HIE
Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean

Project.transmit@ofgem.gov.uk 4 October 2013

Dear Geoff

Highlands and Islands Partnership Response to Ofgem's Impact Assessment – August 2013

Highlands and Islands Enterprise (HIE) is the Scottish Government's agency responsible for economic and community development across the North and West of Scotland and the islands. Renewable energy resources in the Highlands and Islands constitute the greatest concentration of potentially exploitable renewable energy resources in the UK and the region is well placed to contribute to UK and European carbon reduction and renewable electricity generation targets *if* key regulatory barriers can be effectively addressed to facilitate deployment of renewable technologies.

HIE along with its local partners: the democratically elected local authorities covering the North and West of Scotland and the islands: **Shetland Islands Council, Orkney Islands Council, Comhairle nan Eilean Siar, Highland Council and Argyll & Bute Council** make representations to key participants on behalf of industry to influence the way in which grid construction is triggered, underwritten then accessed and charged for in the region. This is because it has a significant bearing on the economics and deliverability (and hence the exploitable resource) of projects in our area.

Summary of main messages in our response:

- **We strongly support the proposed April 2014 implementation date**
- **We strongly support the principle of an annual Average Load Factor based charge.**
- **We welcome the proposed adoption of a specific counter correlation factor being applied to local circuits where sharing occurs**
- **We disagree with the proposed treatment of HVDC and the treatment of the Scottish Islands but do not wish this to impact on the proposed April 2014 implementation date**

We are pleased to respond to Ofgem's impact assessment on CMP213 and our view is summarised under the following headings:

1. Sharing
2. Treatment of HVDC
3. Island Links
4. Security Factor
5. Implementation

We have provided response to your specific questions later in the document.

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1. Sharing
We support the use of Diversity 1 in so far as it is more cost reflective than the Status Quo which relied on capacity based charging. Evidence supplied to the CMP213 Work Group and to the SCR which preceded it in the Project TransmiT exercise, demonstrated clearly that the simple capacity model did not adequately reflect the true use of the network for intermittent and non-baseload plant. The recent changes to the NETS SQSS (GSR-009) demonstrated a move away from network investment based solely on deterministic considerations and more on a cost benefit model where network sharing is implied.

The split between Peak and Year Round background elements for use in the Transport Model is also supported as an important adjunct to sharing. The initial assumption used, of 0% for intermittent generation for the Peak element in the model seems to be adequately justified.

We do, however, feel that Diversity 1 may need further refinement in future to better reflect possible sharing between intermittent generators within zones and across boundaries. The current assumption for Diversity 1 is that intermittent generation runs at the same time and that counter correlation can only occur when mixed with conventional (carbon) generation.

We believe that the method proposed to calculate Annual Load Factor using 3 of the 5 past year's data strikes the right balance as methods using user prediction would require complex safeguards.

2. Treatment of HVDC (Bootstraps and Island Links)
We are disappointed that Ofgem seem to have discounted the evidence supplied through the Work Group report which supported the view that significant elements of HVDC links – within the Converter Stations - are analogous with fixed (non-locational) elements of the AC network.

Since the Work Group report other evidence is emerging on how HVDC with VSC (Voltage Source Converters) can support the HVAC network by enabling greater flexibility and stability. In particular the ability to quickly change the direction of power flow can make it possible for intermittent (renewables) and thermal (carbon based) generation across boundaries to better service demand – when the wind drops energy can be imported from thermal generation with fast response times. The bootstraps crossing multiple constraint boundaries with increasing amounts of generation from renewables in the north could readily allow faster response import of power from the south in times of lower availability of renewable energy with consequent reduction of constraint costs.

There has also been work done using published data [1]to model the effect in the Shetland Islands of an HVDC link to the Scottish Mainland on the demand customers on the Islands which are presently served by a diesel power station, which is due to be replaced in the next few years. It is worth noting that the Shetland diesel benefit is recovered by SHEPD from customers only in the SHEPD area. This creates a significant burden on a limited group of electricity consumers where bills are already high and where the incidence of fuel poverty is amongst the highest in the UK.
The reactive nature of the HVDC VSC technology would reduce the size of any necessary replacement (back-up) power station, in future, as well as the cost of fuel

[1] 'Shetland Northern Isles New Energy Solutions (NINES) Project Consultation, Ofgem, 5 August 2011

year on year. The cost saving bearing in mind the costs of replacing, maintaining and running a thermal power station on Shetland versus the planned onshore windfarm plus HVDC power flow link to the mainland is estimated to be about £15M per annum.

Given the flexibility, stability and easy switch in direction of power flow afforded by HVDC technology we believe it is counter-productive to penalise generators triggering incorporation of this new technology into key parts of the UK NETS. We would strongly urge Ofgem to revisit its minded to stance on HVDC converters and look again at the benefits to the wider Network, including demand and afford similar treatment in charging as fixed parts (non-locational) of the HVAC system.

