OFFICIAL REPORT
AITHISG OIFIGEIL

Economy, Jobs and Fair Work Committee

Tuesday 13 June 2017

Session 5

The Scottish Parliament
Pàrlamaid na h-Alba

Tuesday 13 June 2017

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ECONOMY, JOBS AND FAIR WORK COMMITTEE
19th Meeting 2017, Session 5

CONVENER

*Gordon Lindhurst (Lothian) (Con)

DEPUTY CONVENER

*John Mason (Glasgow Shettleston) (SNP)

COMMITTEE MEMBERS

*Jackie Baillie (Dumbarton) (Lab)
*Bill Bowman (North East Scotland) (Con)
*Ash Denham (Edinburgh Eastern) (SNP)
*Richard Leonard (Central Scotland) (Lab)
*Dean Lockhart (Mid Scotland and Fife) (Con)
*Gordon MacDonald (Edinburgh Pentlands) (SNP)
*Gillian Martin (Aberdeenshire East) (SNP)
Gil Paterson (Clydebank and Milngavie) (SNP)
*Andy Wightman (Lothian) (Green)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Professor Keith Bell (UK Energy Research Centre)
Duncan Burt (National Grid)
Emma Kelso (Ofgem)
Barbara Vest (Energy UK)

CLERK TO THE COMMITTEE

Alison Walker

LOCATION

The David Livingstone Room (CR6)

Scottish Parliament

Economy, Jobs and Fair Work Committee

Tuesday 13 June 2017

[The Convener opened the meeting at 09:49]

Decision on Taking Business in Private

The Convener (Gordon Lindhurst): Good morning and welcome to the 19th meeting in 2017 of the Economy, Jobs and Fair Work Committee. I have received apologies from committee member Gil Paterson. I remind everyone to turn off or switch to silent any electrical devices that might interfere with the sound system.

Agenda item 1 is a decision on whether to take item 3 in private and whether to take in private at future meetings consideration of the committee's draft letter to the Scottish Government on the draft energy strategy and consideration of a list of candidates for the post of adviser for the committee's forthcoming economic data inquiry. Are we agreed to take those items in private?

Members *indicated agreement.*

Draft Energy Strategy

09:50

The Convener: Agenda item 2 is an evidence-taking session on the draft energy strategy. I welcome to the meeting our panel of witnesses, who, from left to right, are Emma Kelso, a partner in energy systems at the Office of Gas and Electricity Markets; Duncan Burt, the head of operate the system—electricity at National Grid; Barbara Vest, the director of generation at Energy UK; and Professor Keith Bell, the co-director of the UK Energy Research Centre.

One of the actions set out in the draft strategy, which you will all be familiar with, is to address

"grid constraints ... for distributed power generation at local, regional and national level".

Can you comment on that? I should point out that you do not need to respond to every question; it depends on whether you feel that you have something to contribute. There is also the possibility of submitting written evidence after the session if you feel more comfortable in dealing with an issue on that basis.

Who would like to start?

Duncan Burt (National Grid): We very much agree that the grid constraints need to be addressed—indeed, they are being addressed. Constraints remain right across the Scottish network, particularly north of Inverness, but they will be corrected by the establishment of the Moray Firth high voltage direct current link, which will come in over the next year, and the completion of the western HVDC link from Glasgow down to Liverpool. Those two major investments—the first by SSE and the second by Scottish Power and National Grid—will relieve the residual major national constraints on the electrical network in Scotland.

Nevertheless, it is important to recognise that individual, very localised constraints might remain, which will prevent new connectees from connecting to the grid in the short term. Scottish Power and SSE are working hard on and investing in removing those constraints. Many are removed by the connect and manage process, which was implemented just under a decade ago in partnership with National Grid, Ofgem and the Scottish transmission companies. That has removed most of the development risk with regard to connections for those parties, but some local constraints will remain that are very much associated with the need to plan and give consent to local upgrades for those connections. An absolutely critical part of the investment environment is that people understand the risks around planning and connection and that,

wherever possible, in balance with the democratic process around planning and construction, those risks are removed.

The Convener: Does anyone else wish to comment?

Professor Keith Bell (UK Energy Research Centre): The removal of constraints is important, but it must happen at the right—in other words, the economic—level. If we limit the power flows on the network, we cannot utilise the cheapest or lowest-carbon forms of generation and we have to replace them with something else. Reinforcing the network clearly comes at a cost, so it is important that we strike the right balance, and I know that the three transmission companies, including the system operator and transmission operator parts of National Grid, have processes for undertaking that cost benefit analysis.

The issue also applies with regard to distribution network voltages. The draft energy strategy highlights the issue of local or community energy and smaller-scale schemes that connect to the distribution network, whatever their ownership might be, and there is room for improvement across the whole of Great Britain with regard to releasing network capacity to prospective new users in the most cost-effective way. By that, I am thinking of the balance that is struck between having extra network capacity and the impact of not always being able to use all of the available energy. It is a question of how much time and energy might not be used, the cost of that versus the cost of upgrades and, indeed, the planning permission for the upgrades, which is another big issue.

