Infrastructure
Commission
for Scotland ///

Thematic Round Table Report

Roundtable Subject	Date	Session timing	Location
Connecting People and Places	Monday 23rd September	13:30-16:00	SFT Boardroom, Thistle Street, Edinburgh.
Accessibility and Mobility	Tuesday 24th September	14:00-16:00	Royal Scots Club, Edinburgh
Housing	Tuesday 1st October.	13:30-16:30	SFT Boardroom
Investing in Nature	Monday 7th October	14:30-17:00	Scottish Enterprise, Haymarket, Edinburgh.
Networks and Regulation	Wednesday 9th October	14:30-16:30	SFT Boardroom
Business and Economic Development Focused Organisations	Thursday 10th October	14:00-16:00	SFT Boardroom
Public Buildings and Assets	Monday 14th October	13:30-15:30	SFT Boardroom
Energy	Thursday 17th October	10:30-12:30	SFT Boardroom
Circular Economy	Monday 21th October	10:30-13:00	SFT Boardroom

Thematic Round Table Session
Connecting People and Places

Monday 23rd September 2019
Thistle Street, Edinburgh

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within this report does not necessarily indicate that they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

The round table discussed transportation connectivity in its broadest sense, and its part in helping to define and create communities and 'places' within Scotland. The round table was asked to help define the key strategic areas to consider, prompting discussion about how Scotland defines 'strategic capital projects. From the Commissions' standpoint, it encompasses actions, achievements and outcomes across Scotland to deliver net zero carbon by 2045 and inclusive economic growth; an inclusive net zero carbon economy. Participants agreed and Transform Scotland added that it should be

> 'a project intervention which can turn around adverse trends.'

EVALUATION

While net zero carbon is a clear aim with a hard-number and timescale, there was a view that 'inclusive growth' is a more elusive concept and needs a clearer economic definition and methodology. It was noted that some economists have expressed that there is a lack of proper evaluation methodology for inclusive economic growth, internationally as well as within Scotland.

It was stated that there is a less-than-optimal state of knowledge, analysis and research on strategic planning and infrastructure in Scotland. After a period of enforced austerity and cut-backs, the perceptions are that there has been a loss of experience and valuable people at sub-national level.

Participants stated there were a range of narratives including Wellbeing, inclusion, productivity and sustainability. This raised the question: 'What outcomes are we aiming for in Scotland and what kind of nation do we want to be in terms of inclusive economic growth?'

The questions were asked, in terms of international benchmarking would Scotland be happy if economic growth slows down while it delivers a more inclusive and carbon neutral nation? If Scotland is to effect radical change, trade-offs will need to be considered. But what are these trade-offs, and are they likely to be acceptable and understood by to people? This will involve effective engagement with the public.

Appraisal and economic evaluations are important, but this must be properly defined, because there is a recognition that benefits can often be overstated, particularly on a longer-term basis. There is evidence that recent infrastructure projects in Scotland have not delivered what the initial project backers forecasted which presents challenge for policy and decision-makers. Existing systems of economic evaluation and appraisal are no longer fit for purpose when dealing with and evaluating an inclusive net zero carbon economy. There is recognition that indicators and outcomes need to be reviewed to meet the new paradigm.

RESOURCES

The need for a framework, specialist resources and skills were discussed. Cuts in local government services have had a wider impact on planning with experienced planners, who had the ability to look ahead strategically, depleted in numbers. Councils are having to cover more with smaller resource levels. This is a genuine concern for Scotland as it aims to achieve an inclusive net zero carbon economy. Scotland has lost intellectual capital due to the local authority cuts.

"We are badly placed [in Scotland] in terms of its futures-thinking capacity… at a sub-national level with the erosion, through cuts in planning and non-statutory services, almost all the long-term thinkers disappeared in the process of local government budgets," said one organisation.

This has meant a significant reduction in the scope of people to think strategically, and to think 'forward' and what happens is a linear, non-credible extrapolation of where we are in Scotland. Outside of national government level, Scotland does not have capabilities nor institutions to make the dramatic changes which an inclusive zero carbon economy requires. Proper research on the strategic future of our cities in Scotland, including the trade-off between housing needs and the labour market, is lacking and has not been properly undertaken, opinioned one participant.

TRANSPORT APPRAISAL

In the sphere of public transport, evaluation is much more hard-edged in its ex-ante appraisal. Statistics about passenger numbers, capacity and volumes are easier to gather than for housing, where there is little evaluation. There are very few cost benefit analyses completed on housing projects.

Scottish Transport Appraisal Guidance (STAG) was cited by more than one attendee as no longer fit for purpose. STAG has been criticised in its failure to include public health, which is a noticeable omission, particularly with reference to climate emergency.

There is now evidence about how to de-carbonise transport, and how much larger the vehicle fleet could be, assuming they are electric vehicles, but the only way to achieve net zero carbon is through 'a very substantive modal shift'. Instead of STAG, Scotland needs a new kind of analysis that recognises this shift. An attendee highlighted that the Treasury's Green Book on investment is at odds with a hard-target of net zero carbon.

In terms of appraisals, Scots have been conditioned to think about things in certain ways. In the past, the bigger the schemes, the bigger the benefit, but old assumptions no longer hold true, giving the outcomes that Scotland wants to achieve.

POPULATION FORECASTS

The part played by 'place' is more than just transport links but how do we view the importance of a 'place'? How does Scotland address the demographic forecast for Scotland? Does the nation accept a long-running drift from the West of Scotland to the East? Or does Scotland need a 'National Settlement Strategy', which could direct and incentivise people to live in certain places?

Allowing a drift from West to East will have an impact on infrastructure demand in the next 30-years, as well as s potential knock on effect of increased carbon emissions in concentrated areas. Should the Commission recommend radical proposals like the creation of Scotland's new towns in the post-war period queried one participant.

PLACE

Ireland has a national planning framework which sits alongside a 10-year capital investment programme, would this approach also suit Scotland's needs? However, does this imply a more 'command and control' economy? Does this suit Scotland?

In Glasgow, there is regular discussion around regenerated and vacant land and; if this is used near the city centre for housing, what impact will this have on the population of West Dunbartonshire and Inverclyde? Getting the carbon dimension right on such issues was cited as 'absolutely critical', both in respect of new-build and a possible reduction in commuting. Attendees where clear that there is still considerable progress to be made to answer these questions.

At an optimal level it is about enabling innovation to be agile, so that our places are resilient and future-proofed. It is also about engaging fully with the public about the kind of services they would like to use in the future.

"In Vancouver, they work backwards in trying to understand how and why people use their transport services to get anywhere," explained another participant.

Agile is having the capacity to make decisions. So how does an agile inclusive net zero economy plan around the future? The issue is seen as policymakers setting rules and regulations in local authority and government that often do not provide the required levels of flexibility. This is pre-determined, and it remains this way, while there are many initiatives where the private sector and not-for-profit organisations are driving innovation.

"The inability of our system to deal with the issues of the future is part of our national problem."

HOUSING AND PLANNING

Communities and housing can become better connected if they have transport infrastructure at their heart, with Freiburg in Germany, a 'city of small distances', cited as a good example of where housing and local transport infrastructure are designed together. Is there a return to the paradigm of 'Infrastructure First?' Although discussion on Chinese ghost cities, showed that Scotland cannot design communities without asking people where they want to live and work. Urbanisation mistakes can easily be made by central planning.

GREEN AND BLUE INFRASTRUCTURE

Household activity patterns have been monitored previously, perhaps this needs to be re-examined to look at patterns for inclusive net zero carbon economy world. Thinking about green infrastructure, which includes the environment between buildings, water-ways and natural reserves, needs to be built in at the start of project planning. When this is done well, the value of the intrinsic area is greatly enhanced, and there are also health and wellbeing

benefits. Currently the measurement of this is patchy or omitted, depending upon the project. We need to do more to properly calculate the benefits of wellbeing.

RAIL

Rail it is not an agile form of transport as routes and journey times are set. In Scotland the network has already been set a target to decarbonise by 2035. This is a challenging target. Rail transport contributes 5 per cent of Scotland's carbon footprint, so the main driver must be modal shift. Yet rail is only a small part of this modal shift.

What can be done with the existing infrastructure to improve loads and usage? How does Scotland squeeze more out of its existing capacity? How can the country make the modal shift that is required? The railway network is sparse in the East of Scotland where space for infrastructure is a major challenge.

The UK has a narrower 'loading' gauge railway system than mainland Europe. This was created by the Victorians and means there is less capacity and headroom than European trains. All forms of infrastructure including roads, water, gas, electricity, power and communications runs over or under the railway system. This makes change very challenging, even knocking a bridge down which carries main water, sewer or gas pipes can take ten years of planning. To make any rail infrastructure changes everyone must be working in collaboration. The last organisation to act holds up the project, resulting in additional costs. This is a real and current issue for the rail industry.

However, the present rail infrastructure could potentially accommodate four or five times more people if travel periods were extended beyond current network peaks. Scotland needs to plan for this capacity, and balance between moving people and moving freight and goods. There is a need to link the physical daily operations of the railway, including the rules and regulation since privatisation, with the physical assets. Scotland needs to reconsider existing regulations which hinder future projects and development.

ROAD

The local road networks across Scotland are not valued as a national asset. While the motorways and major highways are under a unitary authority, there is no single ownership group looking at the proper economic and social benefits of the local roads provision. The road network is now working in a different way than it was originally planned for. As a result, targeted road improvements could be made to overcome congestion and reduce carbon emissions this was cited as good practice. If there are no new major trunk roads, there needs to be repurposing of roads and perhaps even the closure of certain roads to private vehicles.

Scotland has not been good at planning for declining industries. Greater levels of scenario planning are needed to combat this in the future. This will help the country to understand how a net zero carbon economy will work, and plan around this.

The competing priorities: The A9 dualling is a case in point. In a tight-space there is the river, the railway, and the road all vying to get through a small corridor. Who are the winners and losers in this scenario for an inclusive net zero carbon economy? There is a race, rail usually takes longer to put infrastructure in to place.

Another cited issue was the poor maintenance of local streets and pavements, which has resulted in an increase in slips and trips. In turn, this has increased personal injury costs to local authorities and increased NHS expenditure, stretching already tight deadlines. This also has an impact on those with reduced mobility.

DATA AND DIGITAL INFRASTRUCTURE

There is a welter of existing data about public transport, through the National Entitlement Card, which has been run by local authorities. This should be anonymised and openly shared. Scotland need better integration of reliable data to enable greater understanding of societal needs of infrastructure. There is a need to ensure that users can trust the data and deal with risks about ownership. For example, with big data, Uber likely now knows more about consumer travel trends than public bodies. There is no national repository for strategic transport data, developing this would enable more data sharing.

White van deliveries are very inefficient and create carbon stated one attendee. They need to be managed in a much more data-intensive way. There also needs to be more done to make people feel more confident about using public transport with more interconnected and local services. Travel anxiety can be serious issue on new routes for individuals, so Scotland needs to do more to help people plan their journeys, particularly across various providers. There is a need for a Scotland-wide public transport route planning tool similar to that of Edinburgh. People need to understand the personal journey and time and cost benefits to embrace the public transport system, making it as easy as using a private vehicle, as well as being as cost effective. Only then can we expect to see a tangible move from private to public transport.

PREVAILING ATTITUDES

There was a view that many users have been conditioned by the system for many years, which will hinder the needed modal shift. 'We certainly need new thinking, if not new thinkers,' commented one participant.

Traffic charging for entering low-emission zones was discussed, however Scotland may require more tax breaks and better incentives to help people move to a net zero carbon economy. The nation requires a massive behavioural change and a shift of people travelling at peak-hour to prevent congestion. It will require a mix of the stick and carrot. One solution opinioned was that travel demand management will use data more effectively and Scots could be rewarded for active travel with digital tokens which could be spent in local shops. This is about various kinds of positive incentivisation. From a 'place' perspective, it must not be about shoe-horning people into a mass solution.

ATTENDING:

> **SCDI**
> **Glasgow University**
> **Glasgow Commission for Economic Growth**
> **Transform Scotland**
> **Royal Town Planning Institute**
> **Arcadis**
> **Fuse Mobility**
> **Engineering Asset Management.**

Thematic Round Table Session
Accessibility and Mobility

Monday 24th September 2019
Royal Scots Club, Edinburgh

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within this report does not necessarily indicate that they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

Discussion centred on the way that infrastructure can impact on people with disabilities. Three barriers stand in the way of disabled people when using public transport, one charity sector participant said – poor access to information and services, physical obstacles (in streetscapes) and attitudinal behaviours.

