewable generation when it is available.

If the wind keeps rising, NG gets to a point when it has no more conventional generation available to be constrained off. The correct engineering solution to a threat to grid stability is to switch off that part of the system where the problem lies, but that means disconnecting the customers in that area.

Disconnecting customers is not desirable, either in practice or politically, therefore the grid operator must constrain off the surplus wind energy to maintain services. In this situation the wind generator is in a strong bargaining position and can command inflated prices to shut down. Conventional generators participating in the Balancing Mechanism are compensated at levels which equate to actual losses.

Constraining off wind generation is not an act of balancing the grid. It is an emergency intervention to prevent the grid being destabilised by having unwanted electricity being poured into it. It is ironic, to say the least, that the very source of the threat to grid stability can profit in such a manner.

Example 4

The UPDATE is self-congratulatory in respect of the advancement of FiTS and microgeneration. It does not explain that while the amounts of electricity to be generated by FiTS-funded generating means will make little difference to meeting targets, the costs are disproportionately high and these are borne by electricity consumers.

- A single 10kw wind turbine operating at 25% Load Factor for one year will cost consumers £6,132 for producing £1,100 worth of electricity.
- A single 500kw turbine will cost consumers £225,000 for producing £55,000 worth of electricity.
- Solar panels are similarly subsidised by the ordinary electricity consumer.

The Market for Surplus Electricity

A market operates by people buying a commodity in the quantities they want at the times they need it and at a cost that is acceptable to them.

A market does not operate by offering a commodity for sale in random volumes at random times and at prices much higher than the customer has to pay elsewhere for the same commodity.

England is the principal target market for surplus Scottish wind generated electricity. Because there will be times when there will be little or no Scottish wind generated electricity at all, then to be able to use the surplus electricity England would have to make alternative arrangements for generation when Scottish wind generated electricity is negligible, let alone a surplus. And indeed, make arrangements for all generation conditions between feast and famine. That necessity involves policy questions well beyond the competence of the Scottish Government.

Regardless of the issue of proposed Scottish independence, the English consumer will come to understand that he is being required to forego his own conventional generation in order to buy Scottish onshore wind generated electricity at (more or less) twice the basic cost. To add insult to injury, he will frequently have to pay for onshore wind energy to be constrained off to allow him to buy offshore wind energy at four times the base cost of conventional energy. And he is allowed to pay for the infrastructure to enable this to happen.

The customer has to be happy with the deal he is being offered. England is unlikely to conclude that reliance on Scottish surplus wind generated electricity is a good deal.

For any business to embark on a huge investment without adequate market research, and securing the bulk of its future customers, is commercial suicide. For a nation to do it is beyond belief, or should be, but it is actually happening now.

Undeveloped Technologies etc

The UPDATE lists millions of pounds of investment to facilitate renewables research, development and support. The European Marine Energy Centre in Orkney was established in 2003 yet there is not one single operational commercial-scale wave or tidal device deployed in UK waters nine years on. The undernoted extract from the Scotsman is a pretty good barometer of how far we are from commercial energy extraction from wave and tidal resources. The highlights are mine.

"Published on **Wednesday 14 November 2012 00:00**

Orkney-based Scotrenewables Tidal Power has secured a lease from the Crown Estate to develop a **30 MW tidal stream array** at Lashy Sound in the Pentland Firth.

This follows the company **testing a 250 kW device** at the European Marine Energy Centre (EMEC) in Orkney. The project is one of three tidal energy projects that the Crown Estate gave the green light to yesterday. Others included the Solent Ocean Energy Centre off the Isle of Wight and another project near Strangford Lough, Northern Ireland."

Extract from the UPDATE:

"Energy Storage
4.2 Electricity storage already plays an important role in optimising Scotland's power network system, with the pumped hydro storage facilities at Ben Cruachan (440MW, Scottish Power) and Ben Foyers (300MW, SSE). Energy storage will play an increasingly crucial role in enabling the power grid to effectively manage the increased proportion of variable energy inputs alongside interconnection and demand side measures. A wide range of technologies, at varying stages of development, and applicable at various scales offer options for storage, including hydrogen, compressed air, and batteries"

Cruachan can operate for a maximum of 22 hours before the reservoir is empty, Foyers for 21 hours. They can't operate again until they are replenished. Pumped storage is a hugely expensive way of supporting wind energy for short periods.

None of the "wide range of technologies" is remotely well enough developed to provide any useful storage volumes. It is normal, in developed countries, to plan energy policy around what is known to be achievable, not what is hoped to be achievable.

"4.3 Energy systems balancing is also likely to play an enabling role which supports the effective integration of renewable energy. This makes use of technology opportunities to bridge between different energy systems, for instance with 'grid-to-gas' using electrolysers to convert electrical power into gas energy for distribution via the gas networks."

Note "*likely to play…*".

With regard to "grid to gas", see http://www.fuelcelltoday.com/analysis/analyst-views/2012/12-10-24-putting-the-wind-up-fuel-cell-electric-vehicles. This is the relevant extract:

"The wind farms that are paid most heavily to constrain their supply, predominantly in Scotland for the UK, should be targeted first. Electrolysers could be deployed at these sites, producing hydrogen for grid injection; then, when the time comes hydrogen can either be dispensed locally or delivered to refuelling stations nationwide."

In order to effectively harness wind energy from remote sites, it seems we have to extend the gas grid as well. Can hydrogen simply be injected into the present gas transmission system? It sounds unlikely.

"4.6 The Scottish Government is engaging with engineering institutions and other expert stakeholders to get a better understanding of the mechanics, issues and costs involved in energy storage, as well as the effectiveness of the policy levers and proposals in this area."

The logical approach is to get the understanding first and only then, if appropriate, adopt energy storage as policy.

Concluding paragraph

The **2012 Draft Electricity Generation Policy** which forms part of the UPDATE suite of documents includes this:
"4. The Scottish Government's policy on electricity generation is that Scotland's generation mix should deliver:

- *a secure source of electricity supply;*
- *at an affordable cost to consumers;*
- *which can be largely decarbonised by 2030;*
- *and which achieves the greatest possible economic benefit and competitive advantage for Scotland including opportunities for community ownership and community benefits."*

It is clear that the first two objectives at least cannot be met via the Routemap and its UPDATE. It is difficult to avoid the conclusion that Scottish Government Energy Policy is not fit for purpose.

Stuart Young
November 2012