Emma Kelso (Ofgem): I second what Keith Bell and Duncan Burt have said. The investment that is under way and planned is important. As the economic regulator, we believe that it is also important that the investment is achieved as economically and efficiently as possible.

It is not just a single issue to be dealt with once and for all, as the situation constantly shifts with new technology and the transition of our generation mix. We will have to constantly keep our eye on the situation and make sure that we address the issue on an on-going basis.

The Convener: I have a follow-up question. Given the need for some overlap between the United Kingdom Government's approach and that of the Scottish Government, how realistic is the draft energy strategy's approach, bearing in mind that some things may depend on future collaboration between the two Governments? Does anyone wish to make some politically neutral comments on that?

Barbara Vest (Energy UK): The strategy looks ambitious: the Scottish Government has definitely set out its vision there.

You used the word "collaboration", and it will be essential that we all work together to get the best result. Scotland is leading the way on renewables. We have the cheapest form of generation in onshore wind provided that we can use the planning laws to encourage more of it where it is best located—in Scotland, the north, Wales and the islands. We need to work together to achieve the right ends. The vision is there; we need a collaborative approach to go ahead and deliver it.

Professor Bell: I do not see any contradiction in the ambition that the energy strategy sets out for the electricity system. The role of the regulated electricity network and utilities is to facilitate whatever the market wants. The Scottish Government has a role to play, which it has played successfully over the past 10 to 15 years, in creating the environment for investment, building up confidence in the market—in particular, among the people who are developing generation facilities—and, to an extent, attracting demand from whatever new businesses will utilise electrical energy.

The regulatory framework is important for facilitation and, a few moments ago, we talked about the economic development of the network and its facilities. I see no contradiction between the Scottish Government's aspirations and what would be required by the various network companies' licences.

Some details need to be worked out. Some market arrangements are starting to struggle with the transition of the whole electricity system that we are familiar with, and deep consideration is needed of what the solutions might be. It is not within the Scottish Government's gift to drive those solutions, but it has made a positive impact in encouraging the UK-level debate on a lot of those matters. Scotland has a strong knowledge base, not just in its civil service but within its two transmission and distribution companies, that can inform the wider debate in the academic community and so on. That contribution is already being made in informing the wider GB discussion, and I look for it to continue, because what we want to get out of it will be good for Scotland and for Great Britain as well.

John Mason (Glasgow Shettleston) (SNP): The theme of balance runs through a lot of today's questions. On the one hand, we have a lot of renewables coming through. Just this summer, I visited Methil to see the hydrogen work that is being done there, although that is still in its early stages. How reliant can we be on renewable sources, and how much should we look to thermal

generation and demand reduction? It is difficult to see what the balance should be.

10:00

Duncan Burt: That is a great question, and it is one that we are considering closely. Scotland already has one of the lowest-carbon grids in Europe and, with Portugal and Denmark, is leading in Europe on the growth of renewables and decarbonisation.

As we look forward through the 2020s to 2030 and beyond, we see the need for a very low-carbon electricity grid to underpin the decarbonisation of the transport and heat sectors, which is recognised in the strategy. Essential to that will be a good mix of low-carbon sources—thermal generation with carbon capture and storage, nuclear generation and renewables. Those will all be in the future mix, particularly once the growth in heat demand on electricity, which could be significant and peaky, begins. However, we are confident that we have the tools and resources that we need to balance and retain the security of the grid under a wide range of scenarios over the next 15 or 20 years—not only high-renewables grids but grids with large thermal generation and nuclear generation on them.

When we model the Scottish grid, as we have been doing with Scottish Power and SSE, we see that it is perfectly feasible to operate it solely on renewables. Indeed, that regularly occurs at the moment. The only large thermal power station left in Scotland is Peterhead, and it does not run often, so we have regular periods when Scotland is operating entirely on renewable power.

John Mason: Is the implication of that that we do not need any new thermal generation?

Duncan Burt: We can operate the grid without it. We are moving from a world in which an awful lot of the arrangements were oriented around large thermal power. As Keith Bell said, the market has fundamentally changed over the past five years, and it will continue to change as the thermal power stations that are left operate less and less. I expect there to be a lower number of residual thermal power stations left. Ideally, I would like them to be spread around the country relatively uniformly to give us options for how we manage the grid. That would make sense, and it will require changes to arrangements over time. We are considering that closely with the Scottish companies and the industry as a whole.

John Mason: Do any of the other witnesses think that we are being overoptimistic about renewables? Perhaps we are not being optimistic enough.

Professor Bell: Whether we look at renewables optimistically or pessimistically depends on what we are trying to achieve, I suppose.

On the need for thermal plant, I would characterise the issue as being about the ability to operate the system under a wide range of conditions. It is about having schedulable resources—ones that we can control. We are able to determine what such resources will do some period ahead of time, such as a few hours or a day ahead. Wind and solar power are not strictly schedulable in that sense, although we can turn them down. If it is windy, we can switch wind farms off but, if it is not windy, we cannot switch them on. Therefore, they are not quite the same thing.

Conventional thermal generation is schedulable. The designs that we have had to date in Britain for nuclear plants—which make use of steam and are, in a sense, thermal as well—are not terribly flexible but they have some flexibility and schedulability. The other resources could be hydro, interconnectors or other thermal plant. There are different options.