A second participant described the transport experience of people with learning disabilities as difficult, different to other citizens from an early age, and segregated, as many were taken to special schools on private buses with no chance to make their own way, depriving them of learning experiences. 'Bad experiences' – including what can be called 'hate crime' - on public transport persist into adult life, requiring a change in attitudes towards people with learning difficulties. Bus drivers; in particular, require more training on dealing with passengers with learning difficulties and a charity, People First, is calling for a standardised passenger charter that bus companies can introduce across the country.

One example given was a person in a wheelchair asked to get off a bus to make way for a mother and baby in a buggy. Buses should be designed to ensure there is room for everyone.

Inadequate information was also identified as a problem for people with learning difficulties with timetables printed in small writing, almost illegible to some. There were problems too, for the visually impaired, in identifying the right buses and the right bus stops. There were some signs of progress with 87 per cent of bus companies signing up a charter that helps blind people. 'Swap' events, in which drivers swapped with disabled people to learn about their experiences, are also helping in driver training but not all geographical areas have adopted them. Audio devices are being introduced but were not yet widespread.

One obstacle to progress is that disabled people and their representative organisations were not being involved in co-designing information programmes and services from the start, leading to expensive retrofitting. It would help to have universal design to improve consistency across the country. Access 'panels' have been created across the country and would be a valuable source of information on how to improve services for disabled people as well as involving disabled people at an earlier stage in the design process. "Health and safety is institutionalised, why not accessibility," said one participant.

Planners must be careful, however, not to unintentionally exclude disabled people by well-meaning initiatives that fit the low carbon agenda. Excluding cars from urban centres might help towards reducing carbon emissions but car transport was often the only option for some disabled people. Similarly, although electric cars are seen as the way forward, are public charging points being designed in accessible places. Consultation with disabled people is crucial to identifying problems at the design stage.

It is also important not to allow the digital and technology revolution to leave disabled people behind, participants agreed. Websites are not being designed with disabled people in mind and there should always be access to one-to-one human interaction. A study from 2014 showed that one third of disabled people had no internet access. For many, smart phones are complicated and difficult to use, so disabled people require alternative methods of accessing information. One initiative that should help is that websites and apps will be expected to be accessibility-compliant in future, with, for example, audio features and bigger type sizes. Participants agreed that making the internet accessible to all will benefit everyone, with equality of service provided.

BUILDING DESIGN

Design of building infrastructure can be a barrier to disabled people. One example is hospital services. Appointment letters are not easy to read and interpret and, on arrival at hospital, signs are often not clear enough. Colour coding of routes to different departments is a good example of best practice but not universally available. Entertainment facilities can also be difficult to access, excluding disabled people who can be a good customer base. Licensees should be required to make their premises as accessible as possible as part of the licensing process and be able to access funding to make improvements if necessary. Surveys have shown that almost a decade after the passing of the Equality Act (2010), disabled people believe not much progress has been made while non-disabled people thought there has been significant change. One problem is that there appears to be very little audit of compliance with the Act or enforcement or its provisions. There is an argument for minimum standards to be set through legislation.

One barrier to progress, according to a public sector participant, is that accessibility for disabled people to buildings is not being ingrained in the curriculum for architecture students. Incorporating accessibility requires expertise but not enough architectural practices were taking this on board and the necessary skills were not being taught. Accessibility should be introduced as part of the building standards verification process that new developments have to go through before being officially sanctioned.

A participant questioned the need for a special school infrastructure, arguing that disabled children should instead be integrated into a mainstream education system designed to cater for their needs. That would be transformational and attitude changing, as disabled children would not be brought up to believe they were different from an early age. If schools can be made accessible to disabled people on polling days, then why not permanently? Making mainstream schools more accessible could also help with teacher recruitment, allowing teachers with disabilities to take up jobs vacated by retiring teachers.

Participants agreed that the development of community 'hubs' with a range of public sector services would help people with disabilities as it would minimise navigational difficulties to different locations.

HOUSING

Disabled people need the right support to allow them to live independently in places of their choice, one participant said. However, many had to wait very long periods for properties which met their needs in locations of their choice. This suggests a need for more housing designed for disabled people. Local authorities should involve people with learning disabilities from the start of the design process to identify possible flaws and accessibility to the application process should not be solely online. Examples of good design include wheelchair accessibility and walk-in showers. The right human support is vital to make needs clear in applications.

Disabled people are very frustrated with the housing process, a participant said, particularly the lack of wheelchair access. There is a chronic shortage of suitable properties in Scotland with over 17,000 disabled people living in unsuitable properties now. The problem will get worse with numbers projected to increase to over 30,000. Of 130,000 new homes completed in Scotland in recent years, only 15,000 had wheelchair access. One solution would be to make all new homes wheelchair-access compliant. This would require homes to be 10 per cent larger, which is why it is being resisted by private developers who want to maximise their use of space, and, therefore, profits. The way forward would be to make all new homes, through regulation, comply to a 'tenure-neutral' design standard, making them accessible to all. In addition, all new homes should have an 'accessibility rating', like energy ratings. There should also be consideration of register of accessible homes which could form part of the selling process for private properties.

MOBILITY

There should be greater focus on disabled people being able to navigate streetscapes. Active travel measures – such as cycle lanes – are to be welcomed but do not necessarily include disabled people. Shared spaces, in which cars, cyclists and pedestrians mix, can be a catastrophe if not designed with disabled people in mind. One example is people with visual impairment not being able to identify separate pedestrian and cycle areas, suggesting that disabled people's representatives were not consulted at the start of the design process.

ATTENDING:

> **Inclusion Scotland**

> **People First Scotland**

> **Scottish Government Equality Unit**

> **Scottish Commission for Learning Disabilities**

> **Royal Institute for the Blind.**

Thematic Round Table Session
Housing

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INTRODUCTION

The housing session tackled a range of issues from supply and demand and what determines this future demand, zero carbon design and planning around infrastructure and a definition of 'Place'. Participants also discussed inclusive economic growth, the social housing dimension and how tenure is changing. There were overlapping themes across fourteen sectors of infrastructure, including transport, energy, telecoms, housing, waste, water, public buildings, culture, green and natural assets. One participant stated that what was clear is that 'business as usual' is no longer an option and Scotland must do things differently.

TENURE

The Scottish Government's target is to deliver 50,000 affordable homes in this Parliament, which is one aspect of the Scottish Government's initiatives on the supply of housing. This detailed aspiration differs from the English aspiration of 300,000 homes per year, across all tenures. Scotland's target is reliant on a mix of Scottish Government and private sector funding (roughly evenly split), propelled by the rented-landlord sector (RLS) sector to identify sites and getting houses built. Some participants expressed that there is a lack of a holistic view of the whole Scottish market and how that interplays with the private sector, as well as a whole range of affordable homes. In England, a different model is driving up new-build supply, which differs from the Scottish approach. The message from UK Government is that it wants a huge ramp up in supply, across the board, while this message has not emerged in Scotland for all tenure of housing expressed a participant. Delivering housing across all tenures in England appears more urgent than in Scotland with Homes England set up specifically to 'lead the charge'. That said, it was acknowledged that the Scottish Government More Homes Scotland approach aims to increase supply across tenures. Homes England is also helping diversity and allowing smaller builders and new entrants to enter the market, which has increased quality.

Attendees expressed that it is important to understand the needs and demands of home users as their lives change through time, from youth, early adult life, family building, and then to retirement age. Decisions that are made on this human journey depend on personal circumstances. Scotland needs to model this better; modelling is not happening over this 30-year period. Policymakers have not adequately modelled this 30-year life journey and what and how the population is going to be living. This is relevant because this 30-year journey in a net zero carbon economy will bring different kinds of tenure, which may increasingly include the large-scale, long-term rented sector. Some participants agreed that people's desires on habitation are changing and new trends emerging. Millennials and middle-generation who can afford a mortgage increasingly prefer the idea of someone else looking after their property requirements in a build-to-rent sector. Meanwhile security of tenure in older age is important.

NEED FOR RESEARCH

A number of participants recognised that the Housing Needs Development Assessment (HNDA) was in place but felt that this bottom-up approach to housing demand planning does not provide a fully coherent and co-ordinated picture across Scotland. It will require a major research project to understand granular level of housing needs for 30-years' time. There is no current breakdown, of scale, demographics and geography. Modelling has not been done for the whole of Scotland's needs. However, while it is difficult to predict the future, to mitigate against this we must all be clear about the assumptions we make and that they are all the same. It is essential to have a common and shared understanding of the basis of future forecasting.

The complexity of land banking and planning for housing within Scotland's infrastructure cannot be understated. It is a complex picture which is difficult to unpick, and it involved the differing aspirations of land-owners, housing developers, utilities; such as water and electricity, local planners and existing communities. This has resulted in high levels of mistrust, frustration and argument between different parties, resulting in disputes and delay between planners and development industries. There is a need to agree a shared set of standard assumptions which can be amended and updated quickly as new circumstances emerge.

HOUSING TO 2040

There is a 20-year outlook, with the Scottish Government looking to set out the vision for our homes and communities in 2040 and a route map to get there. Scotland's National Performance Framework has a high-level vision for our communities but work on housing to 2040 has expanded this and set out principles to help translate the vision into meaningful actions. The whole of Scotland needs to work together to build the homes and communities we want to see in 2040.

There are questions over what makes a tenure? Is it a house or the person living in that house? Post-Grenfell, it is clear that 'a life is a life', and there should not be different standards and regulations between tenures. So, there is now a convergence on housing standards for all tenure.

"It is a blind alley to go down thinking about meeting demand by tenure potentially. A question is how we use the whole housing stock and whether you build the homes and the infrastructure, and the jobs will follow, or the jobs and the infrastructure and the homes will follow,'' said one participant.

The Planning Act and National Planning Framework provides a good opportunity for a review of this complicated planning system, with structural changes to the development planning system and the removal of procedures and parts of the system which don't add value. This means planners can focus more on preparing and implementing their plans. Better implementation is an important development from the Act. There are new guidelines and a new enabling power for an infrastructure levy and a reconsideration of Section 75 and how it is used.

The National Planning Framework 4 (NPF4) will be required to set out targets for the use of land for the national housing up to 2050, but not solve all the challenges, but it will take an 'Infrastructure First' approach. This is a key theme from the planning review.

The NPF4 could do more to provide clarity. The Scottish Government is in the early stages of planning how NPF4 can set targets for housing. A regional strategy is also being considered in this system-based change. To get there, it will require collaborative working and input from across the sectors to make sure everyone is signed up. It will look more fully at land use and the quality of 'place' and what contributes to long term future of our communities. This is a work in progress. This requires a culture shift. Ultimately, it is the Scottish Parliament that will approve the NPF4.

Housing to 2040 needs to focus on more outcomes, not just the number of homes being built.

How Scotland audits housing land is also very complex and different across authorities. One planner felt this should be strongly led by the public-sector, with better links between local and national planning and regular interactions between them.

DEMOGRAPHIC ISSUE

The drift of Scotland's population from the West to East and from the North to the Central Belt, and from rural to urban areas, is a singular issue which needs to be tackled. There is over-heating of some areas; particularly in Edinburgh and the Lothians, of the housing market. What are the drivers for this drift from the likes of Inverclyde?

Do you simply allow the East of Scotland to grow at the expense of the rest of the country, asked one participant? It will mean an increasing urban densification, is this a good thing? If we take a view this is not a good thing, we need to do something actively about this. There are indications that Glasgow's urban offering, (the positives of an educated labour force, younger demographics, affordable housing, and better public transport infrastructure from suburbs to the centre for both work and recreation) will stem population drift. As Glasgow builds more modern homes in reclaimed inner-city areas there is likely to be a 're-tilting' of demand met by supply. This might take a few years to filter through the system.

We must decide where we want people to be. There was discussion about the post-war New Town Corporations and the powers they had to make strategic decisions for the towns. London Development Corporation and Docklands Development Corporation were successful because they had a range of powers to undertake big projects.

INCLUSIVE ECONOMIC GROWTH

What about failure? Are policymakers and politicians being honest that not all areas of Scotland will be able to benefit from inclusive economic growth? There may be areas where the housing and the jobs are not good enough. With limited fiscal resources, there are likely to be areas where it may not be worth spending more money. Do policy-makers withdraw from such areas and knock down buildings and move people to more prosperous areas? Does Scotland allow places to die? This is a major social question that needs to be addressed when we speak about 'inclusive economic growth'. Do policy-makers spread a little bit of money across the whole of Scotland or invest in 'successful' places. The corollary of this is not investing in place that are not successful. This is a very

tough decision involving big politics — yet, the question must be made. However, capital can move quickly for infrastructure projects and housing to follow investment.

