Environment, Climate Change and Land Reform Committee

Climate Change (Emissions Reduction Targets) (Scotland) Bill

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SHFCA Evidence to the Environment, Climate Change and Land Reform Committee

The key points which SHFCA would like to highlight to the Environment, Climate Change and Land Reform Committee in our evidence for the Climate Bill are:

1. The initial 2050 target should be set at 90% greenhouse gas emission reduction from baseline levels.
2. The Climate Change Bill should contain provisions to allow for net-zero (CO_2/GHG) emission targets to be set at a later date.
3. The Climate Bill should set interim targets for Scotland's greenhouse gas emissions: 66% lower by 2030 and 78% lower by 2040 than baseline levels.
4. The Climate Bill should allow the interim 2030/40 and 2050 emission reduction targets to be updated, with due regard to advice from the Committee on Climate Change.
5. The Climate Bill presents opportunities and challenges for businesses, organisations, and consumers in Scotland.
6. The Environmental Report used to inform the Climate Bill does not address the challenge of reducing Scotland's Carbon Consumption
7. There is a need to better understand the scale of addressing Scotland's Carbon Consumption and the importance of taking leadership
8. The role for Hydrogen and Fuel Cells in the low carbon energy system for delivering Scotland's Climate Bill targets

Hydrogen & Fuel Cells can deliver clean growth and the transition to a low carbon energy system. The use of hydrogen as a clean energy vector will complement the other vectors such as electricity and hot water (district heat). Specific opportunities for use of hydrogen and fuel cells in the low carbon energy system include:

- Hydrogen enables more intermittent renewables (wind/solar) to be captured and used through electrolysis of water to produce hydrogen
- Hydrogen and 'sector coupling' brings more low carbon energy into heat, transport, and industry

- Hydrogen fuel cells can decarbonise ‘hard to treat’ heavy logistics such as trucks, trains, shipping
- Hydrogen allows decarbonisation of ‘hard to treat’ high temperature process heat for industry, such as glass, steel, bricks, and cement manufacturing
- Hydrogen can be used as a sustainably sourced feedstock for chemicals and clean fuels production to support decarbonisation of transport including aviation
- Hydrogen may help sustain and potentially increase important high value supply chain jobs throughout the Scottish economy currently driven by demand for conventional gas and petrol/diesel

Hydrogen & Fuel Cells will help deliver the Climate targets and can stimulate economic development with smart local energy systems. Many of these approaches are being developed at the local system level throughout Europe as part of regional economic development strategies. Example H&FC projects in Scotland include:

- Aberdeen City hydrogen buses & growing the local hydrogen supply chain;
- Levenmouth local smart energy demonstrator project at the Hydrogen Office in Fife;
- Innovative smart energy demonstrator projects underway in the Orkney Islands which include Surf ‘n’ Turf and BIG HIT
- Further recently announced projects in the Orkney Islands include the HySeas III hydrogen ferry and the EMEC ITEG project

Scotland‘s energy sector is changing rapidly to meet the challenge of supplying reliable low carbon power, heat, and transport. Renewable energy has become the single largest contributor to electricity generation, exceeding both nuclear and fossil fuel-generation for the first time in 2014. Emerging energy sources such as hydrogen and bioenergy are also likely to become increasingly important for meeting future energy demand from continued population growth and more use of electricity in other sectors such as transport and industry.

The new Energy Strategy, published in December 2017, set an ambitious new ‘all energy’ target for the equivalent of 50% of Scotland‘s heat, transport and electricity consumption to be supplied from renewable sources by 2030. This will influence significant uptake of renewable technologies, such as offshore wind at multi-GW scale, and lead to the construction of new renewable generation and energy infrastructure.

The following pages contain our supporting evidence for the 8 key points.

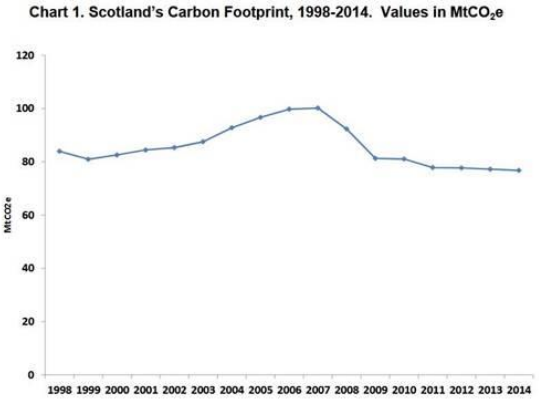
1 The initial 2050 target should be set at 90% greenhouse gas emission reduction from baseline levels.

Stretch emission reduction targets are needed to limit global temperature increase to well below 2°C, and Scotland has a unique opportunity to develop ambitious policies that can lead the way for early deployment of hydrogen and fuel cell technologies in low carbon energy systems.

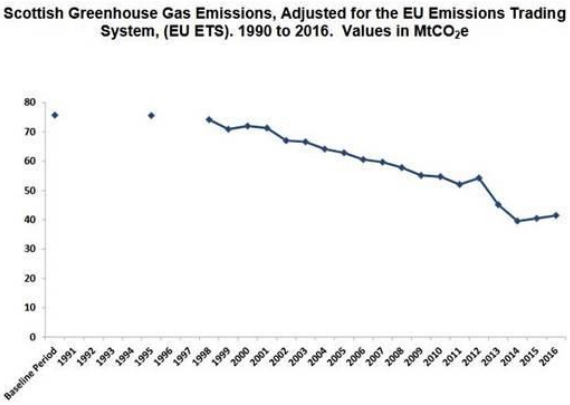
This increase to a 90% greenhouse gas emission reduction from baseline levels would more closely reflect the ambition set out in the Paris Agreement, and is consistent with the Committee on Climate Change (CCC) advice to Scottish Government on new Climate Change Bill (March 2017, Reference 2). The 90% target is recognised to be at the limit of current CCC emissions reduction pathways for Scotland and would require very strong progress in every sector.