Being able to have the level of control that I described under a range of circumstances gives the system operator a degree of comfort about ensuring that the supply to consumers will be continuous under a wide range of situations—for example, if bad weather is coming.

Duncan Burt: I will echo and build on Keith Bell's point. We have a diverse range of sources that we can use alongside thermal generation. The growth in pump storage—potentially in Scotland, in particular—with battery storage alongside that; the potential for demand-side services to play a significant role in future balancing and interconnection into Scotland; and the GB market more widely give us an awful lot of options to help us to operate the grid.

It is worth bearing in mind that renewables already provide a significant number of services to the grid in terms of voltage and frequency support, which allows us to operate the grid securely as we would have done historically with thermal plant. Even the most cold-hearted engineer can see that we have the ability to use other sources of controllable power to manage the grid.

The classic situation that everyone talks about is a very low level of renewable energy. However, we know that we can operate Scotland with a very low level of renewable energy; it is just a question of where we would get the alternative supplies from at the GB level—whether it would be from pump storage, battery storage or the demand side.

Barbara Vest: I come at the issue from a different angle: the operability of the system and what the current and new players can offer. We

are seeing lots of what we call disrupter parties coming in, aggregators and battery storage technology is improving and wind farms are looking to repower and reconfigure their footprint to include solar power and battery storage in order to maximise the capability of the connection. National Grid has said that it will examine how we procure and attract ancillary services, and we have done some work on the current procurement process for ancillary services and what it might look like in a new world.

This is getting a bit techie, but I remember being on a grid code panel many years ago and some of the operatives at National Grid having a presumption about how a wind farm operates until someone said, "Have you ever been out to a wind farm to see what's possible?" A trip to one of the wind farms was organised—I cannot remember which one.

Duncan Burt: Was it Crystal Rig?

Barbara Vest: Yes. Suddenly the blinkers were taken away, eyes were as wide as saucers and National Grid could see what the operation of a wind farm was like. That was way back then; the technology has improved.

We need to have a more collaborative approach to ancillary services provision, and we need to get some of the new disrupters around the table so that National Grid can explain to them what the grid's operability problem is and they can tell us about their potential new solutions. We need to throw away the old rule book and approach and become more collaborative and collegiate in order to understand what the new possibilities are. It is not about picking one winner, because the solution could be a whole range of them working in tandem.

Emma Kelso: I was going to make similar points about the role that demand-side response and battery storage, in particular, can play. Ofgem is currently working with the UK Government and wider stakeholders, including in industry, on how we can ensure that there are no undue barriers to the technologies being able to emerge and continue to grow.

On the point about ancillary services, we are working closely with National Grid. It is important that there is as much transparency as possible in the area, particularly with new technologies, so that they can have a conversation with National Grid about how they can participate in the various ancillary services that are on offer.

I am sure that Duncan Burt would be able to go into detail on some of the new services that National Grid has brought in over the past couple of years to help with the transition to a lower-carbon economy.

The Convener: Bill Bowman has a follow-up question.

Bill Bowman (North East Scotland) (Con): You might not agree that thermal should continue in Scotland, but if it does for the next five or 10 years, is the site at Peterhead fit for purpose? Should it be refurbished, or should we start again at one of the former thermal sites in the central belt?

Duncan Burt: I will not comment on the strategy of a separate company, if that is okay, but I will observe that, across Great Britain, the cost of establishing a network to connect a power station is expensive and uncertain from the point of view of planning and investment, so many parties have chosen to use existing sites for the construction of new power stations. Indeed, the most recently connected CCGT plant at Carrington near Manchester was built right next to an existing substation. That is what usually happens.

In our future energy scenarios, we think that CCS has an important role to play in delivering the lowest-cost low-carbon grid that we can get. Necessarily, CCS sites would tend to be on the east coast of England. Historically, there have been discussions about CCS connection for the Longannet and Peterhead sites. Without getting into the particulars, the use of an existing site would be entirely consistent with the strategies that have been adopted by most power companies in the UK, and both those sites appear to be consistent with the CCS strategy. That is probably as far as I can go.

Professor Bell: Basically, it is up to the market to decide which sites to develop, based on the condition that they are in, the equipment that is there and the degree of refurbishment that would be required, and to come up with a price for providing services. As Duncan Burt said, an existing site has obvious advantages.

When it comes to the procurement of enough generation capacity as a whole, we in Scotland get a lot of benefits from being part of the GB system: we get support during periods of low wind and we have a market to provide to during periods of high wind. For the GB system as a whole, as the committee is aware, there is now a capacity market that is intended to deliver enough generation capacity overall.

I think that the locational value should be looked at, because there are system operation services that come from a particular location. It is partly to do with voltage control or managing the power flows under particular conditions relative to the network capacity.

At the moment, it is quite difficult to think coherently about all those different services as a package, because we have a range of different

ancillary services that are procured in different ways. To be fair to National Grid, it tries extremely hard to get best value out of those services. There are reasons for having different services, because there are different technical requirements. We should look at how the whole package is considered, and the locational value should be taken into account.