There are other dimensions to cost benefit analysis, and how you structure investment and infrastructure. There is a danger Scotland could end up paying for failure when defined against the criteria of an inclusive net zero carbon economy.

Broadband in rural places is imperative. Improving the digital connectivity will help places in the Highlands, Islands and Southern Uplands. In the past, rural areas have lagged when infrastructure; such as electricity and telephone networks, have been rolled out across the UK, and became a contributing factor in depopulation.

PLACE

Planning for place, which can be a very nebulous concept. Scotland needs to understand the 'human scale' of the nation's buildings at a local and regional level. What kind of places do want to live in? Is it an attractive place? Is it safe for my kids to go outside and play? Can they go in a sustainable way to their place of work? We want to design better communities, but regulations, such as access for bin lorries, can impact on this. Again, Scotland needs a clearer picture of what people will want in 30-years' time. A good example cited was that of houses that were built by SSHA (Scottish Special Housing Association) these are still creating 'places' with the possibility for inward investment of jobs and industry. It is unlikely that there will be large-scale plants bringing thousands of jobs when robots undertake many manufacturing processes. We need to understand what Scotland's industrial USP is going to be and where the people will go to build the housing where it is needed.

"We need houses in places which are successful and already have very good transportation links. We don't have the money to create the infrastructure somewhere where there are not already a lot of people," said one attendee.

Scottish policymakers need to look at the outcome and then plot how to get there. Outcome-focused developments are being developed in the regeneration of Fort William at the moment, with a collaboration between Highlands and Islands Enterprise and the Highland Council.

LAND ISSUES

There is competition between neighbouring local authorities to attract developers. Adjacent councils should be working together looking at a more strategic infrastructure level. In one local authority area, affordable houses were not built because the authority wanted a higher level of social housing requirement which deterred developers. Transportation connections are crucial for the success of a place. In order to deliver connectivity, you need a system that allows local authorities to collaborate. It is not working well enough at the moment, although City Deal collaboration appears to be working across local authority boundaries and this may improve this situation.

PLANNING REGULATIONS

It was suggested that some local authorities don't want the housing or the hassle of local developers, they prefer to be commuting destinations rather than residential. Some local politicians would prefer not to sit on local housing and planning committees as they are perceived as fractious. Housing committees still have challenges, with offices and hotels less controversial. Local people often object to new builds in their areas. Such objections might be due to the extra pressures on existing services and amenities such as schools, doctors and recreational facilities. By their nature, builders release housing in drip-fed tranches so as not to saturate the market, but this often means early purchasers are living near a live building site.

For too long we have talked about 'planning control' when it should be 'planning facilitation'. We should be growing the economy where there is existing infrastructure and make it easier for people to invest in the right places.

LAND VALUE CAPTURE

Various work is being done on land value capture, including looking at the systems in Netherlands and Germany. This is not about 'shiny new mechanisms and changing the law', it is public-sector taking a more pro-active approach to delivery. We need to move to a plan-led system but who is going to enforce this and ensure its success? Where is the delivery and framework? There is discussion about an infrastructure agency and who is going to do this. It is a major resource issue, with many local authorities not retaining the appropriate skills as a result of austerity cutbacks. Skills have gone to the private sector in many cases. In England there has been an agency drive with the likes of the English Partnership. Infrastructure is too big for many; particularly smaller, developers to take on, and there needs to be collaboration.

"There needs to be a central supporting body, akin to what we have seen down south," said one participant.

There was praise about Homes England's achievements, which has created a central energy to drive change and higher standards in the sector. 'That's what's lacking up here', stated one attendee.

A bigger over-arching body needs to look at land value capture in a wider sense. If we had a pro-active plan-led approach led by the public sector we could create a bigger cake and bigger share for the private sector. Less confrontation and better behaviour because everyone knows from the start what they will be getting. Developers know from day one what infrastructure they are expected to pay for.

BUILDING REGULATION TO MEET NET ZERO CARBON

Electricity will be used for the heating (and the cooling) of Scotland's homes in the future. Hydrogen is still in its infancy and the present gas network is not suitable for the transmission. Domestic gas boilers are being phased out after 2021. Natural gas remains cheaper than electricity when heating homes, so gas prices will have to rise to encourage all-electric homes. Some developers are looking at air-sourced heat pumps and passive houses with no heating. Other innovative methods of heating should be considered, such as warming seats and sofas, while infra-red panels in the ceiling could be used to heat (or 'radiate') people rather heat the space. The requirement is to keep people, rather than buildings, warm (although there are building fabric issues to consider). The issue of how do you persuade the consumer to buy a house with no heating? This is a huge job in engaging and educating the public.

Post Grenfell tower disaster, the regulations on cladding and insulation fabric is changing. This is not applicable to Scotland, which did not use cladding of the kind used in Grenfell disaster. However, insulation building materials might no longer be suitable due to space requirements and new solutions will need to be sought.

With the global climate emergency, we must look at the whole-life carbon cost of a home, this is minimal extraction of materials, off-site and on-site, and transport.

RETRO-FITTING AND REPURPOSING

How does Scotland plan and manage the existing stock? The country has a massive housing stock that requires retro-fitting to meet demands of net zero carbon. There are four major areas of spend: new build; adaptations; repair and maintenance; and retrofitting for energy efficiency.   Some new homes could be provided by repurposing of non-domestic to domestic in town centres. It is not just the hardware but the 'software'; or human element in taking people out of their homes while the work is being done. There are also additional considerations for adaptations for disabled and older people. The use of retro-fit rewards schemes must be reconsidered to meet a net zero carbon future.

The selling off of Scotland's council houses stock has created a patch-work of housing maintenance issue and related costs.

One step the Scottish and UK Governments could take to help encourage retro-fitting is to zero-rate VAT on all retro-fitting installation and work.

ATTENDING:

> **Development Solutions**
> **UK Collaborative Centre for Housing Evidence**
> **More Homes Division and Planning and Architecture Division - Scottish Government**
> **Architecture and Design Scotland**
> **Shelter**
> **Scottish Property Federation**
> **Homes for Scotland**
> **Scottish Land Commission**
> **University of Edinburgh.**

Thematic Round Table Session
Nature and Green Infrastructure

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within this report does not necessarily indicate that they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

The session, entitled Investing in infrastructure for a nature-rich, net zero future Scotland, was hosted by Scottish Natural Heritage (SNH) and Scottish Futures Group. Ewan Mearns of Scottish Futures Group (SFG) and Scottish Enterprise, welcomed the attendees, and introduced Tony Rose, Director of the Infrastructure Commission, who thanked the SFG for accommodating the commission by facilitating the session. It was different format from the other Commission sessions in that it was a workshop-style approach of several tables discussing core questions. There were three presentations prior to each discussion.

OPENING SPEAKER: WHY IT IS IMPORTANT TO INVEST IN NATURE

Alan Hampson, of SNH, set the scene explaining his role was around digital transformation and how new streams of funding can be diversified to protect nature and deliver zero carbon benefits to society. In terms of the climate emergency, there is a triple challenge. The Intergovernmental Panel on Climate Change (IPCC) report has spurred Scotland to commit to net zero carbon by 2045 and one of the ways to address this challenge is through recognising the valuable role played by nature. However, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report highlighting the five drivers of biodiversity, indicates nature is in its worst-ever state – and deteriorating rapidly.

Another issue is the medium-term financial outlook for private investment which is poor. Previously, there have been a lot of public sector interventions to address market failures or distortions. There are no signs that this is going to happen. Even if there are local interventions, the scale of the issue is beyond what governments are able to do alone. The challenge is for all of us as individuals, which will depend on substantial changes in behaviour. However, more positively, there is an increasing awareness from large-scale investors about backing green/blue projects which support nature.

Fundamentally, we need to present nature in a different way so that it is an integral part of an infrastructure solution. Nature will help society mitigate the effects of climate change but also help us adapt to it as well. Examples of this are carbon capture from the soil and the sea which is a carbon sink, and green infrastructure with 'greening' our towns and cities. Plants have a huge contribution to health and well-being, and in flood management in the way our catchment areas are managed. We require increasingly efficient and sustainable forestry and fish aquaculture. Looking after these natural resources and caring for it through stewardship will guarantee the ongoing supply of goods and services.

Economist Dieter Helm is at forefront as chair of the Natural Capital Commission. In terms of the net zero carbon economy, there are assets and liabilities which fit in the equation about 'natural capital'. For too long, nature has been seen as a free resource that we can draw from, or dump waste into. Natural capital is not about monetising nature but recognising the value of the benefits we get from nature. However, there is a gap between evaluating this in terms of infrastructure projects. SNH has been working on ways of narrowing the gap with investors, using the evidence-base of nature's benefits.

Helm's three principles for natural capital are: public money for public good, polluters pay, and net environmental gain. If there is loss to nature, then that must be compensated and given the poor state that nature is in that needs to be an over-compensation. These are the key principles to integrate green, blue and grey.

There is more talk of 'blended-finance' where public money goes into private-sector projects and therefore nature should be a central part of this. Size matters, institutional investors are looking for larger projects. For example, the £10 million in peatland restoration is viewed as small-scale for some investors who are talking about £500-£600 million. Peatland restoration brings better water quality, acts as carbon storage and helps sustain animals and natural species.

Natural capital needs to be geographically specific, which helps with the 'place-based' approach, and part of an integrated model within a locality, rather than disparate systems. This poses challenges in terms of collaboration and different agendas of various infrastructure partners.

People like to invest in new things, but we need to carry on investing in existing successful projects. We require different approaches and different kinds of appraisals to ensure that nature is central to all type of future infrastructure. Greening finance is also looking at carbon accounts and offsetting green against carbon.

The Economic Environmental Leaders Group (EELG), of the Scottish Government, is examining how the value of nature can be properly assessed for 'investable proposals'.

One exemplar is the Greater Manchester Natural Capital Investment Plan, looking at natural capital assets and the way those assets will deliver benefits. It led to specific interventions, thinking about value and not money. The Landscape Enterprise Network, part of Nestles corporation, which consumes 8 per cent of all milk consumed in Scotland, is working on a value chain with suppliers. Also, projects in Sheffield in the Lower Don Valley after the flooding in 2007 were cited.

THE THREE HORIZON MODELS

Clive Mitchell of Scottish National Heritage introduced the Three Horizons Model for discussion, looking at the how a high-level timeline for nature-rich infrastructure might be implemented. Horizon 1 was the status quo with a world in crisis, Horizon 2 was a world in turbulent transition, and Horizon 3 was a viable sustainable world. It helped attendees deal with several questions including: how close are we to our vision for Horizon 3? What are the priorities to achieving the vision? What are the changes that are in our control? Which aren't? What are the enablers and barriers? The break-out groups were then encouraged to consider this. He stated accountability for inputs and outputs is easy – but not so for outcomes. Current governance and accountability do not serve outcome-based approach well in relation to green infrastructure.

SELECTION OF VIEWS FROM THE BREAK-OUT GROUPS

Among the topics highlighted by the breakout groups were the importance of:

> Green chemistry;

> Adopting more interventionist approaches to driving the circular economy;

> Accelerating carbon offset schemes;

> Using the Sustainable Development Goals to create a common language;

> Aligning strategies with investors' needs/expectations.

Nature and biodiversity are in crisis globally. Bees in California used to pollinate almonds are dying because of pesticides. Intensive farming is destroying habitat and soil quality. Chemicals that are harmful are leeching into land. 50 per cent of pollution comes from the delivery of pharmaceuticals industry. There is a requirement for more green chemistry to ensure biodiversity.

In designing infrastructure, we must design-out pollution. There is increasing discussion about the circular economy, but we need to have a mind-set which starts now. To speed up the circular economy we need to use more stringent regulation, market pricing and other incentives to reward responsible behaviour. We must develop accounting and pricing mechanisms so that the lifecycle cost of materials is taken into account with producers taking responsibility for their use of materials across the lifecycle.

Developing carbon offset schemes to generate investment in natural infrastructure could help us reach Horizon 3. Microsoft already issues credits to benefit farmers; Wessex Water operates an offset scheme. Would a carbon trading scheme work? If so, would this count carbon emitted in China for imported goods? We need to adopt a systemic approach. While there are difficulties in introducing transformative changes in the short-term, if we don't introduce disruptive change then Horizon 1 will prevail. Moreover, we also need honest conversations to address the challenges. We need to dramatically change human behaviours with a primary focus on nature.

