Scottish government Energy networks vision summit

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Ministerial forward

Since we held our Networks Vision Summit, the world has changed dramatically as we found ourselves in front of unprecedented circumstances and a global health emergency. In this new reality we all face, priorities have changed and new policy and regulatory developments came into place. However, the discussions that took place during the Networks Vision Summit event are still valid as our energy networks are now more critical than ever to Scotland's net zero ambitions, and to our desire to see a green economic recovery from the current crisis.

Our Energy Networks Summit raised a number of key themes for the sector. Stakeholders clearly feel that there are several issues that need to be addressed by the main parties involved – government, regulator and the gas and electricity network sector. I have spoken and written many times about the influence that these networks will have in helping Scotland to meet our decarbonisation targets, and the need to ensure that our shift to a decarbonised energy system involves a just transition – one that supports a strong green economic revolution.

Although this is a reserved sector, for which the UK Government is ultimately responsible, it is clearly vital to Scotland's economic, social and environmental priorities. That's why we have, over recent years, been working increasingly closely with Ofgem and with Scotland's energy network companies to ensure that decisions on changes to these reserved structures are flexible enough to recognise and support Scotland's distinct circumstances and ambitions. We laid this out in more detail last year within our Vision for Scotland's Gas and Electricity Networks, highlighting the importance of partnership work.

I am therefore pleased to see that the four recommendations emerging from this Summit underline that need for the key players to work together, and to develop the evidence and shared understandings which will help direct and support the energy network companies themselves, as well as the users of those networks across Scotland. There is already work underway which I believe can address each of these issues, and which I will ensure takes these recommendations fully into account.

For example, I would like to highlight that the Scottish Energy Networks Strategic Leadership Group recently agreed to take forward the development of Scottish Energy Scenarios, in-line with **recommendation 1**.

Through our Electric Vehicles (EV) Strategic Partnership, established in August last year, the Scottish Government, including Transport Scotland, is working with Scotland's electricity distribution network operator companies to explore new ways of coordinating the development and delivery of electric vehicle charging and electricity network infrastructure, to ensure efficient investment and a fair distribution of costs across electricity consumers. We are also working on ways to ensure that our electricity and gas networks can support the decarbonisation of heat, in line with our 2030 interim target to reduce GHG emissions by 75% and our 2045 net zero targets– the development of a Heat Decarbonisation Policy Statement will set out our vision for heat in buildings and the actions needed to support delivery. Our commitment to produce an action plan for the development of a Hydrogen Economy will consider the potential for our gas networks to support large scale decarbonisation of industrial processes. These, and other pieces of work, will go towards delivering on **recommendation 2**.

Our upcoming Local Energy Policy Statement, and our ambition to ensure that Local Authorities across Scotland produce Local Heat and Energy Efficiency Strategies, will help us respond to **recommendation 3**.

Finally, we are committed to ensuring that everyone in Scotland is able to benefit from our energy transition. Our Climate Change legislation contains a set of just transition principles which will ensure that fairness is central to future plans to reduce emissions. This commitment is also highlighted through our support for an independent Just Transition Commission, our focus on a green new deal and our commitment to eradicate fuel poverty. These workstreams are consistent with **recommendation 4**, and will remain so as we make further progress over the coming months.

Paul Wheelhouse MSP,
Minister for Energy, Connectivity and the Islands

Recommendations

1. The Scottish Government should develop, in more detail, a whole system approach for energy which indicates clearly to the UK Government and Ofgem the role that energy networks need to play in the wider energy system in order to realise Scottish decarbonisation and economic ambitions.

2. The Scottish Government should work with the network companies and Ofgem to develop a shared understanding of the role of energy networks in delivering low carbon transport, low carbon heat and supporting industrial decarbonisation.

3. The Scottish Government should work with Ofgem and the network companies to improve the recognition and integration of local energy planning into decisions and policy affecting network development.

4. The Scottish Government, Ofgem and network companies should collaborate to ensure that fairness, a just transition, and the growth of a green economy are central to decisions made about the development of energy networks, given these networks' importance in helping Scotland's people to engage in and benefit from the transition to net zero.

Key themes

Whole system approach

Working together

Delivering decarbonised energy for heat

Coordinating network costs and flexibility

Behaviour change and consumer engagement

Making sure low carbon is incentivised and prioritised

Supporting vulnerable customers and delivering a just transition

Executive summary

In February 2020, the Scottish Government hosted the Energy Networks Vision Summit in Glasgow. The event aimed to help shape the future of Scotland's electricity and gas networks, giving stakeholders the opportunity to discuss and debate the issues addressed in the Scottish Government report 'Scotland's electricity and gas networks: vision to 2030'[1]. The summit provided a forum for stakeholder-led discussion and debate and allowed participants to give feedback to energy industry players such as the network operators, the regulator, and the Scottish Government.