Duncan Burt: As Emma Kelso indicated, we are doing a lot of work on how the markets for the services that we buy, which represent a small proportion—less than 1 per cent—of the overall market for electricity, should change. Today, we are publishing the "System needs and product strategy", which is our way of saying, "This is technically what we need to operate the system, and this is how we think the markets for those services should evolve over the next 10 years." Alongside that, we have done major new tender rounds, such as the enhanced frequency response tender, which, in effect, was the largest battery tender in the world; we did that about two years ago. That has resulted in the bringing forward of significant volumes—200MW—of very fast control plant right across GB.

There is a need to provide clarity and information to make sure that we facilitate that rapid transition. There will be questions for everyone during that process, particularly in the investment cycle for existing and new power stations.

Jackie Baillie (Dumbarton) (Lab): I turn to transmission charging. Ofgem had a review in 2014 and reached some conclusions. A peak security tariff and a year-round tariff were adopted. Could somebody explain the difference between those two tariffs and the value of each of them?

Emma Kelso: I do not have the numbers to hand. If Duncan Burt has them, he should go ahead.

Duncan Burt: I do not have the numbers, so perhaps Emma Kelso could talk about the more general framework.

Emma Kelso: As far as the overall framework is concerned, transmission charges have two components to them: a cost-reflective charge and a residual charge. That means that the charges that any individual demand customer, such as a household or a business—or, indeed, a generator—will pay will depend on where they are located and how they use the transmission network.

As Jackie Baillie said, we did a significant piece of work to overhaul those charges, which culminated in 2014-15. As a result of that, there have been quite significant reductions in charges for intermittent generators in particular. As well as significant reductions in charges for wind farms, there have been smaller reductions for some thermal generators.

10:15

Jackie Baillie: Can you give us a sense of the scale of those reductions in relation to what generators were paying before? Have the charges halved?

Emma Kelso: Off the top of my head, I believe that the charges for wind generators have come down by approaching 20 per cent. That is a ballpark figure. We could write to you after the meeting with a more specific figure.

Jackie Baillie: That would be helpful, given Scotland's reliance on wind generation.

Could you set out the role that transmission charging plays in encouraging new thermal generation?

Duncan Burt: Sure. The historical framework provides for a locational signal in the charges to indicate where it would be more expensive, or less expensive, to connect generation to the system. In general, that has meant that charges for generation have been higher in the north—particularly in Scotland—and lower as you get into the midlands. The lowest charges—indeed, they might be negative—are in central London, where, of course, it would be very hard to build a large power station, but where there is a huge amount of demand.

That framework was reviewed during the most recent major review, as you said, and some adjustments were made to how that would work, particularly for intermittent or variable generation. I think that that will continue to develop. I have said already that the amount that thermal stations are running continues to decline year on year as renewables become more and more prevalent. That is particularly the case in Scotland.

A discussion about the charging process is going on at the moment. SSE has proposed a modification to the charging arrangements for thermal generation in Scotland. That proposal would reduce significantly the charges for thermal generation in Scotland. National Grid is supporting the adjustments that that would make to the signals. That reflects the fact that the way in which the network is being used is continuing to change—indeed, it is changing more rapidly than we would have expected even three or four years ago, as a result of the continued growth of renewables. There has been particularly strong growth in solar energy in England and continued robust growth of renewables in Scotland, which is fantastic for the decarbonisation of the grid. The continued growth of wind in Scotland is a signal that the revisions that have been made to charges

over the past three years have not stymied such development in Scotland.

Jackie Baillie: I would like to take that slightly further; others might want to come in. You are very positive about renewables, which is to be welcomed. The nuclear plant Hinkley Point aside, what new thermal capacity is being generated? I am as concerned as you are about keeping the lights on. Where will the new thermal capacity come from? Is it required or not?

Duncan Burt: As of last year, we have a fully functioning capacity mechanism across Great Britain, which operates against a reliability standard that is agreed and confirmed by the Westminster Government. That mechanism sets a target for the capacity market to deliver enough capacity to ensure continued and consistent reliability of supply at a GB level. We think that those processes are working very well.

As far as the connection of new capacity is concerned, the last large thermal power station to be connected was Carrington in Manchester. Other large stations regularly participate in the capacity mechanism. To date, there has been a diverse range of successful participants in that, from the very large to the very small. It is important to recognise that, in future, security of supply will come from a very diverse range of sources, including the large stations that we know and love, smaller sites that can provide occasional power when it is needed for a few hours, batteries and interconnection.

One of the challenges that the industry faces is that of being able to look anew at fundamental questions of national importance, such as security of supply and grid resilience, and not clinging to the way in which we have run things over the past 20 or 30 years. As Barbara Vest said, we have all had to transform our thinking on how we can operate the grid to make sure that we get best value for consumers out of the existing mix.

The Convener: I will bring in Richard Leonard, who has a supplementary question on that point.

Richard Leonard (Central Scotland) (Lab): Actually I have a specific question that is not directly related. Do you want me to ask it anyway?

The Convener: Why not?

Richard Leonard: Okay. We are a Scottish Parliament committee and I want to ask about interconnectors to the islands. Where do things stand on that issue? My source tells me that the Conservative Party manifesto for last week's election contained a commitment to island wind. Have you already begun to think about the steps that you need to take to put in place the infrastructure—the interconnectors—that will bring that commitment to fruition?