The Sustainable Development Goals (SDGs) have helped to provide a useful, common framework which can facilitate collaboration – it provides a shared language and takes a systems approach which can be useful to apply to investment questions and challenges. Could the SDG model be a useful one to explore?

The rapid growth of on and off-shore wind provides a good example: there was good alignment of stakeholders, the Scottish Government took the lead, market mechanisms were created, and the planning framework supported the sites. This was seen as good investment and with a value for society.

In conclusion, there is a need to align strategies and policy frameworks to invest in natural capital, utilise carbon reporting and pricing, and drive disruptive technologies and change in the whole economy in terms of production and consumption. Physical, human and natural infrastructure needs to work together to reach Horizon 3 and enable fairness and greater participation in wider society.

THE SEIC AS A FUTURE BRIGHT SPOT

Dr John Rogers, executive director of Research & Innovation services, of the University of Stirling, presented on Leadership for

investing in nature-based solutions. He introduced the work of the Scottish International Environment Centre (SEIC) and how it aims to transform the relationship between business and environmental management to protect and enhance Scotland's natural resources. SIEC seeks to address the challenges faced by producers, consumers, retailers, regulators and policy makers. "It is absolutely not about more science telling us we are destroying the planet. It's about a place where we can use research from across the spectrum, including social science, to have mature conversations and take the conflict out of discussions between sectors, communities and citizens.''

SEIC is hosting the Scottish Aquaculture Innovation Centre which is examining the farmed salmon industry and how it can improve its poor environmental track record of farmed salmon, one of the UK's premium, highest-value food and drink export. The Scottish salmon industry with its present business model does not work for the environment.

He explained the university's involvement in the Stirling-Clackmannanshire City Region Deal programme/ the Argyll Rural Growth Deal/ Falkirk Investment Zone Growth Deal and posed the question about where we should build infrastructure to address multiple deprivation. He pointed to the Clackmannanshire Bridge exacerbating the problem of a divided community, enabling those who are better-off to drive into Edinburgh for work and remain disengaged from the local community. He spoke about 'place-based leadership' and how SEIC was moving off the main campus to a site on the River Forth waterfront and into an area of higher density social deprivation. This was about leading by example, so instead of an 'iconic' concrete and chrome building on the campus, it was an environmentally sustainable structure in a location that was 'enabling' and was economically beneficial and cost-effective across its full life-cycle.

On future flooding protection, land management and mitigation, he used the example of the Firth of Forth estuary, which is fed from rainfall in the Trossachs and the Highland Perthshire region. He spoke about the £152 million Grangemouth Flood Protection plan, requiring 25km of concrete and steel, to protect 3,000 homes, yet natural flood management was discounted early in the appraisal. Why was this? He pointed to the Inner Forth Futurescope survey in 2014, by the RSPB, and the natural floodplains upstream which can be used for future flood mitigation. He spoke of the Dutch vision, Room for the River, to deal with rising sea-levels where full estuary monitoring array, with airborne and satellite monitors, linked to real-time data can help with smarter flood management systems. A similar 'full-system scale' approach will be deployed by SEIC

covering Scotland. This will allow business and community resilience and such expertise can exported to other places. In talking about 'bright spots', he stated the SIEC was 'designed to be a perpetual bright spot' and looking for partners to work with.

SELECTION OF VIEWS FROM THE BREAK-OUT GROUPS

This was about looking for exemplars and the 'bright spots' mentioned by Dr Rogers.

> the Clyde Gateway Green Grid Innovation District and the Construction Scotland Innovation Centre (CSIC) in Hamilton.

> peatland restoration is an example of where investment and engagement with communities has worked. Clear codes were established to calculate and monitor carbon content. Peatland loss and associated carbon release is a key challenge given the amount of carbon stored in peatland

> the reinstating of natural riverbanks along the River Tweed.

> Scottish Canals and Scottish Water are using canals to channel storm water, reducing flood risk and enabling more housing to be built in targeted sites.

> in Fife, the River Leven catchment is home to a range of projects that are helping to reconnect industrial communities such as Methil to the river.

> Climate Ready Clyde is an existing initiative that is acting as an aggregator for relevant projects

> the Scottish National Investment Bank or the private sector could also act as aggregators.

Continuing fears about carbon loss in the Arctic and peatland loss in Scotland and associated carbon release is still a challenge – given the amount of carbon stored in peatland.

A recurring theme was there is still too much silo-thinking and there must be transparency and honesty about the hard decisions that must be made to protect nature, and the planet. Collaboration is key; early on in any process, so that the relevant parties and investors are around the table and part of the project from the start, understanding needs and priorities early on.

How can investable propositions best be packaged to appeal to investors?

Start by connecting infrastructure assets owned by public sector institutions across Scotland such as the Forestry Commission, local councils and the NHS. If institutional investors and funds only interested in packaged projects valued at over £500 million, there is a risk that smaller projects will be unattractive. Develop a 'menu' of investable projects which conform to standardised models/approaches so there is a degree of consistency of scope, scale and financial returns. Increasingly pension schemes are being driven by regulatory and public pressure to adopt environmental, social and governance (ESG) principles. The community wealth building approach pioneered by Preston City Council provides a fantastic model, where local anchor institutions (the Council, NHS, College, University, police etc) have pooled their pension and other assets to invest in projects that benefit the Preston and Lancashire economy.

THIRD SPEAKER: PROJECT HEATHER

Mike McCudden, of Project Heather, reminded attendees that climate change is a global problem and requires massive international action. Project Heather is building a new stock market for Scotland, based on ethical and sustainable infrastructure and businesses. Scotland will be the host for the first regulated 'impact' exchange, and part of Euronet. He said there is a massive opportunity for Scotland to tap into global private investors and pension funds who are increasingly interested in green solutions. His organisation is working with the United Nations on its sustainable development goals and using the EU taxonomy on green investment.

"There is not enough collaboration across Scotland in speaking about such areas that we need to address. We are on the verge of a new Enlightenment because we are up against it because we need to solve these problems not in 20 years' time but solving them tomorrow."

Project Heather is looking at impact measurements to interest a global audience of investors. Social and environmental measures will increasingly become key to future investment decision-making. It is about full disclosure, transparency, and working together.

This report was compiled with the assistance of Scottish Enterprise, Scottish Natural Heritage, Scottish Natural Heritage, Research and Innovation Services of the University of Stirling and Sustainable Scotland Network.

ATTENDING:

> **James Hutton Institute**
> **Improvement Service**
> **Scottish Enterprise**
> **Scottish Environment Agency**
> **Scottish Water**
> **Highland and Islands Enterprise**
> **Scottish Natural Heritage**
> **VisitScotland**
> **Food Standards Scotland**
> **SCDI**
> **Project Heather**
> **Scottish Government**
> **Scottish Wildlife Trust**
> **Sustainable Scotland Network**
> **Scottish International Environment Centre**
> **Scottish Forestry**
> **Scottish Parliament**
> **Scottish Power.**

Thematic Round Table Session
Networks and Regulation

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within this report does not necessarily indicate that they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

This session included expert input from network operators and Scottish Government officials dealing with the gas, electricity, broadband, telecoms and water sectors, and looking primarily at the relationships with the regulator in each of these sectors. This was framed in a 30-year context of what infrastructure is needed; how investment can be utilised; the national resilience of existing and future assets; the role of infrastructure planning for net zero carbon; and the inevitable requirement for cross-sectoral collaboration as energy, transport and digital system become more intertwined. Furthermore, the discussion asked: does the current system of regulation inhibit or enhance co-operation?

"The relationship between social policy and regulation is highly important. There is a significant disconnect at the moment between the social policies that we have in the different parts of the United Kingdom versus the flexibility of regulatory regimes on regional variations," said one participant.

GAS NETWORKS

Over the next 30-years there will wholescale decarbonisation of the gas network, with a move from natural to low-carbon gases, such as hydrogen. In Scotland, the current investment is the mains infrastructure replacement programme, where cast iron pipes are being replaced with plastic. This stops leakage of methane gas, a greenhouse gas, and futureproofs the network for the transportation of hydrogen through the polypropylene pipelines. Nearly 80 per cent of pipes have been replaced. This investment will carry on until 2032, under the HSE Directive. The programme could be accelerated allowing decarbonisation of the gas network to advance more rapidly. Meantime, there is on-going work on proving the safe production, transportation and end-use of hydrogen in the gas network. There are issues and research and development is required on how to provide hydrogen heating and enter tenements and multiple occupancy buildings. The sharpening of the target from zero net carbon by 2045 to a reduction of 75 per cent by 2030 will mean adjustment of other investment from the likes of the Scottish Gas Network (SGN). Ofgem, the regulator, is starting to show more flexibility on what can be done.

Rural forums have raised the issue that they are left behind when it comes to the provision of network gas. Is gas decarbonisation going to overwhelm the argument of dealing with the missing infrastructure that could have been built out across rural Scotland? This is unlikely to prevent expansion and there are currently 'infill' projects going into current non-gas areas. Hydrogen opens up opportunity for remote localised networks that are not connected to the mains.

There is a higher level of population off the gas network in Scotland than the rest of Great Britain, while there are also higher levels of vulnerable customers and fuel poverty than the rest of Great Britain. With a higher uptake of fuel poverty allowance too. While these characteristics are different in Scotland, they are not fundamentally different to rest of Great Britain. Scotland is working towards its plan to meet its targets of one disruption in 20 winters.

SGN's business is about the transmission of the gas. It will be up to the regulator to determine what kind of changes may be necessary for a hydrogen economy. This is a reserved matter for the UK Government coming through the Department for Business, Energy & Industrial Strategy (BEIS), which has the Hy4Heat project looking at domestic boilers. Production and storage of commercial levels of hydrogen is still in its infancy. There are question marks over where this will be regulated.

Ofgem appears to be technology agnostic about what kind of gas will used by the networks. SGN has had to move forward pilots to see what the future will look like. The regulatory system, which is a GB-wide system, is incapable of the essential, joined-up strategic thinking that is needed in Scotland. Yet Scotland has a distinct energy policy, for gas and electricity, and Scotland should expect Ofgem's regulatory regime to be sufficiently flexible to allow the network companies to deliver net zero carbon. There are risks if Ofgem does not provide the flexibility it will become more difficult to meet and deliver energy ambitions.

ELECTRICITY TRANSMISSION & CONNECTIVITY

Scotland is now a net exporter of electricity, although we still need an inter-connector to import electricity for energy security supply and peaks after the closures of the large coal plants in Scotland. We are still a renewables power house and the country has achieved a great deal. Renewables in Scotland has been a major success story, with

the Beauly to Denny connector a key element of infrastructure.

Scotland is now generating 10GWs of connected renewables from a country whose winter peak demand is 5GW. Future energy scenarios show Scotland is set to contribute 30-40 per cent of the achievement for 2050 net zero carbon targets for Great Britain, and the 2045 targets for Scotland. Scotland now has inter-connectors exporting 6.6GW. The 'bi-directional' system can also import 2GW of power when the wind is blowing less in Scotland.

The renewables infrastructure on Scotland's Islands needs an interconnector so electrical energy can be transported onto the National Grid. Yet still no Green Light from the regulator on this, which remains a significant barrier. The question was raised: is it better to produce and consume electricity nearer to the point of its production and store it in new-generation battery technology? This was viewed as a valid opportunity which would benefit many rural communities and allow them to reach the net zero carbon target.

One of the big infrastructure projects supported by Scottish Power is the Eastern HVDC, a subsea link between North of Scotland and centres of demand in conjunction with the National Grid. An HVDC converter station is close to the existing power station at Peterhead. This second 'bootstrap' project represents a number of technical challenges.

However, this does not help on extreme resilience scenarios, when renewables transmission still requires a stable transmission system to connect into. Scotland needs to continue to monitor the resilience of the energy infrastructure.

Scotland has an ageing electricity infrastructure with some wires 60 to 70 years old. A resilient network requires more substantial level of investment, particularly to integrate many more sources of energy generation, including photo-voltaic. But it is not like-for-like replacement, it is better technology that is required which can be more expensive but can dramatically improve the systems' ability to cope and predict surges in demand. More electronics are being installed on the grid to increase capacity where some assets are 70 to 80 years old. More protection and control assets have shorter life-span. Scotland is about a third of way towards replacement of existing transmission systems in a 25/30-year programme. However, the network has expanded, with SSE trebling the size of their network.