Following introductory presentations that gave attendees an overview of Scotland's path towards net zero, stakeholders had the opportunity to attend a morning and afternoon workshop, choosing from a total of six topics:

- Flexible consumers
- Decarbonisation of heat in buildings
- Local and community energy
- Transport decarbonisation

- Decarbonising industry
- Energy production – renewable electricity and green gas

The Scottish Government instructed EQ Communications, a specialist stakeholder engagement consultancy, to independently facilitate the workshops and to take notes of the comments made by stakeholders. Every effort has been made to faithfully record the feedback given.

Introductory presentations

The Energy Networks Vision Summit brought together a wide range of stakeholders to discuss the role of the gas and electricity networks in supporting Scotland's ambitions over the coming decade. Scotland now has binding targets to reach net zero greenhouse gas emissions by 2045, and an interim target to reduce emissions to 75% of 1990 levels by 2030, less than 10 years away. Scotland also has existing targets to meet 50% of all energy from renewable sources by 2030 across heat, transport and electricity, to make substantial progress on decarbonising heat, and to phase out the need for petrol and diesel cars and

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[1] 'Scotland's electricity and gas networks: vision to 2030', available at: https://www.gov.scot/publications/vision-scotlands-electricity-gas-networks-2030/

vans by 2032. There is a strong focus on decarbonising in a way that supports everyone in Scotland, through a 'just transition', and ensuring that Scotland's economy can flourish.

Representatives from key stakeholder groups were invited to present their plans and aspirations for the coming decade and consider how these ambitions will affect what is needed from Scotland's gas and electricity networks while helping to deliver a just transition to a low carbon economy.

Claire Mack, Chief Executive of Scottish Renewables, highlighted the challenges the UK was facing in order to meet its targets, especially those relating to the need to accommodate the predicted rapid uptake of electric vehicles and heat pumps, which would rely on the networks taking an incremental and reactive approach. She noted that, by 2030, the model of the distribution system operators (dsos) would have more fully taken shape and, therefore, more immediate clarity on the new, future markets available for renewables would be essential for the industry's ability to plan.

The need for more open conversation on anticipatory investment was also a key theme in the presentation given by **Audrey mciver, Director of Energy & Low Carbon at Highlands and Islands Enterprise,** who pointed out the need to collaborate and innovate on an even greater scale during the RIIO-2 period in order to pave the way for RIIO-3 and achieve a sustainable and economically efficient transformation for long-term network investment. Audrey stated that all parties needed to take a whole system view and work together to develop options for the delivery of low carbon energy.

Tricia mcauley, Independent Consumer Representative, stated that the importance of planning ahead of time would also allow for an assessment of the consumer impacts and unintended consequences of energy networks' actions. She underscored the significance of strong leadership in the energy sector which took into account a just transition that would not leave anyone behind, and the need for networks to consider Scottish consumers while developing smart, flexible markets.

Finally, **Cllr John Alexander, Leader of Dundee City Council,** focused on the need for energy providers to incentivise home charging for electric vehicle owners. He called on network companies to provide clear options for electric vehicle owners and increase capacity to keep pace with the rapid growth in demand. Such growth would need sustained investment to create key pieces of infrastructure which were vital for the decarbonisation of transport in Scotland.

These introductory presentations set the scene for the rest of the summit and provided an excellent foundation for constructive discussion to take place between representatives of key organisations, the gas and electricity network companies, and Scottish Government.

Key themes from the day

A number of common themes were raised during the discussions which took place both in the workshops as well as in the opening and closing sessions. These are summarised below:

- **Whole system approach**
- **Working together**
- **Delivering decarbonised energy for heat**
- **Coordinating network costs and flexibility**
- **Behaviour change and consumer engagement**
- **Making sure low carbon is incentivised and prioritised**
- **Supporting vulnerable customers and delivering a just transition**

Whole system approach

The need to adopt a whole system approach across heat, transport and electricity was a common theme raised in all of the workshops. This recognised the fact that net zero could only be achieved if the different energy players, including Ofgem and government at all levels, worked in collaboration. The Scottish Government was seen as having a key role to play in bringing the energy sector together and enabling closer collaboration between the gas and electricity networks. Electricity and gas network plans should be coordinated to help enable major increases in renewable energy capacity and generation, ensuring that Scotland meets the target of 50% of all energy from renewables by 2030.