Duncan Burt: That is a very active and on-going conversation with Scottish Hydro Electric Transmission and Scottish Power Transmission. We have good plans in place, including technical plans for the connection of island wind. The policy around how that is done and funded is a much broader issue for the Government and Ofgem. We see no challenge, other than the fact that, as with any major piece of infrastructure, building those links is a significant engineering undertaking. However, it can be done and we have the plans to do it.

Richard Leonard: So you have the technical plans but not the budget.

Duncan Burt: That is right—we do not have the funding.

Emma Kelso: Ofgem's role is to approve a connection if a case is made. In doing that, we need to ensure that that cable will be used. That is the first step. Once that has been agreed, we can go through the usual processes, and the usual charging regime would apply.

Gordon MacDonald (Edinburgh Pentlands) (SNP): I have several questions about black starts and re-energising the system. When our predecessor committee looked at the matter two or three years ago, my understanding was that pump storage hydro would kick in first, followed by conventional thermal power stations and then nuclear plants. Longannet is now out of the picture and Peterhead is filling the breach.

I want to ask you about a letter from National Grid to Ofgem dated May 2016. It states:

"For the purposes of Black Start, the country is split into six zones."

Scotland is one of those zones. The letter continues:

"2 units per zone are required to Black Start simultaneously. National Grid's policy states that 3 units should be contracted in each zone".

Can you tell me how many units are contracted in Scotland?

Duncan Burt: A number of units are contracted in Scotland. The major contracts are with two of the pump storage stations and we have parallel contracts to thermal generation in order to restart. We do not discuss publicly the specific names and detail of the stations involved, but I am sure that the committee—

Gordon MacDonald: Is there another thermal station other than Peterhead located in Scotland that could be part of that process?

Duncan Burt: The black start contracts are specifically with the pump storage plant or hydro plant. We have a number of smaller hydro stations that also participate in the initial black start to

connect much of the demand in northern Scotland, alongside the large process of pump storage to large thermal plant. We have arrangements in place to use power stations in northern England alongside those that are available in Scotland, should they be needed in order to facilitate a speedy black start of Scotland.

Gordon MacDonald: I am happy for other witnesses to come in—this does not have to be a conversation between me and Duncan Burt.

On the timescale for black start, I understand that you hope to get 95 per cent of Scotland up and running within 24 hours. However, the same letter from National Grid says:

"NGET's strategy in the event of a Black Start situation is designed to achieve a restoration of the skeleton network within the industry expected 12 hour period."

Why is it 24 hours for Scotland when you are expecting to do it in 12 hours?

Duncan Burt: I would need to check the precise wording of the letter. Our standards have not changed. However, over the past three years, we have changed our strategy in relation to the components of how to do a black start, and we continue to adjust it to bring more options and competition into the market as the number of thermal power stations declines. We call it a spinal strategy, and we are gradually moving to a fuller spinal strategy that allows us to put a larger proportion of the network together earlier and connect generation into it as it comes online. That gives greater diversity of options on black start stations and allows us to facilitate restoration across the country by using stations outside a particular zone, be it the north of England, Scotland or southern England. We have used that approach to militate against the risk of closures of stations such as Longannet, as well as stations in England and Wales. It allows us on the day of a black start to adjust our plans, based on the stations that are available, and to bring supplies back on as quickly as we can—as you would expect us to do.

The spinal strategy means that we no longer focus on restarting particular regions on their own; we grow the network earlier and bring power stations on to it. That technical process is not more complex, but it is different. We will build it in stages with the distribution networks—those are critical, because they reconnect the supply as we go. The first stage has been to merge the two historical plans for the north and south of Scotland into a single zone for Scotland's restart.

Gordon MacDonald: I will ask about the UK specifically in a minute, but first I have a hypothetical question based on a real-life situation. How long would it take to reconnect an elderly constituent who lives in a remote rural part of the country and who depends on electric heating? How would that timescale compare with the situation five years ago?

Duncan Burt: The timescales are broadly consistent with those of five years ago, and our aim is clearly to maintain consistency of restoration times.

Rather than resulting from a major national shutdown, supplies are always more likely to be lost due to very local power cuts that are related to the distribution network. A major national shutdown is likely to be linked to a significant event, such as a major storm like the one that happened in the south of England in 1987 or a terrorist or other malevolent act against the electricity system as a whole.

We look at resilience in total and plan for a robust and speedy restoration that will give policy makers choice as to how to direct power after the first 24 hours. However, we know that in some areas it could be several days before everyone gets back all the power that they need. Those areas would not necessarily be remote and rural but could be urban. That is particularly the case in Scotland, where the smaller hydro stations in the north and in Dumfries and Galloway could provide early support into the rural networks. Local government has a role in working on resilience plans for each region, which build into national resilience plans involving the police, hospitals and everything else. Given the significance of such an event, you would expect us to have robust plans in place that we practise regularly so that we can ensure that, if the worst happens, every constituent is back on as quickly as possible. You will understand that that process takes time and that choices have to be made within it.

Gordon MacDonald: You mentioned the 1987 storm when there was loss of power in the south of England. In the event of a complete GB shutdown, given that you have six zones or power islands or however you refer to them, what is the priority to get those up and running?