The need for greater electricity supply to service electric vehicles is now certain, rather than anticipated. Yet the regulator is not talking about a future transportation system and how it will handle Electric Vehicles (EV), autonomous vehicles, and therefore support the ambitions of the Scottish Government.

The way that regulators looks at the world and the trade-offs that have to be made between benefits and costs to consumers was discussed. The regulator has a statutory requirement to look at existing and future consumers, but interpretation is left to their discretion. A view was the way they look at future consumers is limited to the 2 to 5 years, yet in the bigger targets for 2030 and 2045, consideration of future consumers is imperative for societal cost benefits. It is important that the regulator, explicitly considers those more distant future consumers because they are green lighting on decisions now that will have consequences for 50 or 100 more years. Ofgem has set a high bar for evidence from companies to prove the need for certain investment. If uncertain, then no green light. It is important for the regulator to think about risk in broader terms. This could be a barrier for the future economy. The regulator, after empowerment from government, should be bolder in its decision making. There are mixed messages on net zero carbon at the moment, renewables need a clearer path. Currently, all consumers have access to the electricity system at the same low price of around £100 a year.

Devolution creates an issue, legislation in Scotland is different and the nation cannot afford to move at the slowest pace of regions in England and Wales. There are differences in terms of policy of regional utilities and National Grid, which is looking at an average of Great Britain as a whole. Ofgem has been resistant to considering the policy needs of the devolved governments, not just Scotland.

WATER INDUSTRY

Water and waste water infrastructure as well as the financing of asset replacement is a major challenge because of the national scale. Asset replacement will require a near doubling of the capital programme budget up to 2040 from £600/700 million per year to over £1 billion. 'This is just to keep the show on the road,' said one participant. The water industry in Scotland and the Scottish Government, which owns and regulates the water industry in Scotland, are 'ahead of the curve on what to do and how to do it, certainly compared with the rest of Great Britain'. Ministers tell Scottish Water what they must do, not the regulator, who must cost the requests. Water needs heavy infrastructure of steel and concrete and it is hard to work out the best net zero carbon replacement and refurbishment strategy. Offsetting of carbon is estimated to be the equivalent of 25 million trees.

The separate market for water retail; rather than for sewage and water supply, first opened in Scotland in 2008, but has taken until

2017 for this market to open in England, but not yet in Wales. There are separate regulations and perimeters by Ofwat in England and Wales. There is open debate of how successful this open market is operating within the UK. How water customers relate and perceive their suppliers is still under consideration. Scottish Water does not provide to every household in the country. There are 20,000 private suppliers and some of these suppliers were severely tested in the dry weather in 2018.

Adaptation to meet climate change are required to deal with flooding and surface water, while it is also recognised that putting more into the sewers is not an option as they are reaching capacity. Surface water is less predictable and more intense. The nature and quality of water is changing too because of climate change, so the treatment before it reached the consumer must be different. More intensive treatment to clean water means more energy is required.

Regulation also includes the environment, which is SEPA's domain, as well as drinking-water regulations, which are run by Scottish Water, whose primary obligation is to its customers. In other utilities, it is the other way around with shareholders being the first obligation. In England and Wales, the water regulation system is more challenging with a number of water companies. Scotland has committed to a set of objectives which allows a long-term view on the delivery of water projects and charges for customers.

DIGITAL

The unintended consequences of Ofcom driving consumer costs to the lowest point is that networks in rural areas failed to get the investment that they required. The lowest prices for the highest number of consumers does not promote inclusivity. The consequence is that government and the public sector is called on to fill this digital gap.

One participant said that the current regulatory regime in telecoms is not fit for purpose because of the different territories in which it must operate. Where there is a national target in telecoms that might be pitched at a UK level of 95 per cent target, which translates to 80 per cent coverage in Scotland. Therefore, regulation as it stands does not work for rural and remote areas of Scotland.

The mobile industry works differently to fixed digital infrastructure. The UK Government is working on the Shared Rural Network, where operators share costs of infrastructure investment with help from public sector finance. In 2018 around 50 per cent of Scottish landmass has coverage from all four operators, with a target to bring this up to 80 per cent in Scotland. In 2017, 85 per cent of Scottish Households reported having internet access at home, 35 per cent of these have superfast broadband subscriptions, and only 4% having full fibre broadband. There is now a necessity to work across industries, from the fixed-line telecoms, mobile operators, and the power utilities, to get coverage into remotest areas where there are no existing power connections. Scotland needs innovative solutions for wind generation plus battery storage at mobile base stations in rural areas. The Scottish Government's R100 programme is crucial because this is providing fibre for the whole of Scotland, and utility companies have sites which could be shared. There needs to be continuing cross-industry co-operation to achieve results. 5G is coming along faster than predicted.

"There is a group of customers who can be left behind. How do we avoid that as we move forward? That requires a regulatory intervention underpinned by social policy decision to ensure all people in society should have access in some shape or form," said one telecom participant.

Digital infrastructure must be recognised on par with physical infrastructure, and arguably in a low carbon future it will be more important. Investment in 'classic' physical infrastructure will involve data. It will be impossible to build a road without a data infrastructure. The upcoming 700MHz spectrum auction has not set either a price nor meaningful targets for Scotland, because cost of covering the Highlands was so high.

THE INTERTWINING OF INFRASTRUCTURE

The basis of regulation differs in every industry, including assessment periods. But there is an 'inter-twinedness' of technologies across sectors involving sectors with the decarbonisation of the gas network and electricity consumption, distribution and transmission. Do regulatory regimes have that forward-looking understanding of the inter-connection between sectors? Or are we still regulated by independent silos? It was noted that Scotland needs to change to a 'whole system' approach. There was discussion about a charter and how this could help the network and companies to operate more effectively together. There is the Open Networks Project, with SP Energy Networks is playing a leading role in the Energy Networks Association (ENA) and working collaboratively with other Distribution Network Operators (DNO) to map the road to becoming Distribution System Operators (DSO). There are issues over the speeds at which gas systems could be moved over to hydrogen and how effectively hydrogen can be stored. Electricity and gas are fundamentally different,

molecules and electrons. There are UK and European regulatory forums where all the regulators are active members. But regulators are all operating in their silos, especially on the issue of price controls.

Data centres, which use a lot of energy, will require cross-sector regulation from Ofcom and Ofgen. The centres are vital for security and resilience of the network going forward and particularly when there have been breaches. Energy storage and carbon capture will bring different areas of infrastructure together so there needs to be regulatory oversight of this. Carbon capture will be an opportunity for the energy sector to repurpose jobs and skills as data centres are multi-skilled environments for power system engineering. There is also a need for up-skilling for new types of zero carbon jobs, because of this there is a need to think about the expertise within the regulatory regime. Resilient communications will be needed if we are using electric vehicles in rural areas. A smart ticketing application is less to do with transport and more to do with identity and transfer of personal data, yet it is being seen and treated as a transport issue.

National resilience, including connectivity, is absolutely fundamental to future infrastructure decision-making. Some form of central planning, as opposed to nationalisation, for the energy system transition is important.

ATTENDING:

> **Scottish Government**
> **Scottish Gas Network**
> **SSE Network**
> **Scottish Power**
> **Scottish Power**
> **Mobile UK.**

Thematic Round Table Session
Business and Economic Development

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within the report does not necessarily indicate that they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

Several of Scotland's business membership organisation were asked to expand on their views, offered in written submissions, expressing their opinion on the how and the what, to meet future inclusive net zero carbon economy targets.

THE VIEW FROM THE CBI

The Confederation of British Industry (CBI) shared a round-up of infrastructure needs from a business perspective. The business sector is responding to massive demographic changes, in work patterns, different tiers of employability from work-from-home-consultancy to the 'gig' economy, with disruptive digital technology the driver of opportunities and challenges for Scottish businesses. AI and robots will displace many traditional jobs, while new kinds of work will emerge. There are underlying issues with a skills shortage in key sectors and the UK and Scotland is well behind the curve when compared with other European countries. There are concerns about planning laws and the length of time to get new developments approved. Over the 30-year timescale, infrastructure must tackle digital futures, energy supply and resilience with transportation and mission critical systems in logistics, manufacturing and production. The big question is who will pay for this – and how do we raise new types of taxation?

Digital connectivity, including full-fibre, is essential for businesses to be competitive and to communicate with customers. 5G is likely to have a bigger impact on business than residential customers. The CBI feels a priority should be given to business users because this will enable the delivery of the innovation which a net zero carbon economy will need. The CBI are promoting an economic approach to 5G and not a geographical one.

CONNECTIVITY

There must be better use of technology in roads and railways and the adoption of smart ticketing for Scotland to remain competitive. Scotland's transport system is not joined-up and this is a barrier to business growth and productivity.

The motor car was one of the greatest inventions of the 20th century giving people the ability to go from their front door to where they want to go without involving anyone else, particularly in places with poor weather. The idea that we will all leave our cars and move to a public transport system is going back 100 years. So how do we future-proof transport, making it as flexible and convenient as the car without having the detrimental impact on the environment? It is still unclear how everyone will move away from the car. Local authorities could just ban cars in town centres, near schools, but is that what the public wants? Unless we make public transport easier for people, they will not want to abandon their private vehicles. There was also an observation that very few women will jump into autonomous pod vehicles with men they have not met before. There is a lot of hope that vehicle innovation will combat climate challenge. The next challenge is to understand fully how we use technology to move vehicles around efficiently? For 12 hours of the day, most of our roads are empty, so with semi-autonomous vehicles can we get more freight moving between 9pm and 6am to free up congestion. Smart motorways are the right direction for Scotland.

There is a need for an aviation strategy which ties up with UK transport strategy. High Speed Rail 2 (HS2) can improve connectivity across the UK. If we can get three-hour journey times to London this would reduce short-haul flying to concentrate on long-haul, which brings bigger benefits to business. This is about trade-offs, prompting the aviation authority to work in collaboration with road and rail.

Business does not stop at the Scottish border and our strategy must look to the UK and beyond. Scotland needs to improve connectivity to the North of England, to Newcastle, Leeds, Manchester and Liverpool, with population of over 10 million providing a bigger customer base. This is under-exploited by Scottish business because of difficulties of getting there to do business. It is about maximising returns from the nearest place first.

There is a need for private funds and public sector pension funds to be used to support green infrastructure investments, with existing models in Australia, Canada, and the US, with the likes of Teacher Retirement System of Texas. There will always be a challenge between rural and urban, particularly when 95 per cent of businesses are in urban areas.

FISCAL CHANGES REQUIRED FOR CLIMATE CHANGE

There are business concerns that there is simply not enough public money through tax-raising powers in Scotland for the government to meet these challenges. Public sector must work with private sector in a better and more collaborative way.

New forms of taxation will be required when fuel duty disappears. The OECD are making recommendations about digital taxation. The whole tax structure is based on an old-fashioned model and it needs to be modernised. Business rates is a classic example of this failure.

How does Scotland incentivise and/or penalise activities to carbon emissions? What will future road tax look like? How do we acknowledge that we must change our fiscal approach? From the Federation of Small Businesses (FSB), concerns were raised about penalising premises and property that are carbon inefficient. Many SMEs have large premises to store equipment or supplies but are low margin companies. There is lots of property held by people across Scotland that are cold, draughty and expensive to retro-fit, if at all possible. This is particularly prevalent within the hospitality and tourism industry with many traditional and listed building. There are concerns around future road taxation from rural low-margin businesses.

With regards to the workplace parking levies coming in, the CBI doesn't see this as way of solving the problem, just a way of strapped councils raising additional income. The Scottish Chamber of Commerce raised concerns about the parking levy in rural locations.

PLANNING AND INWARD INVESTMENT

In the short-term, how do you incentivise business to upgrade premises now? The high street is under pressure but there is room for creativity from landlords to upgrade their sites, again local authority planning is taking too long and causing additional costs. There is a disconnection at high level about what Scottish Government and council chief executives understand as the role of planning departments, yet messages are not always passed down to operational planners. Again, it is about a joined-up approach. We need 'creative incentivisation.' For example, this could be offsetting against tax bills.

Energy efficiency of a building different from its heating with commercial properties less likely to be gas heating and more likely to have other sources of heating. Edinburgh has a lot of listed commercial buildings which are difficult to adapt for low energy or installing digital.