Electricity and gas networks should also support efficient and effective decarbonisation across the whole energy system, while supporting broad societal and economic ambitions. Long-term investments should take into account local and regional aspirations for the whole energy system – including transport, heat, and energy efficiency – and support to the local economy. A whole system approach was thought likely to bring significant economic benefits for Scotland – for example, through the creation of hubs for certain industries in locations where renewable sources of generation such as wind, wave and solar are coupled with

smaller gas grids. Many felt that Scotland, with its vast renewables potential, is well placed to benefit from a whole system approach.

Working together

Delivering whole system outcomes and benefits will require greater cooperation between the networks and a wide range of relevant stakeholders, as well as a spirit of innovation and collaboration. The transition to net zero will see many new technologies connecting to the gas and electricity networks – from electric vehicles and heat pumps through to hydrogen electrolysers and biomethane plants. This will require innovative approaches, bringing together previously separate parts of the energy system, and ensuring that we make the most of local opportunities in a 'whole system' way.

Attendees also discussed the importance of greater collaboration between local authorities and the private sector. This is an area where the Scottish Government could help by providing a forum for different stakeholders in different energy sectors to come together, and by setting clear guidance on how low carbon technologies can provide a pathway to net zero. Local authorities and network companies should come together in a more strategic way, which will allow the former to have a more central role in planning the energy system in their areas, including over the longer term.

Delivering decarbonised energy for heat

The electricity networks already accommodate renewable and low carbon power and have the potential to do the same for heat. However, meeting this demand will probably need substantial upgrades to the networks. Getting this right, and securing the benefits as a result, will be hugely important. Stakeholders felt that insufficient network capacity represents a real challenge, alongside the comparatively cheap price of gas which has the potential to hinder the shift to low carbon heat sources. Re-engineering the gas and electricity networks to decarbonise the energy that flows through them requires the coordination and integration of new technologies, such as the use of hydrogen or biofuels for heating.

Attendees considered options to repurpose the gas networks, for example by blending low carbon gases with natural gas, or by fully replacing natural gas with gases such as biomethane or low carbon hydrogen. Biogas was seen as having the potential to deliver benefits beyond simply lowering emissions, such as creating new employment opportunities

and revenue streams for farmers and landowners. Hydrogen could also play a transformational role in the future as a zero carbon alternative to heat, with the Scottish Government potentially funding trials to test its viability as an energy source.

Coordinating network costs and flexibility

Our networks link together a diverse range of energy sources. This will remain vital as we move further towards a decentralised energy system, and the greater demand for sources of flexibility that we expect that to create. Gas networks currently connect around 80% of households in Scotland, delivering comparatively low cost and reliable energy access to energy storage several hundred times greater than our electricity networks. This supports the wider energy system by absorbing large swings in daily demand of energy for heating in domestic and non-domestic premises. The value of this flexibility needs to be considered as we make decisions about the future of our energy networks, and investment decisions in both electricity and gas must consider the potential to use smart systems, demand management and energy storage to make the most efficient use of networks to deliver low carbon energy. There are opportunities here to create thriving local markets for energy production, flexible generation and demand.

We need a meaningful debate on and understanding of this transition, involving domestic consumers, business consumers, and the energy sector. Renewable generators and gas producers need to understand the forms of flexibility and services that network operators might ask of them in future.

Behaviour change and consumer engagement

The networks' transition over the coming decade needs to take place in a way which considers the impact on all consumers, especially those considered vulnerable, as well as businesses. Consumers and their representatives must have a real voice when it comes to developing our networks. Regulation and governance should be flexible, responding quickly to changes and disruption while protecting and advancing consumers' interests. Those who cannot respond flexibly, or who struggle to engage in these markets, need to be protected while reducing economic exclusion and, instead, promoting inclusive growth.

Several workshops recognised that human behaviour presents a challenge to decarbonisation, and that behavioural change will be needed to speed up the transition.

More should be done to understand consumer preferences and make the transition socially acceptable and valuable – taking into account the growing complexity, technical challenges, structural changes and new technologies that will be needed and which will alter the relationship between consumers and the networks. The energy sector and government at all levels can work together to ensure that this happens.

Making sure low carbon is incentivised and prioritised

Innovation which brings together previously disparate parts of the energy system can help ensure that we make the most of local opportunities in a 'whole system' way. Network companies are increasingly focusing on delivering innovation as part of their daily business, leading to greater opportunities for non-network companies to help networks access flexibility from customers and deliver the services that people and businesses genuinely want.

