Quicker and more efficient connections: Ofgem consultation

Response by Community Energy Wales.

1. The demands on the electricity network have been changing for the last two decades

1.1. Our electricity distribution network was designed to take electricity from large, centralised power stations and distribute the power across the country. The legacy power stations are located close to coalfields and ports and therefore close to major conurbations. Nuclear power stations have been built on the coast in the last 4 decades.

1.2. For the last 20 years there have been policy initiatives to diversify, decarbonise and distribute electricity generation. These have originated from Brussels, Westminster, and the devolved administrations across the UK.

1.3. Geography has dictated that the location of much of our distributed, renewable generation is in rural areas remote from the legacy generating plants and the main points of demand.

1.4. It has been clear for some time that to meet the UK's renewable generation targets would require significant reinforcement of the electricity grid in areas with potential for significant renewable energy generation.

1.5. Government acknowledges that this is a challenge noting the need for networks "to connect and manage the new low carbon technologies and generation required for GB to meet its carbon targets[i]."

Conclusion: **The changing demands on the electricity distribution network have been understood and foreseen for over 20 years.**

2. Evidence that current regulatory framework has failed to deliver a grid fit for the 21st Century

2.1. It is clear that one the most significant factor holding back the deployment of renewable energy in the UK is grid capacity. We know that other respondents to this consultation, Forum for the Future, The National Trust, and Community Energy Scotland will provide evidence for this across the UK. In Wales more projects have been either abandoned or constrained by grid capacity than this response has space to list. By way of example: Upper Conwy Valley hydro with 920kW potential constrained to 100kw by grid connection cost but now unlikely to be built; Ogwen hydro 900kW capacity re-sized to 499kW, Anafon hydro with 500kW capacity re-designed to 270kW maximum output due

to connection costs – even though construction costs broadly the same as the larger design.

2.2. In addition to these mid-scale schemes, countless small community and farm scale systems will not be built because of grid constraint or connection costs (a symptom of grid constraint). Farm generation has the potential to play a key part in not only delivering distributed renewable generation but also financially supporting some of the poorest regions of the UK through local employment and increased farm incomes. The economic value and job creation potential of different renewable technologies and ownership models has been researched by Professor Calvin Jones, Cardiff Business School and gives strong support for smaller farm and community owned development. [ii]

2.3. To illustrate the problem we will detail one specific project in mid-Wales. Abernant is a proposed 18kW peak output microhydro generator on a farm south of Built Wells in the Western Power DNO area. The scheme was to be community financed with a rental income supporting the landowner. In December 2014 a routine grid connection request was completed and a connection offer was assessed to require 48km of 66kV line reinforcement. The quoted cost was £5.7m. It was estimated to take up to 6 years to complete. For a small system with a construction cost of around £100,000 this is clearly disproportionate. It is also worth noting that due to regular FIT degression and the inability of schemes to pre-register for more than 24 months in advance, even if the connection cost was proportionate, any delay in connection prevents investment in farm scale generation since there is no certainty of investment return.

2.4. Ofgem have acknowledged that the, "distribution networks are not currently designed to accommodate these loads [low carbon demand and generation] and we expect this to be a key driver of future investment."[iii] Despite this acknowledgement strategic investments are not being made.

Conclusion: **All renewable generation in rural Wales, especially small and medium scale, is being abandoned because of grid constraint despite European and UK government incentives to support investment in renewable generation**.

3. Why has the current regulatory framework failed?

3.1. OFGEM's primary focus has been to minimize the cost of the distribution network to electricity consumers. It has been successful in this aim. This success has come with the consequence that the grid is unfit to meet our climate change obligations. The current focus on cost to the consumer has prevented any strategic investment in the grid despite the clear imperative for investment to reflect the new pattern of distribution for renewable generation.

This was not the intention. The regulatory regime includes a number of principles and mechanisms that have been designed to support grid investment – albeit within the framework of minimising the cost to consumers. These have not delivered. I will address a number of these in turn: (i) prospective generators need the price signal of grid connection cost to direct their investments to places with capacity; (ii) commercial developers will cooperate to pay for strategic investment; (iii) DNO's can invest ahead of demand: (iv) stranded assets must be avoided at all cost; (v) active network management can be deployed to overcome constraints.