There is a lot of money announced by Scottish Government for various schemes, and there is poor uptake because of the lack of advertising or too onerous application processes. CBI would like to see automatic qualifications for such schemes rather than having to apply.

It is a compelling message that Scotland can promote itself as a business location for inward investment that is sustainable and is tackling environmental issues. The big picture and strategic message are important to get across internationally as shareholders and customers expect and demand sustainable businesses. A joined-up, high level strategy is important to show Scotland's credentials to the world. There is something like 180 different strategies across the Scottish Government which makes it a confusing landscape, these needs streamlined for businesses.

"You also need to look at where you get the best bang for your bucks. There are quick-wins, mid-term wins and long-term wins, and there will always be winners and losers," said one participant.

On planning, with councils under pressure, there needs to be examples of best practice and exemplar models which work well. Many Scottish construction companies have decided to only build in the rest of the UK as they can buy a plot of land, get planning permission, build and sell more quickly. This issue is exacerbated with infrastructure issues, such as Scottish Water not being able to undertake work until development have been approved. Lidl were opening up major warehousing which took them years because of planning control. These types of issues delay the creation of jobs.

The CBI recommends that for projects that are across the 32 councils, including telecommunications, there should be a central planning authority with local specialists. They should be based within the councils but solely looking at big projects which have national impacts.

INTERVENTIONS

In terms of place, there needs to be a complete list of all support and interventions required by business to meet climate crisis targets. If retrofitting buildings, we need to think of a 'place' approach, particularly in rural areas, where the whole community is retrofitted at once. This raised questions over what capacity Scotland has with skills and trades to install or equip.

Scottish Power is doing a lot of work on localised energy within communities for the future. One CBI member in Aberdeen is looking at what skills Scotland will need to meet this challenge. Just as critical as innovation, will be site managers and operations

managers having the skills to maintain the technology in working order. Gas engineers will move away from gas boilers, so how are they being retrained. A good example, Bosch centre retrained all of their mechanics. However, across Scotland only a tiny proportion of mechanics have been trained to deal with electric vehicles. The cost of retraining is expensive when we are talking about thousands of jobs, so who pays? The Government, business or the individual? Carolyn Fairbairn, director-general of CBI, is working with national UK organisations on training numbers. Current estimates indicate that ten million people in UK will need upskilling and reskilling in next ten years. We need Scottish numbers. UK Government has set aside £100 million funding, but this breaks down to £10 per person there is a need for billions not millions of pounds of investment.

FOOD AND DRINK WITH A FOCUS ON THE SCOTCH WHISKY INDUSTRY

The Scotch whisky industry is reviewing its environmental strategy. It is an energy-intensive industry. A research paper had been undertaken to consider what net zero carbon would mean for the sector. This aims to identify what policies might be required to reach net zero by 2045. Typically, 80-90 per cent of energy requirement at distilleries is used for heating. This is all combustion by either

fossil fuel (e.g. natural gas and fuel oil) or renewables (e.g. biomass). Electricity is not currently used to heat stills. On Speyside, a number of distillers funded a phased extension to the natural gas grid from near Glenfarclas distillery to nine distilleries. This has helped to reduce emissions by burning lower carbon intensive fuel, lorries (oil tankers) off the road, the deployment of boiler economisers, and enabling local communities to connect to the extended grid. This should also be future-proofed for bio-methane or hydrogen.

Brexit is an issue. Scotch Whisky is exported from Scotland to deep-sea ports (in England or the near continent) or directly to Europe by feeder services. With Brexit, if the channel ports become congested this may have knock-on impact at other ports. There are only two container ports in Scotland, and they provide feeder services to England or the continent. The development of a deep-sea port in Scotland could be beneficial to exporters and would reduce emissions associated with transporting goods overland. Connections to northern England (e.g. by rail) and Ireland could help increase the port's hinterland.

Isla is critical for whisky industry with nine distilleries and a tenth one due to open. A recent report on the Isla ferry and its route to Jura showed that it is a lifeline ferry service for the whisky industry.

There is capacity issue on the ferry due to increased use by passenger (including camper vans) and freight vehicles. This has been created by a successful Visit Scotland campaign to increase tourism on the island, which has limited accommodation – this is one reason for the popularity of camper vans. These take up lane space on ferries and creates capacity issues for other users. For Isla distilleries, it is critical to get another boat on the ferry route.

Heathrow is the only fresh-food airport in the UK. All Scottish salmon that is fresh must go out of this airport. We need another direct site in Scotland, which could attract air freight from the North of England. Food and drink going out of south makes Scotland vulnerable.

TOURISM

The Scottish Tourism Alliance (STA) has launched a tourism strategy looking to 2030, a ten-year vision. The aim is to be 'a world leader in 21st century tourism', driven by changes in the tourism environment. The strategy focuses on four key pillars: people, place and destinations, businesses, and the visitor experience. One of key condition for success is physical and digital infrastructure. Mobile phone and broadband are critical for future growth of smaller businesses. 75 per cent of small businesses have broadband connectivity, 38 per cent of businesses are dissatisfied with broadband speed in Scotland (33% UK), 47 per cent say that they do not believe their broadband is good enough for future needs (40% UK), in rural areas this increases to almost half of respondents (FSB figures) and more visitors have an expectation of joined-up services and experiences. Challenges are connectivity in Scotland, seamlessly moving people around with integrated transport and ticketing, and the issue of attracting and retaining staff in the sector. Affordable housing is required, especially in rural areas. Businesses running under-capacity to be able to continue to operate as they are unable to attract staff.

On connectivity, lower-paid workers trying to get to work during off-peak hours is a challenge. Public transport is sparse at weekends and at night when shifts are finished. Infrastructure and connectivity run right across tourism industry concerns. It is also vital that we protect the natural environment for the future, which is a reason why people come to Scotland. How do we engage with communities and work together making sure they understand that tourism is a force for good? This is not the case in some locations with tourism 'being done to some places' rather than seeing the benefits. A change in attitude will help deal with the perception of 'over-tourism' and ensure the right infrastructure is in place to support

growth. Infrastructure will help channel people out of the key hot-spots and move them to other areas where they can enjoy 'quieter' parts of Scotland. A mega tourism trend is that visitors want to experience more authentic areas and connect with other destinations within Scotland. The key actions from STA's 400 delegates, with a 40 per cent response rate to its survey, is the need to address transport issues, ensure maintenance and development of natural attractions, enable more sustainable travel, invest in technological infrastructure and improve connectivity.

Digital Tourism Scotland is a programme being run to help tourism businesses understand digital business opportunities, helping them upskill from online booking ability to more advanced skills development. This will support the sector to keep pace with customer demands.

TOURISM TAXATION

The Visitor Levy is currently out for consultation and legislation. There is an opportunity to shape what this will look like, and gain a commitment that revenue raised should be invested to enable and facilitate the tourism sector. Tourism tax exist around the world, could Scotland be a world leader in implementation for the benefit of the industry. Revenue could help infrastructure in terms of car parking, toilet facilities, and motorhome facilities as well as waste management. Working with local authorities to collaborate on this will be vital. Taxes raised need to be used on improving tourism assets.

Tourism tax is perceived by the industry as a knee-jerk reaction to deal with a short-term and recent outcry about impact of tourism in some places. FSB says Scotland has spent 30 years trying to build up the industry and encourage visitors and now we are doing a 180 degree turn. Strategically, this is not a good way to deal with an important sector in our economy. STA are deeply concerned about adding further taxation. The UK; and by association Scotland, is 140 out of 140 in terms of global price competitiveness in tourism destinations (World Economic Forum Figures). Visitors also want to make sustainable choices about the destinations that they choose to visit.

TRANSPORT

Development of a deep-sea port is interesting because there needs to be long term view of where Scotland wants to end up. Transport Scotland completed south-west appraisal and demonstrated that roads are congested due to high levels of freight. Scotland needs to assess how freight network works and what would be a better long-term solution. Short-term solution would be to build more roads. A long-term, more strategic view could be a deep-sea port that would free up roads. This is what is currently missing in the 30-year approach.

The Scottish Government introduced a popular tax break, Road Equivalent Tariff (RET), to encourage people to go to Scottish islands but this has caused congestion on ferries. This requires more subsidy from Transport Scotland. "We are stripping cash-raising ability to build new infrastructure. The ferries issues are only going to get worse rather than better," said one participant.

The difficulty is that trade-offs will be required to make changes. Not everyone is going to be happy and benefit from what is expected and needed. A larger question from business is: who is going to pay for all of this? Currently there is £28 billion raised through fuel duty a year. What is going to replace this? Road charging will need to be considered and we need to think how we tax and make this efficient. New forms of taxation need to be hypothecated so that people can see the benefit of it. Is pay-as-you-go road usage something to consider?

Businesses fear that they are already unfairly penalised and already pay more in Scotland than in the rest of the UK, with higher income tax higher and local business rates higher than most of England. A new UK tax system for transport is coming but this will not be devolved to Scottish Government.

One participant said we need to have an independent audit capability in Scotland which gives the evidence-base to evaluate infrastructure. There needs to be better zero carbon metrics which give return on investment. How effective are we with spending money in Scotland? How good is the public sector at managing its budgets because many business people experience public sector projects that are not managed well and waste public money? Opinioned one participant.

ATTENDING:

> **CBI Scotland**
> **Scottish Tourism Alliance**
> **Scottish Chambers of Commerce**
> **Scotch Whisky Association.**

Thematic Round Table Session
Public Building and Assets

Monday 14th October 2019
Thistle Street, Edinburgh

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within this report does not necessarily indicate they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

This session examined how infrastructure can facilitate and become a conduit for change in the 30-year outlook towards an inclusive net zero carbon economy in Scotland. This was about looking at the service demands and key drivers for the organisations in attendance. The session also examined asset maintenance and renewals, focusing on the current state of existing stock, and whether renewal was more appropriate than building new assets. Attendees were also asked to look at building design and asset strategy and how they fit with the sense of 'place'. This took the discussion beyond the physical buildings themselves to planning, connectivity and geographical location.

EDINBURGH

Population growth is a driver for Edinburgh and how the city responds to this. The City is not only building replacement schools but new schools in new areas to meet population demand. In net zero carbon terms, a new build is easy, but the challenge is the existing estate of 600 buildings and the local authority response to this. Recently there has been a ramp-up approach to capital spend on asset management (Life cycle work such as windows and roofs) has increased from £1 million to £24 million. In 2019, the cost will be £30 million. This is just the basics to keep assets wind and water-tight and needs to be increased substantially to meet the carbon agenda. This is a huge step-change in approach. Buildings will have to be closed, so people will be decanted during renewal. The school estate is obvious for retrofitting —but the whole operational estate needs to be considered. There are new-builds commencing on three new primary schools on passive house classic, moving to passive house premium (An evaluation system consists of three classes: passive house classic, a traditional building; passive house plus, with renewables added such as solar panels; and passive house premium, producing more energy than it needs).

Even if Edinburgh City retrofits 60 buildings a year, it will take ten years to deal with entire estate. Thus far, there have only been superficial structural surveys and this needs to be stepped up to ascertain required interventions. An in-depth asset register is not available for the whole estate.

The Council is trying to reduce its carbon footprint, but population growth has meant the footprint is actually increasing. Schools are now being used as wider co-location community assets with shared resources, but the public service model has been slow to be implement in Edinburgh.

OUTER HEBRIDES AND WESTERN ISLES

A polar opposite to Edinburgh. A small place with population declines over the last 35 years. A matter of survival but tentative signs of a growing economy. There are bigger issues in primary care for the elderly and the required adaptions in residential and public buildings to accommodate this. The driver had been a look at the entire public estate from Barra to the Butt of Lewis, through Harris and Benbecula. The Northern Alliance Local Authorities (Argyll & Bute, Aberdeenshire, Aberdeen City, Orkney, Shetland, Western Isles, Highland and Moray) have 58 per cent of the landmass of Scotland. A public estate audit; between local government and health authorities, show over 800 public premises. There is a lack of revenue to maintain buildings and fewer people using them. There has been a growing frustration at the prolonged period of austerity. Affordable and accessible housing is a major issue, which is not helping young people leaving college to find a place to stay, in turn causing people to move from the area.

