**APSE ENERGY BRIEFING 1/15 (FEBRUARY 2015)**

# DISCUSSION PAPER ON A PROPOSAL FOR THE ESTABLISHMENT OF ELECTRICITY HUBS BY LOCAL AUTHORITIES

## 1. Introduction

The Association for Public Service Excellence has existed for many years as a local authority owned non-profit distributing body that provides services to its members. In 2010 it started to offer advice on climate change, low carbon and renewable energy. This work grew in volume and importance to local government over the following four years and so in 2014 APSE created APSE Energy, a focussed group of local authorities collaborating together to explore the opportunities of energy generation and energy efficiency schemes.

The vision of APSE Energy is the municipalisation of energy at local level. This includes local authorities being fully licenced energy providers (both gas and electricity) to the public in their areas, as well as sizeable generators of heat and power from renewable sources.

The vision is seen to be very much in line with the aims and objectives of a local authority and the current economic and financial situation in which local government finds itself.

This paper concerns a number of issues underpinning this vision. Firstly, the ability of local authorities to design and build renewable energy facilities and actually succeed in getting an adequately sized grid connection; and secondly, how local government can stimulate the local economy in the area of each Council to create jobs and growth and shake off the worst effects of the recession. It is helpful that another consequence of action in this area is the Government and country meeting its national and international greenhouse gas emissions targets.

The specific area concerned in this briefing paper is the ability of the national grid to accept connections for renewable energy facilities and how this capacity can be improved. This paper argues that there is a distinct role for the local authority using its various economic development powers, excellent covenant and access to inexpensive loan funds to help remedy a difficult area and remove a logjam. Below it is explained how it is felt that they can do this.

## 2. Background

The Government has adopted a range of challenging targets for renewable energy in the UK. These are part of a wider suite of measures that are prompted by both

international pressure (via the Intergovernmental conferences) to act on climate change and the influence of the strong green lobby in the European Union.

The Climate Change Act 2008 has set the legally binding target that the UK must reduce its emissions of greenhouse gases by 80% against a 1990 baseline by the year 2050. This is indeed a challenging target.

There are various targets set by different European Directives but under the Renewable Energy Directive, the UK has to generate 20% of its power from renewable sources by 2020.

The performance of the UK to date has fallen short of expectations, with poor performance on electricity generation and even worse performance on heat production. The UK is last but one in the league of the EU's 26 countries in performance against these targets.

In order to sort out the electricity generation side, the country needs more solar PV farms and solar PV installations on buildings, more wind farms, CHP engines, AD plants, geothermal installations, hydropower plants and wave and tidal facilities. On the heat side, it needs more ground and air source heat pumps, solar thermal panels and, most important of all, district heating systems.

But there are not sufficient projects on a commercial scale to meet these targets. There are three types of project that could deliver these schemes: commercial projects (by the private sector for financial gain); community projects usually smaller and predominantly for social gain, (but also contributing to the generation of power); and civic schemes, whereby local authorities seek to make better use of their assets (land and buildings) and their ability to raise loan funds inexpensively.

One of the major reasons why the UK is behind on its renewable energy targets is that many projects that are proposed for construction cannot be built because they cannot get an affordable connection to the national grid.

The national grid is part of the country's heritage. But it is old and outdated and does not fit the new purpose required of it. Power stations were predominantly coal fired in the past and so the power stations were built near the coalfields, generally down the central spine of the country, such as the Midlands, Wales and the North East. Gas fired stations were added later but also predominantly in the urban areas. The problem now is that renewable energy is growing rapidly but it is all in the wrong place for the grid i.e. offshore to the West (for offshore wind), in the mountainous areas of Wales and Scotland (for onshore wind and hydropower) and in rural areas (for solar farms and AD plants). It is probably more accurate to say that the grid is in the wrong place for the renewables.

Over and above this, the design of the grid is problematic, with the basic working of the grid usually moving the electricity in a single one way direction. Cornwall, for example, has a grid that was designed for electricity to flow down the peninsula from the West Country, rather than the other way round. Now that renewables have been developed on a significant scale in Cornwall, the power cannot move the other way up the lines.

Another problem is that grid offers are made by the Distribution Network Operator (DNO) and, once accepted, that capacity in the grid is effectively taken off line. Many of the larger renewable energy developers have entered into grid offers in relation to plants that they know will never get built, but that part of the capacity cannot be released so that someone else can use it.