3.2. *(i) A price signal should direct renewable investment to where there is capacity.* The consequence of this policy has been to ensure that the legacy distribution network is filled to capacity. For example, on the East Wales Ring (the WPD owned 66kV backbone that constrains the example discussed in section 2.3), one proposed wind farm of 29MW has been designed specifically to utilise all of the remaining grid generation capacity. By paying a (relatively) small deposit to secure the capacity this development has closed large parts of mid Wales to any further distributed generation above G83 (effectively 3.7kW per phase).
The "price signal" has ensured that large parts of the UK legacy distribution network are now full. In large part (as in the East Wales Ring) this has been secured by large commercial developers with the balance sheets capable of deploying grid consultants to maximise the remaining capacity for their advantage. The "price signal" has ensured that grid has been monopolised by the largest commercial developers to the disadvantage of community and farm scale generators.

3.3. *(ii) Commercial developers will cooperate to share strategic investment.* This may have been a reasonable expectation when the current OFGEM policy was shaped but has not been the case in practice. Experience from REGEN South West (appendix 3 to the consultation paper) has demonstrated the difficulty in developers cooperating to jointly share strategic investments. The unpredictability of large projects (planning, landowners, financing, and short-notice changes to FIT incentives) makes coordinating two or more developments virtually impossible. Where single developers do invest to allow new large-scale generators to be built there is a financial incentive for them to only pay for the capacity they need and no additional capacity for small and medium scale generation is enabled.

3.4. *(iii) DNO's can invest ahead of demand.* In theory this is possible but in practice has not delivered. OFGEM require detailed proof that the investment will lead to a *short-term* reduction in the cost of grid reinforcement – even though the assets are expected to have a 45 year life. Given the uncertainties of individual schemes DNO's have no incentive to make risky investments with their shareholders' capital and OFGEM will not countenance socialising this cost without a short-term saving.

3.5. *(iv) Stranded assets must be avoided at all cost.* It is the fear of stranded assets that drives 3.4 above. But OFGEM is failing to make a key distinction between assets that would only benefit a specific project and investments that would improve the carrying capacity of a large section of the grid. For example, a high voltage spur to a hill that can only be of use to a specific a wind project could be seen as an unreasonable cost to socialise to consumers. The development may be abandoned after the grid had been reinforced for any number of reasons not under the DNO's control. However, going back to the example in section 2.3, a strategic investment to provide a third high voltage connection to the East Wales Ring would allow distributed, renewable generation across an economically deprived area of mid-Wales. To classify both of these investments as potential stranded assets is unhelpful, at best.

3.6. *Active network management will make grid investment unnecessary.* Some active network management can be beneficial in maximising the capacity in a network. But ANM should not be used as a reason for delaying strategic grid investments. This distorts the position in two ways. Firstly, constraining the output of generators means that investment in renewable generators is under utilised even though it is done to maximise the efficiency of grid investment. This is illogical. Reducing the return on generator investment to maximise grid infrastructure investment is a clearly a regulatory failure. Secondly, active network management requires robust communications with all generators on the system. WPD estimate upwards of £20,000 for such a connection. This is no problem for large schemes but is another example of where the community and farm scale schemes are unfairly discriminated against. A £100,000 farm scale renewable project can not afford and additional £20,000 of additional connection cost. (We can supply financial analysis of the impact of ANM connection costs on the Abernant scheme – section 2.3 – which demonstrates the addition of these costs results in the scheme not being financeable.)

It should also be noted that Ofgem has recognised that, "we do not fully understand smart grids"[iv]. Smart grids can be part of the long-term solution but are not sufficiently developed alternatives to strategic reinforcement.

Conclusions: **We have a highly efficient grid that has been utilised to its maximum. However, the mechanisms that were intended to support strategic grid investment are not working. The price signal has saturated the existing grid; developer cooperation and DNO anticipatory investment have not delivered; fear of stranded assets has prevented urgently needed investment, and active network management (still in its infancy) merely displaces investment inefficiency from one domain to another as well asdiscriminating against farm and community scale projects.**

The assets of the legacy grid is may be optimally deployed but the regulatory system has prevented the much needed new assets from being created.

4. An economic argument for investment

4.1. Community Energy Wales does not have the resources to undertake a detailed economic assessment of an investment in the rural grid in Wales. However, we offer the following simple analysis to illustrate the case for investment. Again for convenience we will focus on one specific investment – a third high voltage connection to the East Wales Ring.

4.1.1. From 2.3 above we know that the estimated cost making a third high voltage (66kV) connection is £5.7m.

4.1.2. There are currently two high voltage connections to the ring and DNO planning has to allow for one of the two connections to be down (so called N-1 scenario) and still operate within safety limits under all demand and generation scenarios. A third EHV line could, in theory, double the capacity under an N-1 scenario.

