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EPRG Workshop on Distributed Generation and Smart Connections, in partnership with UK Power Networks

How Smart Connection of Distributed Generation can help solve our energy problems and decarbonise the economy supplying cheaper electricity to our homes

A one day Energy Policy Research Group workshop on “Distributed Generation and Smart Connections”, in partnership with UK Power Networks gathered together academics, practitioners and Network Operators to look at the future of Smarter Connections and how these will bring benefits to all levels of society.

The government has set objectives and targets for de-carbonising the economy which means that Distribution Network Operators need to develop smart solutions, including smart grids to enable further penetration of Distributed Generation from all types of generating technologies.

James Veaney, Head of Distribution Policy for OFGEM, and Henning Parbo, Chief Economist of Denmark’s Energinet, started the four sessions by looking at “The Role of Regulation”, and how it is playing an important part in establishing rules and guidelines for the energy industry to work within. As well as enabling Distribution Network Operators to get to know who their customers are and how their needs could be better met.

Veaney said: “Distributed Generation has massive advantages and the government has a number of stimulus packages in place to encourage people to connect Renewables to the Network. Our role as the Regulator is to make sure that the process through which they get connected to the Network is fair, is reasonable, and enables them to get a decent level of service but also protects the interests of all consumers who are connected to the Network.

“We know that the process of being connected to the Network can be complex and it can be costly. We have tried to make sure that arrangements are in place so that customers are charged in a fair and transparent manner, and that the process is simplified as much as possible. What’s more crucial is that the Networks understand the requirements of these different types of customers and responds to them and considers not just the technical impact of these customers on the Network, but who these customers actually are! We need to start to explore what benefits they can actually deliver to the Network more widely”.

Parbo talked about the importance of wind power in Denmark a country others are learning important lessons from. He said: “Just twenty years ago 100 per cent of our energy in Denmark came from Central fossil fuel Units, nowadays wind power amounts to something like 40 per cent of the energy production. Local Combined Heat and Power (CHP) is around 20 per cent, and then we have solar, biomass and so on. Less than 50 per cent is now in the hands of the old generating units. We will continue to increase the amount of decentralised generation and we are probably going to see the old business model more or less disappear within ten years or so.

“In my view regulation has been crucial to this development, without the regulation accompanying this development we would have seen no evolution of it. A lot of experiments have been going on

in this area; we have tried a large amount of different incentive schemes and support schemes in order to encourage this development.”

Both Veaney and Parbo saw a bright future for Distributed Generation. Veaney elaborated: “We have been learning about putting the right incentives in place to encourage the Networks to engage in direct dialogue with customers and for them to be prepared to trial more innovative approaches to meeting their needs. It is a fantastic way of revealing best practice. It is providing the right stimulus for people to innovate and be more flexible in their arrangements because that can deliver benefits to customers and also to the Distribution Network Operators themselves.

“What I have learnt is that once you as a Regulator specify a time period, or specify any particular level of service, the Distribution Network Operators will respond to that very doggedly. If we say you need to provide a certain service within a month, they will provide it within a month. They design their systems and processes to meet those obligations that we set as a Regulator. I think we need to find ways to incentivise them to do things the best way that they can, to allow all smart people who work at the Networks to do really smart stuff and reveal best practice. We can then learn from that and then we can use that to leverage the other companies to get up to those standards.

“We have given people the opportunity to be more creative and given them the right incentive to deliver best practice and this does work more effectively. We now see Network companies being outwardly facing and engaging with their customers and stakeholders on an on-going basis. This is absolutely crucial if they are to respond to the challenges that lie ahead.”

Parbo said that in Denmark restrictions were being put in place to ensure that wind sources of energy did not produce too much power. He said: “We now have huge amounts of wind power meaning that when it really blows in this Country we have too much, so a new regulatory scheme has been put into place whereby Generators (offshore wind) do not receive any support if there is too much wind. Everybody seems happy both the wind industry, the Transmission System Operator (TSO) and the government.

“We rely heavily on our interconnectors from our neighbouring countries and they are following the same processes as we have been through more or less. We do have very close collaborations with our neighbours.”

He then spoke of the consensus among politicians of all parties that was making it easier for companies to plan their futures: “One of the most interesting lessons is the consensus that exists in our Country starting with the political parties. There are no objections to this green conversion as it is called in Denmark, the voters like it, and we are all working towards the same goal. To have this commitment from all the parties is crucial.”

In the second session on “The move to Smarter Connections”, Sotiris Georgiopoulos, a Low Carbon Senior Project Manager within Future Networks at UK Power Networks, spoke of their innovative Flexible Plug and Play demonstration project that is hoping to cut the costs of connecting Distributed Generation. It is being tested in East Anglia between Peterborough and March.

Georgiopoulos said: “This is an area where we have a high number of proposed connections, it is one of the first areas that has exhibited a high input of generation both from wind and from solar

generation. We are developing interruptible connections so that we will be able to offer additional connections from the Network without the need for extensive upgrades of the Networks”.

Georgiopoulos gave further detail of how it works: “We connect a Generator on the Network, and then the Distribution Network Operator has the ability to manage the output and reduce the output of that Generator at certain times to keep the Network within certain limits. You need a control system and communications that can deliver the functions of the system and then you need a contract and commercial rules that the Distribution Network Operator and the Generator engage with. These are the two key ingredients: a technical solution and a commercial contractual framework.”

