

DTI Consultation:

Adjusting Transmission Charges for Renewable Generators in the North of Scotland:

Deadline 19th October 2005

Response by Dr N. Keith Tovey, Energy Science Director, CRed Programme, HSBC Director of Low Carbon Innovation at the University of East Anglia, Norwich NR4 7TJ. k.tovey@uea.ac.uk.

The CRed (Community Carbon Reduction Programme)

The CRed Programme has core funding from EEDA (the East of England Development Agency) and has been taking up the challenge declared in the Energy White Paper (2003) to move towards a low carbon economy. It goes further than a 60% reduction by 2050 by recognising the importance (as outlined in the White Paper) that significant progress must be made by the 2020s if this aspiration is to be achieved. The CRed target is thus for a 60% reduction in carbon emission within the leading bodies associated with CRed by 2025.

The CRed Programme recognises the need for a multi-pronged approach towards carbon reduction involving technical measures directed at energy conservation, the promotion of renewable energy technologies, and last, but certainly not least the need to engage the public at large, businesses, and other bodies in an awareness campaign particularly directed at the interface of technology and social acceptance of new ideas.

The CRed Programme welcomes the opportunity to comment in the present consultation in so far as it could have an impact on the future development of renewable energy and hence the potential to reduce carbon emissions in the UK as a whole.

The following submission comments on some of the specific questions raised, but also considers some of the policy issues for which no specific question was raised in the consultation document.

Format of this Response

This response first considers some issues of policy before considering specific answers to some of the questions posed in the Consultation Document.

The Present Situation for Charging

As indicated in the Discussion Document "Adjusting Transmission Charges for Renewable Generators in the North of Scotland" the present system for TNUoS charging: (Transmission Use of System), derives from the submission by NGC (National Grid Company) to, and accepted by, OFGEM (Office of Gas and Electricity Markets). The charging is zonal and aims to reflect the differential costs incurred in transmission losses and balancing issues encountered by NGC and in part reflects where there is a surplus of generating capacity over demand. The introduction of BETTA (British Electricity Trading and Transmission Arrangements) on 1st April 2005 removed much of the cross subsidy prevailing whereby consumers in the SHETL and SPTL areas subsidised consumers in the south and conversely generators in the south subsidised those in the Scotland, particularly in the SHETL area in respect of transmission charges.

The move from NETA to BETTA means that any renewable generators connected to the transmission system in Scotland pay substantially higher transmission charges than their counterparts, particularly in the south west (where they are effectively subsidised). However, all generators, not only renewable generators, are affected equally by the charges in a particular zone. Where renewable generators do gain compared to the situation prior to April 1st 2005 is the removal of the charges associated with the inter-connector between England and Wales and Scotland.

The situation is clearly complicated by the historic difference in definition in transmission as opposed to distribution north and south of the border. Renewable generators in England and Wales are all under 100 MW and are connected at 132 kV or less and thus incur no transmission charges although they clearly incur

distribution charges levied by the relevant DNO. In Scotland, there are renewable generators connected at 132 kV which is classified as transmission and herein lies part of the problem which this consultation is attempting to address.

Issues of Policy as outlined in the Discussion Document: Document “Adjusting Transmission Charges for Renewable Generators in the North of Scotland”.

Orkney, Shetland, and Western Isles.

The main thrust of the Consultation Document relates to charging in Orkney, Shetland, and the Western Isles. Yet, according to the National Grid Seven Year Statement (Appendix A, Fig.A-1-1) there appears already to be a transmission connection at the 132 kW level to the Island of Lewis (Harris), and in Fig. A-1-3 it would appear that the Western Isles are already part of TNUoS Zone 3 (Skye). It is unclear why there this charge cannot be applied as it presently stands, or is the discussion relating to a HVDC link to the Western Isles based on the assumption that the existing capacity is insufficient and that ultimately a new charging zone would emerge.

The time scale for the consideration is up to an including 2014, and it is questionable whether links to all the three Islands Groups would be built in sufficient time for them to benefit from this relatively limited time scale.

It is true that the Western Isles and Orkney and Shetland have a significant potential for renewable generation. However, in view of the long distance for transmission (for Shetland) and the associated increased transmission losses there must be questions on overall policy as to whether such a long transmission line makes sense or that it would be completed in the time frame. This consultation, at least as far as Shetland, goes would seem to be more academic than real, unless it were planned to route the Norwegian inter-connector (which has `currently been delayed) via Shetland. The large losses in long distance transmission might be better addressed using hydrogen as the energy vector – i.e. hydrolysing water and transmitting this gas which has the advantage of storage possibilities as well as being an energy dense medium. Such a move could provide the necessary impetus for cleaner fuels – whether by fuel cell for electricity generation or for transport motive power. Holding out the possibility for reduced transmission charges and an inter-connector might hinder innovative development like this which may well be much better in terms of the Government aim of reducing carbon emissions.

While the existing 132 kV line to the Western Isles could no doubt be exploited further for similar reasons to those advanced for Shetland there should be further consideration of alternative uses of renewable generation when the capacity of the existing line is exceeded (e.g. using hydrogen as the vector).