Duncan Burt: The priority is to get the electrical network back functioning as a strong system, given that it would have been significantly impeded by a complete shutdown. We expect to get the vast bulk of the network back and energised in the first 24 hours.

Gordon MacDonald: Would the network be back uniformly across the UK, or would it be back in certain areas?

10:30

Duncan Burt: The network would function uniformly across the UK—it would be broadly uniform, as there may be differences of an hour or

two. Resilience is managed at a regional level, or at a national level for Scotland and Wales, and it is key that power is available right across the country to provide support to critical local infrastructure. We are looking closely at that issue with Government at the moment to make sure that we have the right plans in place for speed of connection and resilience of network, while the electrical system goes through significant transformation. We work closely with the network companies in Scotland and England to make sure of network resilience, given its critical role. All those things have to come together for resilience to work well.

After the first 24 hours, it may be possible for policy makers to begin to make choices about where the power goes, depending on the situation. Our plans are for power to continue to be fed uniformly around the country to where it is needed—that is what we expect to happen.

Gordon MacDonald: You mentioned the interconnectors. We could be dependent on the thermal plants in north-east and north-west England. If the thermal connectors from the UK to Europe did not work in the event of a GB shutdown, would the interconnectors between Scotland and England work?

Duncan Burt: Yes, they would work. The interconnectors are an integral part of the GB network and would continue to operate. They could form a fundamental part of a black start.

Gordon MacDonald: My final question is about the European Union interconnectors with France, Belgium, the Netherlands and others. As thermal capacity in the UK continues to drop, what impact could Brexit have on black starts and broader system security if the deal is a hard Brexit or if we walk away without a deal?

Duncan Burt: Without getting into hypotheticals, the UK is linked into the broader European market, in which National Grid has said that continued participation by the UK is beneficial, because it delivers a lower price to consumers in Great Britain.

However, our capacity mechanism arrangements covering GB look at the level of security that we need. The vast bulk of capacity for GB is delivered within GB—only a relatively small proportion is not.

Gordon MacDonald: Is that about 3 to 5 per cent?

Duncan Burt: Yes, it is low numbers. Even at short notice, under most scenarios we could happily replace that interconnection capacity with GB capacity. We are working closely with Government on the evolution of the energy market as part of Brexit, which will continue as things progress over the next couple of years.

Barbara Vest: We are currently harmonising arrangements on EU network codes that have progressed to the point at which we are almost at implementation. We would prefer to remain part of all that. However, whatever happens with Brexit arrangements, we expect that stakeholders will be consulted on what will stand and what will fall by the way. Our members are interested in making that work.

Emma Kelso: Ofgem also considers that the interconnectors play a helpful role in security of supply. The precise way to trade across those interconnectors remains to be seen, depending on the arrangements that ultimately come out of Brexit.

It is worth noting that the capacity market works in such a way that it de-rates interconnectors. It takes into account how much it thinks it can rely on an interconnector being there when it is needed. If required, the de-rating factors could be adjusted in future capacity market rounds, so we could adjust the capacity that was procured within the UK if we could not rely as much on the interconnectors.

Professor Bell: I will make a general comment on this strand of the discussion. Things are changing and there are uncertainties—Brexit is one, and the generation mix is changing too. The key thing is that the main parties that are responsible for ensuring continuity and security of supply for the GB system and all the regions therein—Scotland, Wales and so on—keep everything continually under review. There is an active process of checking that the existing arrangements and procedures are appropriate. We have not needed black start in GB, but we can never say never. The key thing is that everything is kept under review and up to date.

It is encouraging that the Department for Business, Energy and Industrial Strategy has established the working group that Duncan Burt mentioned. From my contacts with various parties, I am encouraged that the matter is being taken seriously. I think that there has been a step forward given the seriousness with which it is being taken. There is still a lot of work to be done, but we are going in the right direction. We look for that work to be brought through in a timely fashion. Hopefully, any delays will not matter, because a black start is a very unlikely thing. Duncan Burt has said that what we want is to have an insurance policy in place. In respect of both everyday security of supply, which is provided by the capacity market, and very rare things, we want to make sure that the facilities are in place, are kept up to date and are continually under review.

Andy Wightman (Lothian) (Green): I want to move on to talk about Scotland's energy efficiency programme. There are a growing number of local initiatives for energy generation and energy efficiency. The island of Eigg has a system that is completely off grid, and yesterday we visited Levenmouth and saw generation for transport and electricity that is off grid but parallel and connected to it. We also visited the University of St Andrews, which is generating district heating and hopes in future to generate electricity and make the university carbon neutral.

Are the regulatory and technical aspects of local solutions for energy generation and energy efficiency fit for purpose or are there challenges that we need to be aware of?

Emma Kelso: As you rightly point out, this is a constantly moving target, so it is important that we make sure that the regulatory arrangements remain fit for purpose. There are a number of planks to that on both the generation side—with embedded generation, for example—and the retail side. We are increasingly seeing local authorities becoming involved in making retail offerings, and there is a possibility for the Scottish Government to be involved as well.