3. Island Links

The need to settle a charging structure within TNUoS for the Scottish Islands was a major plank of Project TransmiT with the need to offer stability in use of system costs on the one hand (where expansion factors had been previously undecided) and unlock the Islands' potential for renewable generation to assist in the decarbonisation of the UK generation mix on the other. It is surprising, therefore, that there is little concerning the Islands in the Impact Assessment. WACM2 offers little change from the National Grid's approach to indicative island tariffs ,as far as, both, the (high) level of charging and the stability of the expansion factor – based on a project by project full cost for local subsea links (AC or HVDC). One perceived barrier to investment in new generation on the Islands was the disparity in TNUoS between the Islands and the nearest Mainland charging Zone. For Orkney the difference under Status Quo mainland charges is estimated at (2020) £42.96/kW whilst for WACM 2 (and also the Original and many other WACMS) the difference is increased by a further £5/kW to around £48/kW (figures drawn from CMP213 Code Administrator report - modelling). The other Scottish Islands (Shetland and Western Isles) are similarly affected.

Whilst the outlook for HVDC / HVAC TNUoS equivalence has changed relatively little under WACM2, we are pleased to support the Counter Correlation Factor (CCF) in the context of local sharing on radial circuits. We believe that it will significantly encourage and support sharing of local circuits with multiple users and make such circuits more cost effective to plan and build. The measure in the CUSC will require cooperation between NGET and the TOs, the TOs and the users, and user to user, in order to become effective. It is likely to need some changes to BCAs also in relation to firmness of access. We look forward to working with relevant parties to support proposals to present to the Regulator in due course.

4. Security Factor (Island Links)

We support the introduction into the CUSC of a SF of 1.0 for local, single, radial circuits as it is cost reflective.

5. Implementation

Given the protracted timescales we strongly support early implementation of WACM2, or similar with an effective date of April 2014 in line with Ofgem's minded to position.

Overall we support many of the aspects of WACM2 with the proviso that there is a strong case that HVDC converters, where they provide a similar or improved function to HVAC infrastructure, should be treated as non-locational.

Please find responses to the specific questions in the consultation document below:

Question 1: Do you think we have identified the relevant impacts from NGET's modelling and interpreted them appropriately?

HIE and Partners feel that the relevant impacts are adequately identified through the modelling, both, in the Ofgem Impact Assessment and in the Code Administrator's report. It is possible for users to assess potential impacts to their own businesses using the modelling generated during the process of Project TransmiT.

It is difficult to tease out the impacts of the various options on Island generation. Higher hurdle rates for Island based generation implies that higher levels of intervention would be needed to enable Island generation to contribute, effectively to National and European targets for renewable generation.

Question 2: Do you have any further evidence of the impacts of the charging options not covered by NGET's analysis?

The impacts of the various charging option through the Original and the Alternatives are adequately covered by the NGET analysis. We do feel, however, that the Status Quo is not a fixed position as tariffs under this regime are likely to change as, for instance, new technologies such as HVDC are built onto the Network. Changes in Expansion Factors within the Status Quo regime could affect prices more than sharing for instance in some parts of the system.

Question 3: Do you agree with our assessment of the options in terms of the strategic and sustainability impacts? In particular, are there any impacts that we have not identified?

The impacts on generation in the Scottish Islands are difficult to assess from the modelling results e.g. whether island wind is modelled as contributing to the targets. Furthermore the modelling undertaken hasn't been sophisticated enough to reflect specific conditions on the islands (such as different hurdle rates to reflect the use of relatively new - riskier in investor terms - HVDC technology). So whilst targets are met in all of the scenarios modelled, this doesn't bring out the regional impacts, for example high TNUoS post 2020 and 2030 having a major bearing on the viability of wave and tidal arrays making the step from small demonstration projects to staged roll-out of the technologies based on increasingly large arrays.

We recognise that model granularity is always a challenge, and we note additional work that we have been involved in (with DECC) that has looked at the impacts on the islands more closely.

The biggest single factor which may affect the connection of significant renewable generation from the Islands is the treatment of HVDC where the effect of 50% socialisation of converters shows the range of price changes to consumers through to 2030 as relatively small even in regional terms.

Question 4: Do you think that socialising some of the cost of HVDC converter stations could lead to other wider benefits, such as technology learning? If so, please provide further evidence in this area.

The socialising of HVDC infrastructure which is analogous to HVAC non-locational parts of the network would ensure consistency and remove disincentives to adopt

HVDC. Without this there is a danger that incorporation of new technology may be held back – leading to a system which could be less efficient and therefore more costly to consumers going forward.

Introduction of new and improving technology, generally, shows a downward curve in unit costs over time as the technology is learned and supply side competition becomes more of a factor.

In the case of Shetland which has, currently, no connection to the UK grid - the delay or even non-build out of an HVDC, as a result of high TNUoS, would lead to the demand subsidy continuing at levels of around £20M per annum. Evidence of this existing consumer cost burden is attached as Appendix 1.

One of the benefits of the controllability of VSC is that power reversal can be very quick, the converters could reverse full power in milliseconds. The limitation here is the response of the network.