Several workshops highlighted the need for all energy players to work together on innovation projects, regulatory change, and whole system planning. Low carbon technology developers need to understand the opportunities that their products can provide, and more should be done to educate consumers and energy producers about their benefits and impact on the energy system. All energy stakeholders and organisations need to work together to build the right policy and regulatory frameworks to encourage low carbon technologies, especially in new developments.

Supporting vulnerable customers and delivering a just transition

The Scottish Government, Ofgem and the network companies must ensure that the vulnerable and less affluent, including those living in fuel poverty, are not left behind. All of society, should benefit from new innovations such as flexibility services, heat pumps and electric vehicles, not just the more engaged and affluent – who are potentially paying less for their energy compared to those less able to embrace the new technologies and approaches. The costs and benefits of the transition need to be equally shared.

Achieving this goal will require more clarity from energy networks and from all tiers of government on who should pay for network upgrades. The Scottish Government, Ofgem and the gas and electricity networks need to work together to ensure that decarbonisation involves a just transition for Scotland and the rest of the UK.

Session summaries

Workshop one: flexible consumers

Stakeholders were asked to consider a range of challenges facing the energy networks, Ofgem, the Scottish Government and the UK Government. While it was noted that there is commitment to put consumers at the heart of decisions about the energy system, there are a number of challenges which need to be addressed. For example, connecting renewable generation and developing electrified heat and transport can all increase costs – something that disproportionately affects those in fuel poverty and those not on the gas network, who pay higher prices for their energy. Stakeholders were asked to consider the principles upon which decisions should be made about the future of the networks, along with the challenges and opportunities, before putting forward a series of recommendations.

The main challenges cited by stakeholders related to a lack of knowledge of flexibility services on the part of most consumers, coupled with a lack of incentive for them to change the way they consume energy. Stakeholders felt that the Scottish Government could lead the way by promoting flexibility services and by educating customers on the benefits. Scotland was thought to be well placed to take advantage of the rise in consumer flexibility and its opportunities, including lower bills for consumers. Greater use of flexibility services would help reduce costs for major energy users and lead to increased employment opportunities for workers.

The Scottish Government was thought to have a clear role in influencing Ofgem and the UK Government to ensure that appropriate regulations are in place to deliver benefits for all consumers. Stakeholders believed that the move towards greater flexibility required intervention and should not just be left to the market.

Many argued for more collaboration between all relevant actors in this area, and it was felt that suppliers, planners, energy networks, and the regulator all had significant roles to play. Greater leadership at all tiers of government, including local authorities, was thought essential to support the move towards greater flexibility, and to ensure that these services are included in the planning of new housing and commercial developments.

Workshop two: decarbonisation of heat in buildings

The workshops explained how decarbonising the energy demand in buildings, and in particular the technologies used for heating, represents one of the biggest challenges in decarbonising our energy system. Stakeholders were told that the electricity networks already provide low carbon energy and, in combination with heat pumps and modern, smart electricity heaters, electricity networks can increasingly supply energy for heat. However, there will need to be a substantial upgrade to the electricity networks to accommodate this new demand.

Attendees were asked to consider options to repurpose the gas networks – for example, by blending low carbon gases with natural gas, or by fully replacing natural gas with gases such as biomethane or low carbon hydrogen. Unlike the option of electrification, decarbonising a building through repurposing gas networks cannot be done individually but needs to be part of a larger coordinated scheme which converts all the buildings supplied by a particular network. After the presentation, the groups were asked to cite the challenges and opportunities associated with the decarbonisation of heat in buildings.

Insufficient network capacity was thought to present a real challenge, as was the comparatively cheap price of gas which means that consumers and developers are understandably reluctant to change to low carbon sources to heat buildings, given the cost and considerable disruption. A lack of stringency in building regulations and a lack of certainty around the future role of gas were thought to make this more challenging.

Attendees also discussed the opportunities associated with decarbonising heat in buildings, such as the potential to reduce and balance demand. Decarbonising heat could also provide an opportunity for farmers and landowners to explore new revenue streams, such as the development of biogas plants, and for engineers to build on their skills. Exploring hydrogen as a source of heat for buildings could, in due course, provide both a low carbon and a low cost option, which would benefit customers, including those living in fuel poverty. Stakeholders felt that collaboration, consumer engagement, cross-sector planning and information sharing were critical for the future of the decarbonisation of heat and that a long-term strategy should be set out to remove uncertainty.

Workshop three: local and community energy

Local energy schemes have the potential to support the efficient development of electricity networks by balancing supply and demand within network constraints, which can be particularly valuable where there is a peak in demand for a relatively short amount of time. Scotland has been successful in connecting community and locally owned electricity generation schemes to the networks funded through Feed-in Tariffs, a support mechanism which is no longer available. This means that it is difficult for local energy schemes today to develop a business case.