All of this is a result of the national system that predates but has applied in the UK since the privatisation of the Electricity Boards. Accordingly, in a privatised system, if the grid is to be upgraded, this has to be funded by those seeking to develop facilities, rather than by national taxation. Bearing in mind that the national grid requires billions of pounds of investment, this has started to become something of a problem. In order to appreciate this, there is a need to understand the operation of the system, which is covered in the next section.

**3. The National Grid System**

It is necessary to know something about the national grid to appreciate the problem that this paper is seeking to address. The basis of the system is that there are still a large number of major fossil fuel burning power stations that generate electricity. This electricity moves through the high voltage transmission networks, of which there are four, including National Grid. Under them, the Distribution Network Operators, of which there are 14 in six regions, cover the local distribution network.

It is a rule in the UK that electricity distributors cannot also be suppliers, and so under the DNOs there are the electricity supply companies. These are dominated by the so called 'big six' (British Gas, Eon, Npower, EDF Energy, Scottish and Southern Energy, and Scottish Power), although there are a whole range of other supply companies, even though their joint market share is little over 5%. Members of the public, as users of electricity, have a contract for supply with one of those supply companies. That is how the system works.

The big disadvantage about electricity supply in the UK – even in 2015 in a highly sophisticated Western European country like the U.K. – is that by and large energy cannot be stored and therefore the amount of electricity generated has to be balanced with that required at any point of the day or night. Different types of power station can be brought on line in different time periods, but the addition of many new and different types of renewable energy facilities has not made this any easier.

The key figures for the purposes of this paper are the Distribution Network Operators (DNOs). They run the local distribution network, as indicated above.

There are fourteen licensed areas, geographically defined, which were based on the former Electricity Board boundaries. The DNO's are companies licensed in the UK by OFGEM to distribute energy. There are six main DNO's, covering the main areas, and four independent DNO's operating smaller networks from within those areas.

The DNO distributes electricity from the national grid to homes and businesses. However, as mentioned above, the Utilities Act 2000 prevents the distribution

companies from supplying electricity. This is undertaken by a range of electricity supply companies, chosen by the consumer, but dominated by the 'Big Six'.

The essential point of this analysis is that an agreement with the relevant network operator is necessary to connect a renewable energy system to the national grid or the local distribution system.

## 4. Applications for Connection to the Grid

As mentioned above, the way that the grid works is that the DNO is responsible for the distribution network in a particular area. If a renewable energy facility is to be built, such as a solar farm, the developer needs to apply to the DNO to arrange a grid connection.

There is a statutory process for doing this, with applicable time limits, which is outside of the requirements of this paper. The point is that any developer has to apply to the DNO, including public sector bodies, which are treated the same as any other applicant.

The DNO will then consider the application and will determine whether there is spare capacity on the grid in its area. If there is, it will make a grid offer, which is open for a set number of days. The grid offer will indicate the financial cost of any works that need to be undertaken to the site to facilitate the connection of another generating facility. The developer then has a set number of days to consider the offer and either accept or decline it.

If the offer is accepted, then the grid capacity for that facility is effectively reserved for that project and provided it is progressed diligently by the developer, the capacity will remain available, even if the construction has not been completed several years later.

As an example, if a local authority wants to construct a 5 MW solar farm on land it owns, it will apply to the local DNO for a grid connection. The offer is made and accepted and then the plant installed. At the conclusion of the work, the DNO will finalise the grid connection and the payment of the financial incentives linked to that process, via metering will commence.

As mentioned above, it can be a problem when a large developer with extensive funds at its disposal accepts multiple grid offers, even though it knows that some of those sites will never be built.

## 5. Local Authority Energy Projects

Local authorities are acutely aware of their responsibilities to undertake activities which have a positive and beneficial imapct for their areas. As it became clear that climate change and global warming were a particular problem, most local authorities adopted some form of climate change strategies and tried to lead by example as per the signing of the Nottingham Declaration on Climate Change in October 2000.

However, most early policies were climate change and emissions based, or in other words were about reducing the carbon footprint of the authority or its area.

It was only when new financial incentives were introduced for renewable energy schemes – principally the Feed in Tariff in 2012– that the interest in developing renewable energy schemes started to accelerate.

Early schemes were stand alone in nature and were often one off projects. But some authorities started to see the wider implications of renewable energy and comprehensive green strategies. It was then that strategies started to be developed that involved more than one technology (e.g. solar PV, wind, biomass etc.) and integrated heat and power systems.