VSC technology can provide black-start services, and control voltage and frequency, providing there is a feed from the sending end. It does not need a synchronous generator, such as a thermal plant, to provide voltage and frequency reference locally. A VSC link was instrumental in restarting Long Island following a blackout in 2003.

Question 5: Do you agree with our assessment of the options against the Relevant CUSC objectives? Please provide evidence to support any differing views.

Yes. The work of Project TransmiT has clearly demonstrated that options which incorporate a significant level of sharing based on Annual Load Factor are more cost reflective than the Status Quo. WACM includes the Diversity 1 option which, though it shows a moderation of sharing, balances simplicity with accuracy (though with room for further refinement). Diversity 2 and 3 contain a predetermined cap on sharing and as such seem to lose cost reflectivity.

We do remain concerned that the treatment of HVDC as fully locational may lead to barriers to connection in the Islands.

Question 6: Do you agree with our assessment of the options against our statutory duties? Please provide evidence to support any differing views.

We generally agree – though the treatment of HVDC as 100% payable by the generator, particularly in the Islands may not do enough to remove barriers to entry for new generators. Removal of barriers to entry, by definition, enhances competition.

Question 7: Do you agree with our assessment that it is appropriate to implement WACM2 in April 2014? Please provide evidence to support any alternative implementation date.

Yes. We feel that the issues around TransmiT have been fully and adequately debated and that there should be no further delay in implementing a new regime which will be more cost reflective than the Status Quo.

We hope that you find these comments useful and look forward to viewing outcomes in due course.

Yours sincerely,

Elaine Hanton
Head of Energy
Highlands and Islands Enterprise

In partnership with:
Shetland Islands Council
Orkney Islands Council
Comhairle nan Eilean Siar
Highland Council
Argyll & Bute Council

Attachment:

Appendix 1

Estimation of savings on Shetland generation cost subsidy with grid connection and Viking Wind farm

Appendix 1

ESTIMATION OF SAVINGS ON SHETLAND GENERATION COST SUBSIDY WITH GRID CONNECTION AND VIKING WINDFARM

COSTS TO SHEPD CUSTOMERS TO SUBSIDISE SHETLAND GENERATION COSTS

	2009/10	2010/11 Existing	2012/13	Scenario 1 Straight Replacement	Scenario 2 NINES with SVT generating	Scenario 3 NINES with no SVT generating	Scenario 4 Viking & HVDC High Avail	Scenario 5 Viking & HVDC Low Avail	Gas Pipeline
Capacity cost £k		0		5393	4476	9660	5393	5393	4427
Fuel costs £k		9550		7160	5570	11457	162	851	
O&M costs £k		6450		5160	4014	8257	1000	1000	
Contract purchases £k		13000		13000	13000	0	0	0	
Market value Energy £k		10000		10000	8890	8890	113	594	
Market value of Capacity £k		0		0	0	0	3149	3149	
Cost of subsidy £k		19000		20713	18170	20484	3293	3501	
GWh generated in Shetland	213.7	213.7		213.7	190.0	190.0	1500.0	1500.0	
GWh generated in Lerwick PS		106.9		106.9	83.1	171.0	2.4	12.7	
GWh purchased									
	SVT	85.5							
	Burradale	15.4							
	Mainland	0							
	Viking	0							
	Other	6.0							
Shetland Maximum Demand exc SVT		48							
Shetland Load Factor exc SVT		51%							
Shetland Maximum Demand incl SVT		68							
HVDC Availability									
Real post-tax return on capacity				4.03%	4.03%	4.03%	4.03%	4.03%	4.03%
Tax rate				20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Real pre-tax return on capacity				5.04%	5.04%	5.04%	5.04%	5.04%	5.04%
Life of assets				20	20	20	20	20	20

Initial investment £k				67000	55600	120000	67000	67000	55000
GB System capacity payments £/kW							47	47	
Capacity of Replacement Power Station MW				67	48	48	67	67	
Fuel cost of replacement power station £/MWh				67	67	67	67	67	
Fuel cost of existing power station £/MWh		89							
Market value of energy £/MWh		46.8		46.8	46.8	46.8	46.8	46.8	
Viking Output Profile	370.8		MW Available to Shetland						
0%-5%	13.4%	9	9						
5%-15%	13.3%	37	37						
15%-25%	9.1%	74	68						
25%-35%	6.9%	111	68						
35%-45%	5.8%	148	68						
45%-55%	4.9%	185	68						
55%-65%	4.8%	222	68						
65%-75%	4.7%	260	68						
75%-85%	5.5%	297	68						
85%-95%	8.0%	334	68						
95%-100%	23.5%	362	68						
	100%								
Probability that Viking Meets Shetland Demand inc SVT							73.2%	73.2%	
Assumed Probability that Viking Serves 20% local demand when HVDC down							1.1%	5.8%	
Probability that HVDC Interconnector meets 100% Shetland Demand incl SVT							98.5%	92.1%	
Probability that Lerwick PS required to meet 90% demand (10% 3rd parties)							0.4%	2.1%	
Probability that Lerwick PS required to meet 70% demand (10% 3rd parties, 20% Viking)							1.1%	5.8%	