The relative close proximity of Orkney is a different matter, and there is considerable scope if such a transmission link were in place to exploit numerous renewable energy sources. These include removing the current restriction on maximum output from the European Marine Energy Centre at Stromness and the possibility of over 100 MW capability from utilisation of the existing Churchill Barriers for exploitation of tidal energy.

In Orkney, in particular, there is the potential in the next ten years of a much more diverse system of renewable energy generation than perhaps Shetland and the Western Isles, and serious consideration should be given to differential adjustments in TNUoS based on technology (e.g. marine current, wave etc). In particular the potential for increased adjustments (over and above those proposed, with possibly reduced adjustments for those technologies such as onshore wind which are more viable at least for next 10 years) should be considered

North of Scotland

CRed concurs with the Government belief that the current zonation for TNUoS charging are somewhat arbitrary. It would make more sense to use a North of Scotland area, but the definition in the Consultation Document (Page 18) is also vague as it crosses several counties. It would appear that the area referred to is

the mainland SHETL area and this makes more sense for a clear definition. In the discussion it is assumed that Zone 3 (Skye) is part of North of Scotland and not part of the Western Isles.

The issue regarding TNUoS adjustments needs to be considered in the light of promoting the best opportunities for Renewable Electricity Generation without providing an advantage for those schemes which might have gone ahead regardless. On page 15 of the Consultation Document the following is raised:

"A particular risk associated with putting an adjustment scheme in place is that it could create perverse incentives for renewable generators to locate in the area in which charges are adjusted, when they would otherwise have located elsewhere."

A review was done to examine the likelihood of this being an issue in the case of onshore Wind Generation in the SHETL Mainland area. Data of wind speeds from the DTI database at three elevations were used to predict the wind speed at hub height of a typical 1500 kW wind turbine (67m). From a typical wind turbine rating curve and assumptions regarding generator and transformer efficiencies, the predicted output in several locations around the country were made. Many of these locations are at actual sites of wind turbines - a few are located in the centre of some projected developments. The information is shown in Table 1.

	Grid Reference	Actual Wind Farm	Annual output (MWh)	Income from electricity sales (£)	Charging Zone	TNUoS Charge	Net Income (£)
Peninsular	SX9068	Yes	5361	483834	21	-8.04	495894
Midlands	SP2583	No	3431	309625	15	1.32	307645
Mid Wales	SN9195	No	6646	599831	15	1.32	597851
East Anglia	TF8310	Yes	3681	332203	14	3.12	327523
East Anglia Coastal	TG4819	Yes	3273	295396	15	1.32	293416
Lewis	NB3040	No	5661	510924	3 (Skye)	23.10	476274
Caithness	ND1745	Yes	5321	480177	2	20.93	448782
Orkney	HY3425	Yes	8865	800052			800052
Shetland	HU4252	Yes	9379	846473			846473
Lake District Coastal	SD1380	Yes	3986	359773	11	4.91	352408
North East	NZ3281	Yes	3445	310924	10	8.09	298789
South of Scotland	NT6060	No	7639	689462	9	11.82	671732

A projection of income from the sale of electricity from the same wind turbine at the different locations is included. This income assumes that the effective price of a ROC is around £50 per MWh, the wholesale price is around £35 per MWh and allowances are given for Climatic Change Levy exemption etc. It is apparent that the projected output for those in the North of Scotland is less than those in several locations in the south and thus the extent of possible relocation as a result of adjustments to the TNUoS charges would seem to be minimal. Indeed the charges will be small relative to the income. The other charges for implementing a project, such as site specific construction costs and interest charges, will affect the viability of a particular scheme, but on the proposed charging levels it is unlikely that there will be much, if any, relocation of projects in the North of Scotland arising from any adjustments to the TNUoS charges.

There would seem to be relatively little justification to provide onshore wind generators with additional advantages. However, most other forms of renewable generation including offshore wind are still likely to be very marginal in cost effectiveness even with the proposed levels of discount and technology based adjustments should be considered in this region.

Redistribution of Costs following Adjustment in TNUoS Charges for Renewable Generators

It makes sense to redistribute any effective rebates to renewable generators so that the scheme is cost neutral overall. Where possible, the redistribution should be made to enhance the regional zonal supply charges rather than being distributed uniformly over all customers. Rather than a uniform charge, this charge should

reflect the proportion of renewable generation within each of the supply (i.e. DNO) regions. Thus the charges should be redistributed only among customers in the supply areas which are below average in renewable generation. Such a redistribution would enhance the reduction of carbon dioxide emissions as this would tend to encourage more local generation of renewables as outlined in the Energy White Paper (2003).

While a variable redistribution on regions would help an even better redistribution would be on Local Authority Districts in proportion to their shortfall from average. While initially this might be difficult to implement under the present Energy Act, it should be considered for the future as this would also send signals to Planning Authorities to implement renewable energy policies consistent with the Government expectations of carbon dioxide reduction.

Responses to specific Questions

Question 2 (Scottish Islands) Are particular types of development more like to be affected?