In the last year this work has accelerated further and many local authorities are now looking to be energy self-sufficient. This means that they want to be able to generate enough power to support all of their own functions and operations. To do so will take significant capital investment, but that investment has a guaranteed income stream to offset against it. In the longer term authorities that do this will save considerable amounts of money that would otherwise be spent on energy and have a useful method of income generation into the bargain.

But local authorities want to go one step further than this. Whilst it is highly desirable to be energy self-sufficient, this is an inward looking goal, which affects only the authority itself. The truth is that most local authorities are also interested in wider economic and social benefits and many people in their communities are also suffering from fuel poverty or difficulties with rising energy prices. So the final piece of the jigsaw is to become a registered electricity and gas supplier to the public. This is the only way in which the full social value of the electricity supply can be captured. This goal is actively being sought in authorities across the country.

However, the move towards the more sophisticated outcomes mentioned above cannot be achieved without better grid connection availability.

**6. The Position in Local Government Post the Recession**

The financial situation in local government is bleak. When the recession and the banking crisis hit in 2008, it could not have been predicted what the full impact of the downturn on local government would be. Five years of fiscal austerity to reduce the deficit has resulted in massive reductions in Government revenue support for local councils. The Chancellor's Autumn Statement now projects austerity forward to at least 2019 with Government spending as a proportion of GDP falling to historically low levels. Regardless of who wins the General Election in May 2015 the impact of reductions in spending are likely to continue for councils with the bulk of the pain yet to come. It is conceivable that over the course of the next Parliament local government will become unrecognisable from the position it enjoyed as recently as2006.

There are three sources of funding for local authorities. The first is central government grant, the second is local taxation (Council tax) and the last is miscellaneous income generation, including parking, leisure and commercial

refuse collection. So it is imperative that local authorities look for increased funding in order to become more financially self-sufficient and less reliant on central government grant or changes to the tax base which are unlikely to materialise. Whilst updating and refining the local taxation system including council tax and business rates would be desirable, it is unlikely that any Government would commit itself to such a radical overhaul of the local tax base. So income generation provides the only way forward and renewable energy is one such opportunity.

Another way for the public finances to recover from the recession is for there to be growth in the economy. This means more taxes, more services being paid for and more people in work. Whilst growth may be the answer to the even more austerity and get the UK back on track financially. It is nonetheless difficult to engineer. The U.K. economy grew by 0.5% in the last quarter of 2014 representing a slowdown over the previous period with manufacturing and construction being particularly sluggish and only the services sector fuelled by greater consumer spending leading to increased output.

Local authorities are intimately linked with their local economies and tend to understand what is happening. They have economic development functions that require them to find growth and to stimulate economic activity where possible. There can be no doubt that an increase in construction of renewable energy facilities would help.

They are also moving more into new house building now, whether social housing or shared ownership, and have economic development zones to promote new light industrial and commercial activity. All of this can be brought together to help find some relief in a difficult time.

**7. The Problems with the Grid**

The difficulties with the grid are becoming more urgent, bearing in mind the developments outlined above. Further renewable energy will only be possible with grid connections. New housing will require electricity supply at a reasonable cost to make it cost effective to build.

If local authorities could play a role in freeing up the grid in their areas, then they would achieve success in three key aims: delivery of their economic development powers to generate growth and jobs; getting their own renewable projects connected and working and generating income for the authority.

**8. The Proposal**

So if the problem is insufficient grid connections to facilitate local growth via more renewable energy facilities, the solution is to remove that problem. The proposal is therefore that the local authority takes an active role in the electricity grid in its area and acts as facilitator to create new capacity. This may be by the building of an energy 'hub' that would enable a considerable amount of new capacity to link to the grid.

If there is plenty of capacity available in any event, then there may not be a need for action. However, in the vast majority of areas, this is not the case.

If a local authority has itself struggled to obtain grid offers, then it is very likely that others have too. If that demand could be mopped up and joined together, it could be used to base a business case that would justify building new capacity.

As mentioned above, new primary substations can be built by a DNO working outside of its own area, but to be sustainable, these will need both generating capacity and electricity users to be linked to the system. This is because of the way Distribution Use of System (DUOS) and Generation Distribution Use of System (GDUOS) charges work. These are explained below.

It is also important to note that the resident DNO is unlikely to undertake this work itself. This is because that is not part of its statutory duty and since privatisation the companies are private companies, seeking to make a profit. There is no reason, therefore, why they would want to operate in such a facilitative role.