He said the business case was proven: “It is proven and we have had a significant number of acceptances. There is a market appetite and there is a customer need. We should progress and integrate these types of offers within our standard products in the future.”

Georgiopoulos praised new developments in the industry: “The Low Carbon Networks Fund has gone a long way to being the catalyst for developing various new methods. The interruptible connections that we are trialling in Flexible Plug and Play is one, and we are now moving in a more dynamic and fluid environment. We will need to develop these methods to be able to flexibly and cost effectively deal with Distributed Generation and other low carbon type technologies in the future.”

Dr Michael Pollitt Assistant Director of the EPRG – Energy Policy Research Group, and Reader in Business Economics, Judge Business School, University of Cambridge spoke at the third session on “Business Competition and the Economics of Connecting Distributed Generation”. He said that the economics of Smart Connections did add up: “If you offer the Smart Connection alternative, which involves giving people a much cheaper connection offer but subject to the caveat that they will not be guaranteed the export of 100 per cent of their capacity, they will see that it does add up. They may have to accept some curtailment of their output but when they do the cost benefit analysis, they will see that the savings are so great on connection and the losses are really quite small in terms of lost energy sales, so they will then take the Smart Connection offer.”

Pollitt said they had been studying the March Grid area that UK Power Networks was trialling and that smarter connections worked out economically but some groups gained more than others: “Smarter Connection is definitely better. What you end up with is a significant amount of extra generation, which is profitable at the current energy prices and subsidy rates”.

“We looked at three basic groups in Society, the Distributed Generators themselves, who are getting the direct benefits of faster connection; the Distribution Network Operators who may be getting some payments for connecting the more Distributed Generation and the Suppliers and Consumers who are getting some savings in terms of reduced losses or reduced CO2 emissions”.

“What we found was that actually out of the total sum of those costs and benefits, it was the Distributed Generators who were walking off with most of the total societal benefit”.

“The consumer is not benefitting from the Smarter Connection option, and also worryingly the Distribution Network Operator is also not benefitting significantly. The question arises: “What’s in it

for us?” as a Distribution Network company. Then you have to consider what is in it for Society from these Smarter Connections.”

He said that new solutions were needed to tackle this inequality: “What we suggest as a result of our scenario analysis is that there should be a new Smart Connection fee, which the Distributed Generators pay to the Distribution Network Operators, in order to incentivise this Smarter Connection.

“With the removal of the current distribution incentives to connect Distributed Generators, there will need to be some replacement in the future.”

Pollitt said that others were still working on similar solutions too: “As we heard from OFGEM today, and as we heard from our colleague from Denmark, all jurisdictions haven’t worked out a genuine Smart Connection charging approach, even though they all recognise the advantages of connecting capacity at points in the Grid where there is available Network capacity.

“We would like to see more of an auction based approach, but for that auction, as in California, to include some element of the connection cost, as well as the energy costs. Clearly we can look at the prices that come out of the auction and see whether those are competitive with the larger scale projects that we conventionally think about.”

The Fourth and last session of the day looked at “Distributed Generation Opportunities and Future Challenges”, and heard from a number of speakers.

Duncan Burt, Head of Commercial Operation of National Grid; Euan Norris Senior Project Manager of SP Energy Networks; Ben Wilson Director of Strategy & Regulation and Chief Financial Officer, of UK Power Networks; and Zoltan Zavody Head of Grid at RenewableUK. They all said that they were optimistic about the future too.

Burt said: “The test cases that we have seen today absolutely back up what we have seen on transmission, which is that the business numbers for this stack up. There are some real hard yards for everyone here in terms of organisational change and driving the businesses very differently to line up with what customers want and need while maintaining security of supply as we do that. There is an awful lot in there in terms of people, technology, commercial structures and regulatory frameworks alongside policy. That is a lot to handle all at once, but I am sure everyone is up for it. It is certainly going to be a very interesting period ahead.”

Norris said: “We are a regulated organisation, being a Distribution Network Operator and things are evolving in terms of how we are incentivised, how we recover our revenues, and what we have to do to deliver the infrastructure fit for purpose. Things have changed from a regulator point of view from when I started in the industry 16 or 17 years ago.

“But we have started something that we don’t know where the end game is. We are trying to put in solutions that are fit for purpose going forward and there is certainly more collaboration and more co-ordination between the Network operators now. I think this is a good thing for everybody’s benefit. There is a lot of sharing of knowledge and I would encourage that going forward.”

Wilson said: "I think we are at the start of something very exciting over the next five to ten years, we are going to see a complete transformation of what it means to be a Distribution Network Operator. The really exciting thing about this is that it is customer led, it is our connection customers that are demanding that we do this. It is a very exciting customer led revolution."

Zavody said: "I was very pleased to have been here today, non-firm is one of the many emerging tools that Network companies can deploy to support the connection of more clean affordable renewable energy to the benefits of the Country as a whole."

The EPRG Workshop on Distributed Generation and Smart Connections held in partnership with UK Power Networks was stimulating for all who attended it. The lights certainly went on and will remain switched on for many of those who attended.

Michael Pollitt expressed optimism about the future: "In the future I think we will all be a lot more conscious of the fact that more of our electricity is being generated closer to where we live and where we work. I think the exciting thing is that the cost of Distributed Generation is coming down. We all know about solar PV on roof tops but it is also true that single wind turbines are becoming cheaper and I hope that the cost will come down sufficiently and that locally renewable resources will be something that many people are familiar with. I am a technology optimist."