Any retail supplier has to have a licence and there is a regulatory architecture in place to make sure that anybody who participates in the market sticks to the rules, but it is important that the detail that sits beneath that is able to evolve as we move through time. Ofgem is working closely with the Scottish Government, the UK Government and stakeholders to make sure that we play our part in making sure that those arrangements are as fit for purpose as possible. In addition, we recently responded to the Scottish Government consultations on the issues.

Barbara Vest: We have long promoted the adoption of a whole-system approach that looks at power, heat and transport together. It is important to get the regulatory framework right, so we have called for an holistic review of charging. Let's face it: the current regime used a traditional model, where all the big generation kit was connected to the transmission system, with demand from the network system. That is not the picture now.

We need to ensure that the arrangements are not barriers to entry for more energy efficiency and for getting more demand-side initiatives and so on up and running. We need stability in policy. It is therefore important to have a review of charging hand in hand with a review of ancillary service provision. That review should consider all charging, as well as the balancing of services, the use of system costs and interconnector costs because the playing field is not level in relation to what some users have to pay.

There is something that we need to be careful about and to embrace. Whatever we propose regarding energy efficiency, we must educate consumers, because there is a huge impact on them. We need to explain to them what the impact of all the initiatives will be on their bill. We have to carry them with us. We also need to ensure that they are willing to play their part.

In the initial stages, if we were to green the heat system or to go for more electrification, that would result in a big overhead for consumers in terms of time, conversions and so on.

There are energy efficiency things that we could encourage those who are able to pay to participate in, and that should help, too.

If all those things reduce demand on the system and if we then opt for electrification for transport, that will increase the overheads. Again, that is where the education system comes in, by explaining to people what the impact on their bills will be.

Andy Wightman: Some of the energy strategy is quite ambitious. It will take us 10, 20 or 30 years to decarbonise and to increase energy efficiency and there will be points along the transition where we have to make very important decisions, for example on hydrogen and the gas network. How do we ensure proper ownership of those decisions?

Related to that, given the long timescale, is there any benefit in having some kind of independent body to deliver the strategy or to be accountable for its delivery—given that Governments and members of Parliaments come and go?

Duncan Burt: There are a few points to make on that. First and foremost, a clear strategy from Government and consistency of policy are key, and we really welcome the work that the Scottish Government has put in on the strategy. It is ambitious and far-sighted in scale, and it covers everything from electricity to transport and heat. The benefits of such clear policy direction and of consistency of direction are evidenced in the tremendous growth of renewables in Scotland over the past 10 years. That is largely related, we think, to that clarity of policy at a national level.

As we consider what is going to happen, it is very important that we test and pilot potential solutions alongside trying to design all the stuff up front.

Barbara Vest has eloquently mentioned the role of very new entrants a couple of times—as well as that of disruptors coming into the industry. Not all the answers for this revolution—in the decarbonisation of electricity, in transport and in heat—will come from the existing large players

who have the capability and capacity to engage in an extensive Government review. We found that through our wide programme on demand-side management, which is called “power responsive”. It has everyone—from Tesla to the distribution networks to small and large commercial entities including retail businesses—participating by helping to figure out what we should decide now and what we can leave until later. McKinsey brought out a very good report for World Energy Forum earlier this year, which highlighted the tremendous value of optionality in the way in which the energy markets and the decarbonisation of transport and heat will evolve over the next 10 or 20 years.

10:45

That is recognised in the strategy—although perhaps not consciously—in the diversity of options around heat and the need to move early in some areas. In terms of how that is done in Scotland, I would say that in SSE and Scottish Power you have two large and actively engaged companies, which are bringing international expertise—particularly in the form of Iberdrola for Scottish Power—into the distribution networks in Scotland. A number of innovation projects up here are being funded by Ofgem.

Across Scotland there is a tremendous wealth of smaller, innovative energy companies that are participating and helping to lead the debate, from Flexitricity in Edinburgh to Smarter Grid Solutions in partnership with SSE and other companies in innovation projects. You have some tremendous organisations up here and we should ensure that we use them heavily, along with experts such as Professor Bell.

Gillian Martin (Aberdeenshire East) (SNP): I was going to ask how feasible you thought the move from 15 to 50 per cent in the next 10 years would be, but I think that you have largely answered that question.

I will move on to the investment that people have made in wind turbines, for example, and the removal of the subsidy. You have said some great things about how well we are doing in creating renewable energy in Scotland and much of that could be due to the regime that allowed people to invest in expensive wind turbines. What is your message on the removal of that subsidy? What will the impact be on growing the amount of people who make such investments in renewables technologies?

Professor Bell: It is perhaps my turn to kick off. There is a real challenge in general for the contracting of electricity generation. The shift to low-carbon energy means that we have plant that has high capital costs but low running costs. The conventional way of running markets is based on the short-run costs, so in a fossil fuel dominated market, it is to do with the relative prices of different fossil fuels, such as gas and coal, competing with each other. Whatever is the marginal unit sets the price for the market and everyone recovers their money and gets a bit of a surplus that pays off their long-run costs. However, if everyone has very small short-run costs and the wholesale price is determined by that, it is very difficult to see how suppliers can recover all their long-run costs.