The local authority could:

- Run a communications campaign to try and ascertain what demand there is for new grid connection capacity;
- Prepare a detailed database of those who have applied to the DNO for a connection, but have not been successful. This would include the type of technology, project site, capacity sought and so on. The DNO has this data but cannot disclose it to the local authority.
- Survey its own land for suitability for renewables, whether wind, solar or whatever. It could also look for land on which to place the hub.
- The local authority would then obtain quotes for the building of the electricity hub – thought to be in the region of £3m - £4m – from a DNO working outside of area.
- Following clarification of the costs and where the hub might be situated, the Council could canvass companies and individuals who would be interested in connecting to the new grid.
- It could also harmonies this with its own aspirations, whether for solar or wind farms or other renewables, as well as other areas of economic development, such as new housing estates that it is building, land zoned for industrial or commercial development or whatever.
- Once sufficient numbers are prepared to support the venture, by signing contracts, the Council will procure the building of the hub and recover its costs from the wider group, when the connections are made.
- The DNO working out of area will operate the hub as a commercial venture once it is constructed and will recover its income in from standing charges and other revenue.

In this way potentially dozens of public bodies, companies or other individuals could obtain a grid connection and build out their sites, with the attendant benefits to the local authority. These include many areas such as business rates, where the rules have recently been changed to permit local authorities to retain 100% of business rates levied on renewable energy facilities.

## 9. Technical Issues

There are a number of technical issues that are beyond the scope of this paper. However, there are some that are fundamental to the proposal and these can be briefly stated as:

- Due to licensing requirements, only a DNO can build a new hub;
- However, DNOs can build outside of their own areas, hence the term 'DNO working out of area';
- It is unlikely that a DNO would take the risk of developing a new hub without agreement from the potential users, but they would have no way of getting this (hence the local authority's role);
- In order to make this viable, the new hub has to have energy *users* attached to it, as well as energy *generators*. This is because of the way that DUOS charges work.

The Distribution Use of System (DUOS) charges are applied by the DNO to those to whom electricity is supplied. However, a different form applies to those who export electricity to a DNO grid. This is the position regarding generators of renewable electricity and they pay GDUOS (or Generation Distribution Use of System) charges.

The difficulty that the DNO has is that it makes money from the DUOS charges, effectively the difference between the cost of electricity being purchased by the substation owner and the cost sold to businesses using the power. In the case of generation sites, GDUOS charges apply, which is effectively the incumbent charges for the generated electricity exported to the substation. This means that where there are only generators, the owner of the substation becomes cash flow negative.

Specialist advice will be necessary on the finer points of the electricity grid. However, Scottish and Southern Electricity has already expressed interest in this notion and has intimated that it would be prepared to discuss this in more detail.

## 10. A European Perspective?

In informal discussions with Leeds City Region it has become clear that there are funds from the ERDF that are available for qualifying projects. This raised the question as to whether EU monies could be used to build a new hub on the basis that it was core economic regeneration, as explained above.

Melanie Taylor is the Green Economy Lead at the Leeds City Region Enterprise Partnership and she expressed interest in this on behalf of the constituent authorities. Preliminary views seem to suggest that ERDF might be used for this purpose but it seemed clear that his would not extend to the actual connection to the hub by users. However, the actual construction of the grid itself would seem to be covered.

However, a more detailed analysis would be required to confirm that this is an option.

## 11. Conclusions

This is a strong concept which requires much more work to develop. There is an opportunity for local authorities, which in the right areas, could lead to considerable increases in economic activity locally, to the benefit of everyone. 'Growth is king' and any avenue that can deliver that is worth exploring.

Whilst there is both work and risk involved, this is no more than might be anticipated in a shopping centre redevelopment project or the like, which are regularly facilitated up and down the country.

There are a number of practical issues to be overcome but before APSE Energy embarks on further work, we would like to canvass the thoughts of member authorities to gauge support for this idea in principle. Marc Wynn of Asset Utilities (a specialist in grid connection matters) has agreed to provide some help and Scottish and Southern Electricity has agreed to look at potential areas and give a view on whether a local grid would work.

Just as aspirations have risen astronomically in the past five years, to take local authorities from a few solar panels on the Town Hall roof to contemplating a full energy company, so is it time to address this issue.

The time is right for bold action.

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**Consultant**
**18 February 2015**

## APPENDIX

### Distribution Network Operators in the UK

- Scottish and Southern – North Scotland & Southern England
- Scottish Power – South Scotland/ North Wales, Merseyside and Cheshire
- Northern Powergrid – North East England & Yorkshire
- Electricity North West Ltd – North West
- Western Power Distribution – East & West Midlands, South Wales and the South West
- UK Power Networks – Eastern England, London & the South East