The increased wind speeds in much of Orkney and Shetland suggests that renewable generation by onshore wind could well be cost effective even with the proposed charges. However, there must be questions on a scheme including Shetland and the associated transmission line as this might divert from alternative methods for promoting schemes e.g. hydrolysing water and using hydrogen as an energy vector instead of electricity. If a UK - Norway HVDC link is constructed via Shetland then this would need a rethink. There is much potential on Orkney including the use of the Churchill Barriers which cannot be used at present. For renewables other than onshore wind, the costs effectiveness is marginal and these should have enhanced discounts above those suggested.

There is confusion over the status of the Western Isles as a 132 kV link already exists. If proposed developed requires additional capacity, then consideration similar to Shetland should be made otherwise charging on the same basis as Skye would seem relevant at the present time.

Question 5: On the basis of the costs and benefits, should the Government put in place an adjustment scheme covering the Scottish Islands of Shetland, Orkney and the Western Isles?

There are questions about the needs for additional connections to Shetland and the Western Isles (see above) as this might otherwise hinder other developments. If, however, either of these go ahead, then in both cases, some adjustment seems relevant. In the case of the Western Isles, the advantages of onshore wind would seem to be only marginally better than several other places in the UK, while on Shetland - it appears much better, but on the other hand the charges for Shetland will be greater. For Orkney there is merit in an inter-connector at the transmission level.

In these circumstances the proposed 50% reduction in the TNUoS charge on the surcharge over and above the highest mainland charge would seem relevant for onshore wind. However, for all other renewable technologies, which are barely cost effective, if at all, consideration should be given to pegging the charge to the highest mainland charge. Since the proportion of such technologies will still be small by 2015 the additional costs of this will be small, but such a strategy would enhance the development of such in the post 2014 period.

Question 6: What impact will GB transmission charges have on renewables development on the mainland of Northern Scotland?

As indicated above in the discussion of policy issues, it would appear that for onshore wind that areas in the North of Scotland are already disadvantaged compared to some areas in the south of the UK, and the extent of relocation of projects into this area should adjustments be made would be very limited in view of the relatively low impact the charges have on overall cash flow. However, as onshore wind is now becoming cost effective, there is perhaps little justification for much adjustment for this resource.

Question 7. Are particular types of development more likely to be affected?

Renewable resources other than onshore wind have questionable cost effectiveness at the present time and any opportunity to encourage development at an earlier date should be welcomed.

Question 10: On the basis of the costs and benefits, should the Government put in place an adjustment scheme covering the mainland of Northern Scotland?

There seems little justification for adjustment for onshore wind in this region, but there should be provision for adjustment for other forms of renewables. However, it is important to continue to reflect the actual TNUoS charges but this applies to the UK as a whole. Offshore wind is perhaps the next most cost effective resource and consideration should be given to the whole of mainland UK, not just the North of Scotland, to reduce the transmission charges throughout the UK for this technology to 75% of the standard zonal tariffs for offshore wind. For non wind technologies the reduction should be to 25%. These reduced charges would still send zonal signals, but would assist the newer technologies to get off the ground and hence enhance the Governments overall aspiration of a reduction of carbon dioxide.

Question 11: Should the specified level above which charges are adjusted be a fixed amount adjusted so that it retains its real value or should it be pegged to the level of mainland charges?

See the responses to questions 2 and 5 above. If any adjustment is made then it should be relative to prices on the mainland so that changes in the charging structure on the mainland will automatically reflect to those on the outer islands. There must be a question whether any adjustment should be made in respect of Shetland and the Western Isles under the situations identified. There are more effective ways to utilise any increased renewable energy capacity which would not be encouraged if there is an effective subsidy for electricity.

Question 13: 50% an appropriate level of discount about the specified level? If not what level of discount should apply and why?

See also Questions 2,5 and 11 above. If inter-connectors are available to the Western Isles and Shetland then perhaps a 50% reduction for onshore wind should be applied. However, for offshore wind the charge should be say 37.5% of the excess over the Mainland Charge (i.e. 75% of 50%), whereas for all other technologies the reduction should be 12.5% of the excess over the Mainland Charge (i.e. 25% * 50%). In the remainder of the UK, there should be a 25% reduction on all positive TNUoS charges (25% increase in all negative TNUoS charges) for offshore wind. Similarly there should be 75% reduction in all positive TNUoS charges (or 75% increase in all negative TNUoS charges) for all non wind renewable charges. .

Question 14: Beyond the requirement for NGC to adjust transmission charges, and the requirement for suppliers to pay additional charges, are there any additional issues that would require modification of transmission and supply licences in order to facilitate the implementation of an adjustment scheme?

It is important that any charges are distributed in a manner consistent with enhancing the likelihood of increased renewable generation. Spreading costs uniformly to suppliers will not address this issue. On the other hand allocating these additional charges on customers in the DNO areas inversely in proportion to the proportion of renewable generation in each area would help to address this. Thus charges from adjustments should be distributed among those DNO areas which have less than average renewable generation, but not on those areas with a higher proportion of generation. In the longer term, the possibility of levying the charges at the Local Authority District level should be explored as this could help renewable penetration from a planning perspective as those authorities with little or no renewable generation would have to compensate those areas with above average renewable generation.