That issue is partly recognised by the institution of the capacity market, which ensures that there is enough capacity and fills in some of the gap. It is also somewhat addressed by the contracts for difference that have been signed with low-carbon generation. In the past, contracts for difference have been for onshore wind, solar photovoltaic and offshore wind, and also Hinkley Point C, and in the future they are promised for offshore wind, although not onshore wind, as you have highlighted. I am not sure that that is a consistent position to take with respect to contracting the cheapest forms of energy for the GB or Scottish consumer.

There is a fundamental issue relating to the long-run recovery of costs in a wholesale market that will be highly volatile—it needs to be volatile to reflect times of shortage and to allow some plant to run for only a short period and to recover its costs—and giving confidence to investors over that period. I have not thought this through enough, but I see some need for longer-term procurement of energy.

Recently, I was talking to a colleague from Chile who works with the system operator there. Chile is way ahead of the world in the organisation of electricity markets—it liberalised the market in the 1980s, whereas we did it in 1990. There is a lot of value in looking at what Chile is doing. My understanding is that it is moving to a slightly longer-term, more centralised procurement—albeit competitive—of a range of types of generation, trying to make it as technology neutral as possible. In principle, if we see the levelised cost of onshore wind coming down to near the levels of a new combined-cycle gas turbine plant, that appears to give an opportunity for onshore wind, which remains the cheapest form of low-carbon energy in our part of the world. There is a lot to be thought about there, which could lead to a fairly wide-ranging change to the way in which any type of energy is procured.

Gillian Martin: So it comes back to consistency.

Professor Bell: I think that you are right, yes.

Barbara Vest: Our members are fully supportive of electricity market reform—the

capacity mechanism and the contracts for difference—and onshore wind has been proven to be one of the cheapest forms of renewables, so let us see onshore wind capacity built where it is most efficient and effective and where local communities support the building of it.

The other thing to look at is the repowering and the more efficient use of existing sites, which is the next phase that we are looking towards. If the planning regime is right and the will is there, we can get these projects built and up and running.

Gillian Martin: Would you accept that removal of the subsidy is a barrier to onshore wind becoming viable as a main source of energy, or do you think that it is irrelevant?

Barbara Vest: There are many challenges. The removal of the subsidy has not helped, but we need to look at more efficient ways to deliver. The problem at the moment is that the policy is uncertain. The sooner we get some certainty, the better all round—for many areas, not just energy.

Ash Denham (Edinburgh Eastern) (SNP): The draft energy strategy contains a proposal for a Government-owned energy company. At the moment, we are not exactly clear what form that will take. What are the panel's views on that? Would such a company have the potential to address market failures by investing in infrastructure, for instance, or would it act more as an energy supplier, or should it be doing both those things?

Emma Kelso: It is a very interesting concept and, in some ways, it is not entirely new, as I alluded to before. Some public sector organisations such as some local authorities in Scotland, England and Wales are already looking to gain electricity supply licences. It is something that Ofgem is more than happy to work with the Scottish Government to explore.

We have recently set up an innovation hub in Ofgem, which is designed so that any industry player or potential industry player can come along, ask questions and talk about a new concept or a new way of engaging in the market. They can look at the regulatory barriers and the current rules and what would perhaps need to be changed to facilitate those innovations. We are very supportive of further discussions about that concept.

Barbara Vest: This is a tremendous opportunity, but it could also be not such a good idea if it is not fully explored and the risks are not properly assessed. I have recently been approached by one of the local authorities, which asked, "Should we get into this area, Barbara?"

My advice is that you have to research it. There are some very good operatives out there at the moment who are doing this already—you need to get out there and speak to them and find out what their experiences are so that you can fully assess the risks and the rewards. You need to speak to the regulator to find out the process that you need to go through. Once you have done all that, you need to sit back and double-check what others have done. It is not a speedy process, but it means that you have time to fully assess the opportunities. Others have done it and some look as though they are making a success of it. It is a tremendous opportunity, but there are also partnerships that can be set up with the existing companies and, after all, they know the system best. I think that my message would be to get out there and explore the possibilities.

Professor Bell: I think that Barbara Vest's advice is very sound.

Barbara Vest: We have a very good trade association as well.

Professor Bell: There are risks. We are not totally clear what the Scottish Government has in mind on this. It may well be that, even just as a user of a large amount of energy, it could strike a long-term contract that would underpin investment in new renewables capacity, so that could be a good thing.

There is a need to know what you are doing in the marketplace—that is what Barbara Vest was saying in a nutshell. There are people who have expertise that the Scottish Government, in whatever guise it wants to take this forward, could partner with and gain knowledge from.

Ash Denham: Part of the proposal involves the idea of issuing a Scottish renewable energy bond as a way of financing support for Scotland's renewable energy sector. That links back to Gillian Martin's question about subsidies. With subsidies being removed, is issuing bonds a way forward to finance renewables in Scotland?

Professor Bell: I think that it is a great idea. There are commercially available bonds out there that do a similar thing. It can play to the concerns of individual citizens and investors about the environment and sustainability and so on, so why not do it?

The Convener: That brings us to the end of this session. I thank all our guests for coming in today. We will now move into private session.

10:56

Meeting continued in private until 13:05.

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