4.1.3. Current installed and deposit paid generation capacity on the East Wales Ring (WPD figures) is (very roughly) 40MW (informal WPD estimate). We assume a new EHV line will enable a further 40MW of renewable generation capacity.

4.1.4. Assuming a capacity factor of just 30% (could be more depending on mix of renewables) the EHV line could enable annual generation of 105 GWh.

4.1.5. Using a composite income figure of 12p / kWh for export and generation subsidy, this would earn almost £13m a year in income for over two decades. If we further assume that 90% of the income is for maintenance and financing costs then we still have £1.3m pa of net income against an investment cost of £5.7m – a payback of less than 4 years. This analysis does not take into account jobs, farm incomes supported, the economic multiplier that comes from farm and community ownership, the additional cashflow once the capital financing has been repaid. It is simplistic but intended to demonstrate that the regulatory framework does not facilitate rational, economic investments in grid infrastructure.

Conclusion: **The regulatory controls are preventing rational economic investment that is essential for us to meet climate change goals.**

5. Responses to specific questions

We have set out above our analysis of the problem and the failure of the regulatory framework to deliver a grid to deliver our international and national policy goals and our carbon reduction commitments. We do not have the technical knowledge to answer many of the specific questions to the consultation but where we can answer our responses are below.

Scenario 1

Q 1 and 2

Scenario 1 does not address the strategic impasse. We would point out that Scenario 1 as presented in the consultation documentation states that the only reason for anticipatory reinforcement is to "lower the overall cost of reinforcement". Taking the example of the East Wales Ring – anticipatory investment in this infrastructure does not reduce the overall cost of reinforcement for any current or likely customer. It is therefore difficult to see how this will ever be allowed under the current regime.

Adding an additional leg to the East Wales Ring is an investment to enable future connections – a chance to reset the grid for a distributed future. It is *additional* investment which enables new generating connections in the long term but does not reduce foreseeable connection costs in the short-term. DNOs have no incentive to take a risk which may see them punished for being less efficient. The efficient management of the existing infrastructure needs to be separated from the long-term strategic investment in new capacity. As framed, Scenario 1 does not provide a workable mechanism.

We also note that under RIIO-ED1DNOs are assessed on customer satisfaction survey. It would appear no measure of the satisfaction of prospective customers that do not connect are taken into account.[v]

Scenario 2

Q 3 -15

We do not have the technical experience of a DNO needed to answer these questions in detail. However, we are able to make a general observation about this scenario. The points we have raised in relation to scenario 1 broadly apply here. The only important difference is that the balance of risk between the DNO, the DUoS customer and the regulator for poor decision making is slightly altered. Your requirement for "robust evidence justifying forecasts in growth, scheme design…" indicate that this is only concerned with short-term evaluation of total connection cost. No recognition of the longer term – decade plus – benefits is included in this scenario. We therefore conclude that once again this tinkering with the regulation will not deliver strategic investment.

The consultation is framed in terms of the existing paradigm of minimising the distribution cost to end consumers and maximising the efficiency of the *existing* infrastructure. Quasi-market mechanisms have been developed to ensure that the cost of specific individual developments are fairly apportioned but the mechanism contains no method for making strategic investments for the general good.

Consider the analogy with the road network. We are have a system to charge a supermarket for the cost of connecting the new facility to the road network but we appear to have no facility at all for making the trunk

road dual carriageway – let alone to build a new motorway. And in energy terms it is new motorways that we need.

Scenario 3

This scenario represents the only feasible basis for making strategic investment.

Q10: Under the current framework and within the terms of this consultation this represents the only feasible way to allow strategic investment in the grid.

We would suggest either no premium for the DevCo or a small premium as we believe that public bodies with a wider economic remit should play the role of DevCo and not commercial developers seeking to make a profit by speculating on grid capacity. The benefit if wider connectivity and rural development should be the driver not private profit from grid speculation.

The DevCo should have first rights over a proportion of the capacity – perhaps 25%. This is like current arrangements where the developer paying for reinforcement has exclusive right to the connection except that the exact location of the connections at the time of ordering the reinforcement may not be known.

Q11. This proposal would immediately help the East Wales Ring problem. All development – even an 18kW microhydro is stopped pending a 66kVB, £5.7m reinforcement that neither the developers nor the DNO are about to undertake. But the reinforcement doesn't just support one location but the entire ring. This is an ideal opportunity for WG, Local authority, Green Investment Bank other social investors to make a strategic investment. There would be an expectation of supporting economic growth in an economically deprived area of Wales and with the expectation that over 10 years all or most of the initial investment would be returned. We propose 25% of the total Ring capacity enabled would be reserved for the use of DevCo making 75% available for commercial developers immediately.