The Western Isles is small council with £100 million budget a year with half of this ring-fenced. Of the remaining £50 million, £10 million must be saved, equating to £64,000 a week for 160 weeks. The region has taken a close look at how local government can deliver. They have taken a charter approach working with communities to see how they can reduce demand on services, and to see what is actually needed. Out of 34 schools, 11 have been closed, while six have been refurbished or rebuilt. ('We didn't spend money on educating and training users in the new facilities, so they've ended up using it the way they used the old ones.'). Now 33 per cent of primary pupils are in new buildings, 76 per cent of secondary are also in new-build properties. The remaining building are in a poor condition. However, digital education is now a big driver and 24 teachers have been recruited to assist in wider learning projects. Many of these learning projects have students

from around the globe accessing remotely through the internet. Looking at the multi-use of schools. Looking at the multi-use of buildings, the question was raised: Why can't schools be used during the holidays for tourism?

The Northern Alliance provide leadership and are looking at how to work with the total public sector, such as HIE, colleges, local NHS and Skills Development Scotland, to deliver public services through sharing assets. This is move to 'co-location' and to 'agency-fluid' workforce, where you might work for one public agency but deliver services for another depending on location. Another is moving 300 council staff from the headquarters, which costs £600,000 a year to run, into the surrounding communities and allowing the office to be used by other agencies, such as Social Security Scotland and HIE, who pay nominal rents. Joined-up services are delivered through the creation of the Integration Joint Board (IJB). The challenge is the Outer Islands; within a 120-mile chain of 28 islands, they feel they have been forced to look at this joined-up approach, but they feel that the Scottish Government still works in silos.

A PILOT IN BARRA

The Hebridean island of Barra is merging community health, hospital provision and social care housing, aiming to get all public services into a single location. The question posed was: how does the council engage in growing business and public sector budgets? 'If we can't be more efficient and grow business, we are cutting services and that would be a death knell for some communities.' New thinking, such as the Barra pilot, has been necessary.

The community forum is the driver of economic and social regeneration. This is challenging within the existing democratic structures. How do we empower and enable communities to take charge of economic and social regeneration? With help of Scottish Futures Trust, the region has stopped constructing single-use buildings and now uses colocation as the standard model. Partnership between public and private sector on Barra's single-resource project is in line for Scottish Government funding.

'At the end of the day, we are all giving a public service and the public expect us all to work together and that message is getting across,' said one participant.

The most challenged place in Scotland can often be the most inventive, but it still takes time to get everyone moving in the same direction. In Barra, there is an ambitious and engaged community.

POLICE SCOTLAND

Police Scotland was created out of the eight geographical police forces across Scotland, plus two national shared services divisions. The model was different in that the police services were funded through council borrowing and cash reserves. There was a different methodology and mindset around managing the estate and the regional infrastructure.

When it became a unitary force, it changed to become a 'national' asset. The amalgamation was intended to make £1 billion of savings: £100 million per year over ten years. Instead, the budget was cut by £200 million, which is why the service is in line for £1.9 billion of savings over ten years. As a result, Police Scotland has been under-investing in infrastructure. The £300 million of reform funding from Scottish Government for first four years was not used for reform or transformational policing, it was used to settle a VAT bill and redundancy payments. Police numbers were protected but 1,700 civilian staff, many of them infrastructure experts, such as estate or ICT managers, were made redundant. However, removing civilian staff meant the work had to be backfilled by police officers, who are not experts in infrastructure. This created a major challenge for Police Scotland. As a new unitary pan-Scottish authority, the leadership wanted to gain an insight into the state of the police service's estate. This meant a re-employment of external estate experts, financial controllers and planning professionals. A 2015 condition survey report signalled a £250 million maintenance bill. In last three years, Police Scotland has been rebuilding its technical civilian capability to undertake a realistic assessment of the condition of the asset estate. In 2018, the Digital Data and ICT strategy was published with a business case proposing £300 million of investment for ICT infrastructure. This is not cutting-edge or new but a move from analogue to digital environment, using off-the-shelf products already in use by police forces in England and Wales. Scotland's ten relatively-small organisations; each on under-invested legacy platforms, was not suitable for modern policing. Police officers are still using paper and pen, rather than mobile and smart technology. There is a need to place all systems and data onto a single national entity, to solve issues with data protection and cross-forces criminal records. The combined forces held 25 million 'nominal' records for a population of 5.5 million, with each force duplicating criminal records on separate databases. The fundamental issue was the digital infrastructure was not there to support a 21st century national police service, at a time when digital and cyber-crime is growing exponentially. This does not include serious organised crime and terrorism, where the investment in technology is 'astonishing'. Police Scotland is finding it hard to keep

pace with this level of international, no-boundaries criminal activity. There is a need to protect the public in the digital as well as physical public space.

Police Scotland have made a capital request for £300 million for ICT improvement from the Scottish justice budget, which is a £100 million is budget for the entire sector. Police Scotland's view is that police ICT must be viewed as part of the national infrastructure of Scotland, not purely a policing issue within a justice budget.

On the police estate, there are a large selection of police stations and housing across Scotland. Originally, the estate strategy was to sell surplus assets. Money from this offset the lack of capital investment but was not sustainable. The new estate strategy was launched during the summer of 2019, with a different approach to work, where possible, to co-locate with other public sector and 'blue light' services, including possible shared vehicle maintenance depots. Police Scotland has been working with Scottish Futures Trust on the question: 'Why do you need a traditional police station in every town?'

Every small Scottish town has a police station and local community' visibility is key to keeping people safe. However, this visibility could be at a school, hospital or council building. For the most part, the estate strategy is moving away from separate police stations into co-location sites, better integrated into communities.

A condition survey in 2015 suggested £15/£16 million a year was needed for the basics of the estate, upkeep. This is essentially health and safety modifications only. Sticking a 'Band Aid' on the ageing infrastructure eventually causes a problem as this is not a long-term solution. Maintenance bills are rising as infrastructure; which is not carbon friendly, is deteriorating. Police infrastructure needs to be imbedded with all other discussions on community infrastructure. Each divisional commander is linking in with key public sector leadership, in councils and health service, to ascertain their infrastructure plans and where they can be aligned. If buildings are required, it will be in collaboration with the local councils. For example, in Aberdeen, Police Scotland is exiting Queen Street flagship building and decanting into local council properties.

The Police Scotland fleet has 3,500 vehicles, one of the largest in the UK. It is a light fleet of patrol cars and vans. They have made a commitment to go to a low carbon fleet by 2030. However, there are issues with charging points for police cars across the whole of Scotland, again an issue being shared with other 'blue light' fleets. Introduction of police electric vehicles at the pace the infrastructure allows in the general growth of EVs will not enable Police Scotland to meet its 2030 obligation.

SCOTTISH FIRE AND RESCUE SERVICE

The experience of Police Scotland is shared by Scottish Fire and Rescue Services (SFRS). Fire stations built in the late 1940s were built around big industrial sites, such as Clydebank near steel-making and ship-building. SFRS is looking at risk profile which has moved as demographics have moved. The Transformation Futures Vision project is looking at fire stations as newer technology and faster fire appliances mean service can increase radius around communities. SFRS has 600 buildings across Scotland, with 356 stations - 40 of those don't have running water or toilet facilities. A backlog survey in 2017 showed nearly £400 million is needed to deal with the backlog in investment. There are over a million pieces of operational equipment.

House fires have dropped dramatically in last 50 years. However, increase in activity with out of hospital cardiac arrests, road traffic incidents, water rescue and flooding has increased. The Fire service is the first responder in terms of a climate change response. The skills profile of the service is changing. A transformation programme means a change in the asset portfolio to support these new functions. There are 30 stations which now have public sector partners embedded within the stations. The FSRS is working with Scottish Futures Trust on an overhead-only charging regime.

Modern fire appliances, costing around £300,000, with water inside need to be in heated garages and plugged in to prevent water freezing. Air brakes need to be maintained. New electric 18-tonne prototype appliances cost in the region of £700,000. The Fire service are carrying out only emergency repairs to their buildings at the moment. They are looking at Standard Station Design; with SFT, to assess the minimal estate requirements.

There are issues with carcinogenic contaminants from fires which covers operational kit at incidents and needs to be removed at the fire station. A new fire station which includes clean and dirty areas can be built with a modular approach; the 'McDonalds' approach to construction: build it anywhere, looks the same and feels the same. This design can be bolted onto any school, hospital or community centres. There are examples in the North of Scotland were the health service, the fire service, the police and the ambulance service all work alongside each other.

Many community fire services in rural Scotland are supported by volunteers and they need to be able to respond to incidents in agreed response times.

One critical challenge is there are no contingency funds or strategic reserves for either police or the fire services. If funding existed and was not locked down to a year-on-year budget, then collaboration

with other 'blue light services' on 5/10/15 year infrastructure projects would be more feasible. At the moment, for police and SFRS, this creates an alignment issue.

THE FURTHER AND HIGHER EDUCATIONAL ESTATE

The Scottish Funding Council is responsible for running a mass education system in Scotland. While the forecast for further education college provision over the next five years is uncertain, there is an assumption that capacity for the next 30-years will be roughly the same. The further and higher college sector has waxed and waned depending on the skills demands and there will be a need for new types of teaching and courses. There are question marks over whether UK universities sit in the public or private sector, although they are still in the public sector in Scotland, due to the fees structure. This creates a stretch on funding for infrastructure. The college sector is essentially in the public sector and therefore subject to annual budgets. Overall, there are concerns about the financial viability of both sectors: in general, national trends, international competitiveness and national research incomes are beginning to weaken, coupled with a downward slide in recruitment of international students.

Technology for learning is a factor in dispersed areas. Fundamentally, in the next 10/15-year time frame, the student and teacher relationship are not going to change the requirement for space, but the nature of how this space is used will certainly change. Methods of teaching and learning are changing, and this is an infrastructure challenge. Efficiencies and effectiveness can be made on the learner journey by considering digital and physical infrastructure. There is a pilot at Halbeath in Dunfermline where two secondary schools and the main college facility are being brought together.

The College sector has a £350 million infrastructure backlog of repairs, the annual spend on a health, safety, wind and water tight approach is £20 million per year. But the buildings are deteriorating. There will be six major college campus projects at £75 million to £100 million each over the next ten years. Universities are less substantive due to funding models, but the figure is around £800 million, with £20 million a year coming from public purse. Universities are in the private space and raise their own funds for projects. Four major Scottish college campuses need substantial work. Some of these should be knocked down and new building put in their place, which would be more cost and carbon friendly option.

It is a difficult balancing act to provide college provision at a local level. It would we logical to concentrate all West of Scotland college provision in Glasgow and give students free train and bus tickets. What is the best way to deliver a curriculum for the future? The guidance is about delivering courses for 104,000 full-time students in the higher education sector, and 193, 000 in further education – a total of 297,000 students.

MOVING TO AN INTEGRATED SENSE OF PLACE

A sense of place requires deeper thinking about the people who live in each 'place' and what will be their needs and requirements in the next 30 years. The 'place' principle as at the heart of all Scottish Government future thinking. Place before policy, institutions and building. In everything, it is place and outcome.

A question was raised on how do you take public services forward into this new and integrated place? If the public sector works in a more integrated way, the public will see this and in turn expect public service to be more joined-up and transformational.

What should be done with empty police stations or derelict council buildings? One participant said resilience is anchored in place-making, while place-making is anchored in the existing buildings and the life of the community that happens to be in these buildings. More needs to be done to recognise this. When you empty a town of its existing buildings and public services; which tends to be within the relatively good architecture, you vacate the centre of the town. If you vacate the centre of the town, you are already losing it, shops and amenities close without the business the public services employees provide. There needs to be more discussion about what the retention of an existing building actually costs as an asset, as embodied energy value in construction is expensive. Many older buildings are very adaptable and can take a lot of change. A great example has been Gartcosh, where a new build has freed up other buildings. Participant's view was it is fundamental that existing assets must be reused. On the issue of housing, making better use of older buildings to provide local facilities for young people was cited as a good example.

The session returned to the balance between strategic thinking and local delivery, and at what level strategic thinking is under-taken and how does it cascade to a local level? The Public sector must be service driven but there is recognition that better alignment across bodies is needed with a clear indication of what success looks like through the prism of 'place'.

Fort William 2040 has involved the Scottish Government looking at around 20 projects that the community would like to be tackled,

including flooding, travel, the high street and safe neighbourhoods. It requires local communities to be joined up with a 'place' plan. A sense of 'place' will be different in each and every location, but there needs to be coherent national framework, so everyone is aiming in the same direction and that it is a catalyst for future national infrastructure.

'In 30-years, if the public sector is going to remain and deliver a high-quality service, it will not be structured the way it is at present. Our relationship and strategic planning will be closer. The biggest lag or challenge at the moment is with government catching up with the delivery end on the ground. 'We still, pretty much, go back to silos in government to make our cases' said one attendee.