Stakeholders were told how a number of schemes have been established in the past few years using biomethane and that, in the future, there is the potential to use green hydrogen from renewable generators. Stakeholders were also told that larger forms of transport could be powered by low carbon gases, in particular hydrogen, delivered via gas networks. On decarbonising transport more generally, the session touched on a role for the Scottish Government in educating and informing consumers while continuing to influence the UK Government and regulator on the need to spread the benefits across all consumers.

The complex nature of establishing community energy projects was seen as a real challenge for communities wishing to connect, with the removal of subsidies, including the Feed-in Tariff, being a clear barrier as it reduced the incentives for communities to participate. However, attendees felt that local and community energy had the potential to deliver a range of benefits, from financial and social benefits for communities to increased flexibility for energy networks.

There were calls for dnos to become more familiar with local needs and to help enable community energy schemes, while local authorities were invited to take a more active role in supporting community energy. There was a role identified for the regulator to review network charging in order to incentivise communities wishing to participate in local community energy schemes.

Workshop four: transport decarbonisation

Electrification of transport will play a critical role in meeting climate goals and reducing local air pollution and its associated health effects. Scotland has set out a bold ambition to phase out the need for new petrol and diesel cars and vans by 2032, eight years ahead of the rest

of the UK. Moving from EV early adopter to a mass market poses challenges for the planning and operation of the Scottish electricity networks as reducing emissions from the electrification of transport will likely increase the demand and applications for connection to the electricity distribution network. Decarbonising transport is a challenge as we need to ensure that the electricity network is able to support the increased demand and that we have the EV charging network in place to accommodate and support a decarbonised transport system.

Stakeholders were also asked to consider other parts of the transport challenge, namely buses, hgvs, trains and ferries, as well as the possibility that larger forms of transport could be powered by low carbon gases, in particular hydrogen, delivered via gas networks. It was felt that the Scottish Government should work to educate and inform consumers of the benefits of the transition to a decarbonised transport and that it should seek to influence the UK Government and the regulator to ensure that the electrification of transport will align with a just transition.

Workshop five: decarbonising industry

This session heard that there will need to be closer cooperation between network companies and industrial energy users to make significant advances in decarbonising industry, and that there are opportunities for growing potential revenue streams and cost reductions associated with a flexible approach to energy demand. Aligning electricity demand with market signals will become more valuable, as will the ability to adjust demand (or on-site generation) at short notice, for example in response to faults.

The opportunity for decarbonising the gas network could involve changes to the mix of gases, or even the delivery of pure hydrogen from low carbon sources. The discussion considered the potential challenge for some businesses presented by the intermittent nature and geographic location of many sources of clean energy. However, certain blue-chip companies, as well as the food and drink industry in Scotland, would be particularly well placed to take advantage of decarbonisation and it was suggested that certain industries should set up hubs close to sources of generation.

The point was also made by some that the perceived uncertainty in terms of UK Government policy and the tendency of many shareholder-owned business to prioritise short-term

objectives, and profit, over long-term (10 year plus) outcomes, were challenges that should be overcome. The Scottish Government should take a leading role by encouraging a whole system approach to the decarbonisation of industry by funding pilot projects, including those involving hydrogen grids, to produce a road map for the decarbonisation of industry. Some also argued that the Scottish Government should seek to influence the regulator to provide incentives for businesses to decarbonise.

Workshop six: energy production – renewable electricity and green gas

Stakeholders were told that network costs include connection charges and system charges, both of which are changing, particularly in the case of electricity. The costs of connecting to the network are higher in Scotland than elsewhere in the UK, and there have been major changes to how distribution connected generators are paid. Meanwhile, there are strict limits defining the characteristics of the gas that is allowed to flow through the networks, which is a potential barrier to the introduction of more low carbon gases, particularly hydrogen.

Stakeholders identified a number of challenges, including uncertainty over policy and legislation as well as technical issues such as conversion, storage and transmission. They felt that more should be done to overcome the barriers presented by consumers not wishing to change their behaviours or pay more for renewable energy.

Rolling out renewable electricity and green gas in energy production in Scotland was seen to have far-reaching benefits for many elements of society. It was felt that this could lead to greater autonomy and sustainability for local communities and that it could increase job opportunities – something that is particularly important for an economy which is heavily dependent on the oil and conventional gas sector.

It was commented that there is a growing range of potential revenue streams for energy producers, with generators now able to gain revenue from being flexible, matching supply to demand, and providing technical services needed to meet increasing demand.