Q12. In the example given in Q11 this question is irrelevant – all connecting customers on the Ring would be connecting to the existing network that now has a greater carrying capacity for generation.

Q13. As noted above, the premium should be small or zero. The benefit is a broader social goal. We would recommend a premium sufficient to give the DevCo a modest return of say 5% over in the expectation that the capacity would be used over the next 10 years.

Q14. We suggest 10 years.

Q15. Under current rules a developer who pays reinforcement costs for a connection has exclusive use of that connection. We do not see why DevCo could not be given exclusive use over an proportion of the capacity – negotiated and agreed at the time of the reinforcement order is placed. The only difference is that the exact location of that capacity is unknown at the time of order. I can see problems with the best locations being taken first but this could be workable. The DevCo's primary concern is with renewable capacity, carbon emission reduction, job creation and economic development of rural Wales so private developer use of the capacity – at fair recompense for their share of the connection cost – is not an issue.

Q16. It is our belief that coordination of private developers to make large scale strategic grid investments does not work for the reasons stated in section 3.3 above. Evidence over the last 5 years suggests that this is the case.

Scenario 4

Q17. We do not have experience to be able to comment.

Q18. As Q17.

Q19. The introduction of design and assessment fees would only harm smaller farm and community scale schemes by adding to the already high upfront cost of preparing renewable projects for construction. Only larger commercial developers have the balance sheets to be able to take this up front investment. The current system of deposits has been widely misused with developers having no hesitation to buy "options" to develop. Increasing the option cost with assessment fees is unlikely to deter commercial developers but will harm farm and community developments – a further tipping of the rules in favour of larger private developers.

Q20. This is a technical issue that we are not in a position to answer. However we point out that we believe that something can be done on this issue as the Abernant scheme discussed in section 2.3 at only 18kW is the equivalent to just over 4 G83 connections and it is impossible to avoid the conclusion that the rules are being applied to strictly. In fact in consultation with the DNO on this scheme they admitted that they could accommodate 18kW but, 'their lawyers advised that the only defensible position was to charge connection costs for ALL G59 connections regardless of scale. It would appear that fear of legal challenge from commercial developers and not actual grid constraint is harming farm and community scale renewables.

Q21. We face a situation where developers have been stockpiling deposit paid grid offers with very little intention or ability to complete the

scheme. The DNOs need to apply much more rigorous checks that best endeavours are being applied by the develop to develop the scheme. The onus should be on the developer to prove that it is being progressed – so a presumption of the order being cancelled unless proof of activity is produced. This will protect genuine developers but prevent stockpiling.

Q22. Active Network management and storage are, by OFGEM and the DNP's own admission, are immature technologies that are not able to deliver carbon reduction targets in the short term. We believe that continued research needs to be done but that ANM and storage should not be used as an excuse to stop strategic grid investment today.

Q23. We do not believe flexible terms are a high priority. Flexible terms on £5.7m connection offer for 18kW doesn't make it achievable. Given that schemes can be financed with relatively low cost of capital, flexible payment terms are not a high priority. Zero interest on terms might help but State Aid issues may prevent Government prescribing below market rate finance. If that is the case then this is of no benefit and will open default risk.

Q24. Very few if any – see answer Q23.

Q25. Probably nothing.

Q26/ 27. It has to be acknowledged that some investments into the grid need to be made for the general benefit and will be paid for by means other than existing and new connection customers. We believe Scenario 3 gives the only viable way to achieve this. It is worth noting that other strategic networks all receive state (national Government and European funding) for some part of the infrastructure development, for example trunk roads and rural broadband network. It seems perverse that one of the vital national infrastructure networks that is currently hampering us delivering on our international climate change commitments is actively prevented from supporting strategic reinforcement by its regulator.

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[i] *Strategy decision for the RIIO-ED1 electricity distribution price control – Overview*, Ofgem, March 2013, section 2.1
[ii] *The Economic andSocial Impact of Small and community Hydrio in Wales,* Natural Resources Wales / Community Energy Wales, (final publication awaited)
[iii] *Strategy decision for the RIIO-ED1 electricity distribution price control – Overview*, Ofgem, March 2013, section 2.5
[iv] *Strategy decision for the RIIO-ED1 electricity distribution price control – Overview*, Ofgem, March 2013, section 2.16
[v] *A guide to electricity distribution,* Ofgem, April 2014, section 5.2.

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