ATTENDING:

> **Comhairle Nan Eileen Siar**
> **Scottish Government - Regeneration and Place**
> **Scottish Fire and Rescue Service**
> **Police Scotland**
> **Scottish Futures Trust**
> **Edinburgh City Council**
> **Scottish Cities Alliance**
> **Scottish Funding Council**
> **Architecture and Design Scotland**
> **Ryder Architects**
> **University of Strathclyde.**

Thematic Round Table Session
Energy

This report gives an account of the discussion at the round table session. The Infrastructure Commission for Scotland would like to thank the sector experts who gave their time to attend. The views expressed and recommendations provided form part of the Commission's overall evidence gathering. Inclusion within this report does not necessarily indicate that they represent the views of the Commission nor every participant at the round table.

INTRODUCTION

The discussion around Scotland's energy future was an integral part of many of the round table sessions arranged by the Commission. However, this session looked in detail at the provision of new net zero carbon options including the advent of hydrogen systems, the adoption of heat pumps for housing, and the prospects for carbon capture and storage (CCS).

NEW SYSTEMS

Participants agreed that provision of heat to buildings was a difficult decarbonising challenge with 80 per cent of homes currently using gas heating through conventional fossil fuel boiler systems. One option is changing the system to hydrogen gas because of its zero carbon properties. However, although the technology exists there are many obstacles to overcome before it can become a widespread alternative.

There are three types of hydrogen: grey, hydrogen produced as a waste by-product or industrial by-product (such as at Mossmorran Natural Gas Liquids plant in Fife): blue, obtained from natural gas or industrial residual gases by splitting them into hydrogen and CO_2, with the captured CO_2 safely stored in empty gas fields; or green, from renewable energy. Its production takes H2O, splits it into its constituent parts through electrolysis, with the hydrogen captured and used. This is the pure form of hydrogen with zero carbon emissions, while blue, according to some participants is 97 per cent carbon free after carbon is captured and stored. Grey is the cheapest to produce (approx. £1.50 per kw, compared to blue, £2.50 per kw, and green, £5 per kw) but one participant said the costs of producing green and blue are expected to fall substantially in the future.

Several pilot schemes for switching to hydrogen were outlined. HyDeploy, led by Keele University, is blending 20 per cent volume hydrogen with natural gas as a safer, greener alternative that can be fed into the existing distribution grid without changing the existing boiler systems within buildings. Results are so far positive but, although a step in the right direction, it is far from total decarbonising even if the hydrogen volume is gradually increased.

Another project involves identifying a small urban area and installing a new green hydrogen grid.

A third is Hy4Heat, a UK government-backed scheme to establish if it is technically possible, safe and convenient to replace methane with hydrogen in residential and commercial buildings and gas appliances. It aims to accelerate the development of a hydrogen grid by involving all stakeholders in the hydrogen supply network, including pipeline suppliers and boiler manufacturers. Problems to be solved in terms of acceptability include colour and odour as well as an inadequate pipeline network still too dependent on steel pipes that can be damaged by green hydrogen. Polyethylene pipes are the solution.

A fourth project on Orkney is trying to both develop a green hydrogen network for transport needs and a regulatory framework that can be applied nationally. Green hydrogen is better for transportation fuel cells and the efficiency is improving.

Given that green hydrogen systems have yet to be proved, some participants favoured developing blue hydrogen carbon capture systems as the technology is already available and would lead to a speedier reduction in carbon emissions. The coast around Scotland is asset rich in carbon storage areas, which could become another revenue earner. In addition, four major gas pipelines already existed that could be used in a CCS network. Building them from new would cost £200m. However, a significant barrier in creating a CCS storage network is the costs involved as industrial producers were only likely to invest in the technology if there was government subsidy. Likewise, they would only act if government took on, or at least shared, insurance liability. It was pointed out that such problems were overcome in the early days of the North Sea oil and gas industry.

Green hydrogen faces similar, if not greater, barriers. Production in sufficient quantities would require a massive expansion in renewable energy supply, such as offshore wind farms. However, if such expansion were to take place there would be surplus hydrogen available for export and a potential major revenue earner.

Some participants cautioned that hydrogen used as a heat providing system was not yet ready for mass roll out and therefore unable to bring about rapid reduction in carbon emissions to meet the 2045 net zero carbon target set by the Scottish Government. Blue hydrogen was not carbon free and the costs of setting up a green system were 'eye-watering'. One participant suggested that a rapid

program to install heat pumps, tried and tested technology, would be a quicker and less expensive method of reducing emissions. This was particularly important in rural areas where district heating systems were difficult to introduce. This could be combined with making existing buildings more energy efficient.

Another participant suggested that a combination of both hydrogen and heat pump systems were necessary to achieve targets. Blue hydrogen systems are achievable in the relatively short term although the economics needed to be clarified as to who would pay. In any case, the public had to be made aware that big changes in the way buildings are heated are necessary. This would be easier if the public understood more about the cost benefits and social value of the new technologies that needed to be introduced, e.g. job maintenance ('the main proponents of blue hydrogen in Canada are the unions,' one participant said) and creation.

Persuading a nation used to natural gas and with an established boiler system would not be easy, participants agreed. Public approval of major disruption would be easier if the use of blended hydrogen/natural gas supplies became widespread. The 'who pays' issue is crucial, with the cost of replacing boilers in homes approx. £6,000, and installation of heat pumps £8,000. One way of increasing public acceptance of new systems would be to change thinking. Energy consumers should be able to buy 'heat' — rather than electricity, gas or oil. That would help to overcome resistance to change.

TRANSPORT

Participants agreed the introduction of low-emission zones in central urban areas was helping to get across the decarbonisation message, with unpolluted air the main incentive. Industry was responding, e.g. some companies are now only offering electric company cars; petrol companies were changing forecourts to provide lower carbon fuels, although this was not yet apparent in some rural areas of Scotland.

REGULATION

Participants agreed the current regulatory system for energy supply is not fit for purpose as it focuses on price rather than environmental considerations. "Net zero carbon is not part of Ofgem's remit," said one participant, "and that has to change." It was noted that there is no regulatory system for hydrogen power.

With only three private companies controlling the hydrogen gas

supply, one participant said that if hydrogen was the future then it was a necessity to set up a Scottish Hydrogen PLC to develop and regulate the sector.

GOVERNMENT INTERVENTION

A private sector participant suggested that clear government policy was a major driver of change. For example, coal fired power stations have been phased out (Drax in Yorkshire was coal fired 20 years ago) after a clear government steer they were no longer acceptable. Drax now produces power from renewable energy sources in Scotland. Businesses will not act without this direction. Carbon pricing (the cost applied to carbon pollution to encourage polluters to reduce the amount of greenhouse gases they emit into the atmosphere) is an extremely good driver of change.

OTHER SYSTEMS

Participants agreed that ReFLEX project in Orkney should be closely monitored and given great support in helping to achieve the net zero carbon target. This is a multi-partner, £28.5 million project aimed at maximising the potential for renewable energy generation on the islands and ultimately eliminate the need for fossil fuels. ReFLEX Orkney (Responsive Flexibility) aims to create a 'smart energy island' by developing a 'virtual energy system' in Orkney which will monitor generation, grid constraint and energy demand and then use smart control of energy technologies to manage and improve the supply-demand balance. This will maximise use of locally- generated green energy and pave the way towards a carbon neutral future.

Technologies to be rolled-out as part of the project include domestic batteries for homes, larger batteries for businesses and public buildings, vehicle-to-grid chargers, electric vehicles, hydrogen fuel cells and smart heating systems.

PARTICIPANTS

> **Scottish Carbon Capture and Storage**
> **Drax Group**
> **Scottish Power**
> **Siemens**
> **University of Strathclyde**
> **Scottish Renewables**
> **Scottish Government**
> **Advisian.**

Thematic Round Table Session
Circular Economy

Monday 21st October 2019
Thistle Street, Edinburgh

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INTRODUCTION

Participants heard that considerable work is being carried out among public sector waste professionals on the benefits of the circular economy (defined as an economic system aimed at eliminating waste and the continual re-use of previously-used resources) to identify key sectors and regional initiatives. The circular economy, as opposed to the present linear economy, could yield multi-million-pound financial benefits, jobs, investment and an impact on social community for Scotland.

THE BENEFITS OF THE CIRCULAR ECONOMY

Reducing over-consumption of products is an effective way to reduce carbon use. Improving low recycling rates is high on the agenda as one job created in recycling equates to eight jobs elsewhere, although, at present, three-quarters of those jobs are outside Scotland. One problem is that reprocessing waste products abroad can lead to pollution in other countries. However, some other countries, thanks in part to Sir David Attenborough raising the profile of plastic pollution, are no longer willing to accept some types of western waste, particularly plastic. This is an opportunity for waste-producing countries to create their own processing industries. The opportunities for creating a more efficient circular economy and adding to decarbonisation goals are obvious. Business in general is becoming more interested in scaling up to exploit the possibilities of the circular economy.

BARRIERS

A key point is to find out what is actually available as circular economy resources on a national scale, aligning 32 local authorities and 20 plus waste companies with objectives. At the moment the system is too fragmented with too little knowledge of what resources are available and how to make the best of any business opportunities that arise. "It's not just a matter of melting something down to extract what is in it, but also recognising there are high value jobs attached," said one participant.

In addition, both the physical infrastructure and the management systems need to maintain it are inadequate. One barrier is that recycling is (rightly) carried out for environmental reasons but without recognition that there are economic opportunities too. Creating economic opportunities will lead to more reprocessing facilities in Scotland, which will have an impact on carbon reduction as it lessens the need for waste to be transported within the UK or exported abroad. Although Scotland can collect PET plastic bottles and there is a demand for recycled plastic products, there is little reprocessing capability in the country.

At present, the wider picture of the circular economy is not inbuilt at the product design stage. Participants agreed that as a result the circular economy suffers from too little transparency about what materials are actually available within a highly-complex waste stream in which there are too many participants. This led to the lack of recycling of potentially valuable raw materials. In turn, lack of regular and consistent supply of these valuable ingredients led to a lack of investment in these areas.

In addition, poorly thought-through decisions governed by cost are instead adding to future costs and increasing carbon output, one participant said. One example was using impermeable, rather than permeable, surfaces on roads. This meant that instead of surface water draining away, the run-off had to be collected and treated with all the associated costs. Some countries, such as Switzerland, instead treat wastewater as a valuable asset, recycling heat from waste water captured at sewage plants for heating purposes. Phosphorus, which can be used as a fertiliser, is another wasted asset within wastewater.

REGULATION

One barrier to exploiting the circular economy with the water sector, participants agreed, is the regulatory system. Regulation had changed in that it was previously geared towards investor return. Now it is geared towards consumer protection and the lowest possible prices, leading to a lack of investment. This in turn had led to reduced investment and less money for maintenance of networks. As a result, the water industry had gone from zero debt, to £50 billion debt, since privatisation in 1989. One participant claimed money had flowed into dividends, rather than water system development and maintenance. There is a need now for 'smart' regulation, in which there is objective evaluation of social value of investment, rather than simply price. That would lead to the right

type of value-based investment in which cost was not the over-riding factor.

COST BURDEN OF RECYCLING

Participants agreed that the responsibility – as encapsulated in packaging regulations coming into force in 2023 (Extended Producer Responsibility Scheme) – should remain with producers. Meanwhile projects such as the Deposit Return Scheme (DRS) in Scotland are the right way forward. In Scotland, drinks containers of between 50 millilitres and three litres in size made from aluminium, steel, glass and PET plastic will carry a deposit of 20 pence, which can be recouped when returned to a designated return point for recycling. However, participants agreed that the public sector is still shouldering a significantly unfair cost burden for recycling, when compared with private sector producers.

FUTUREPROOFING

Participants agreed that there is an urgent need for less complexity and greater transparency within the waste stream. Reliable data collection, that is available to policy makers, is a priority and should not be confined to the private sector. Public bodies with waste data (such as SEPA) should also be encouraged to share it more widely so that it can be subjected to economic analysis. They should be given official reporting obligations.

One suggestion was an over-arching national body to monitor the waste stream, encourage waste management reprocessing projects with an economic return and change public perceptions of waste as waste, to waste as a valuable resource.

PARTICIPANTS:

> **Scottish Government**
> **Zero Waste Scotland**
> **Topolytics**
> **Water Commission for Scotland**
> **Highland Spring Group.**