Advice from the CCC highlights that to meet ambitious targets beyond 2020 much more is required to reduce emissions from transport and agriculture and land use, and also a focus on the increased uptake of renewable or low carbon heat. A more ambitious 2050 target will build on Scotland's success in meeting the 2020 greenhouse gas emission (GHG) reduction target, and underlines the need for further achievements to deliver the required outcomes.

Based on recent statistical data on Scotland's Carbon Footprint by the Scottish Government (December 2017, Reference 3) there is clearly a very large carbon footprint associated with imported goods and services into Scotland. Embedded carbon in imported goods and services is higher than the overall reported Scottish territorial GHG emissions (Reference 4, June 2018) and represents the overall global emissions footprint associated with Scottish consumption of goods and services.



Scotland's Carbon Footprint (Ref 3).



Scotland's GHG Emissions (Ref 4)

The Climate Plan should consider how might Scotland measure and report this overall global carbon footprint from imported goods and services alongside the territorial GHG

emissions in a way that allows timely and informative comparisons, alongside the development of suitable policies and proposals to reduce Scotland's Carbon Footprint.

It is important to consider not just 'territorial' source emissions, but to measure and to address Scotland's whole system emissions on a lifecycle basis. This is reported as 'Scotland's Carbon Consumption' and tackling these consumption emissions should be considered as part of Scotland's leadership for climate change action.

2 The Climate Change Bill should contain provisions that allow for net-zero (CO_2/GHG) emission targets to be set at a later date.

The Scottish Government (SG) should anticipate the need to set a future net zero GHG emissions target. The distinction between GHG and CO_2 targets should also be made clear. Fuel cells can contribute towards delivery of both CO_2 and GHG reduction targets. The catalytic process used in fuel cells to generate electricity is both highly efficient and also non-polluting.

For distributed combined heat and power generation fuel cells can provide higher electrical efficiencies, and also eliminate the production of nitrogen oxide gases (NO_x) which include N_2O, which has a GHG potential almost 300 times greater than CO_2 IPCC, 2007 (Reference 5).

The Scottish Government should consider setting a net zero carbon dioxide (CO_2) emissions target for 2050. This is proposed by the CCC in their advice to Scottish Government on new Climate Change Bill, as part of their recommendations for Option 2 to 'Set a stretch target for a greenhouse gas reduction of 90% by 2050, potentially accompanied by a net-zero CO_2 target for 2050.'

This increase to a 90% stretch target, above the current 80% target, would more closely reflect the ambition set out in the Paris Agreement. A 90% target for all greenhouse gases could potentially be accompanied by a 2050 target to reduce Scotland's CO_2 emissions to 'net-zero'. This net-zero target would also reflect the commitment under the Paris Agreement to reach net zero global emissions in the second half of the 21st century.

3 The Climate Bill should set interim targets for Scotland's greenhouse gas emissions: 67% lower by 2030 and 78% lower by 2040 than baseline levels.

The 2030 and 2040 interims target should be consistent with delivery of the 2050 stretch target of 90% GHG emissions reduction.

The advice from the CCC also supports establishing these interim targets, and explains that these reductions would keep open the option to achieve more ambitious levels of 90% emissions reduction by 2050. This would allow Scotland to increase its overall ambition (and set it into legislation) at a later date, if required.

Real progress has been made with decarbonisation of the electricity supply, but much less for heat or transport. To achieve the low carbon energy supplies required to delivering 2030 and beyond targets will need careful consideration of actions and pathways for heat and transport, using hydrogen to efficiently store and effectively transfer low carbon energy resources across power, heat, transport, and industry sectors using hydrogen and fuel cell technologies.

The draft Climate Change Plan is right to consider the use of moderate amounts of hydrogen in the gas network from the mid 2020's, and should build on this approach to provide a pathway for the substantial decarbonisation of domestic and commercial heating. Hydrogen could deliver low carbon heat at competitive cost with minimal disruption compared to other low carbon heat options. Moreover, it offers opportunities to maintain and possibly increase the wider economic benefits of existing energy supply sectors if hydrogen supply (and any associated transport and storage of carbon captured in hydrogen production) may make use of existing infrastructure, skills and supply chains already developed in the oil and gas extraction and gas distribution systems (Turner et al, Reference 6, August 2018).

Hydrogen and fuel cell technologies offer the flexibility to 'sector shift' renewable or low carbon energy from electricity networks into heat and transport, with the added opportunity of using hydrogen as a feedstock for chemical conversion processes. Hydrogen offers the potential advantage of cost-effective energy storage at massive TWh scale to address the future seasonal energy demand for low carbon heat which will be required by 2040.

Hydrogen could deliver low carbon heat at competitive cost with minimal disruption and need for electricity system upgrading compared to other low carbon heat options. Hydrogen and fuel cells should be considered alongside district heating and electrification for low carbon heat, with these respective heating technologies playing complimentary roles in meeting the overall targets coupled with diurnal heat storage at a local level. Hydrogen and fuel cells will play an important role in delivering a low carbon energy system for Scotland, both at a local scale and also in much larger deployments such as hydrogen as inter-seasonal energy storage for low carbon heat.

Plans for large-scale emission reduction technologies in heat and transport should be developed, and this is an area where SHFCA and our members can assist. Deployment pathways similar to the 'Renewables Roadmap' could be used as part of planning and delivery of low carbon energy systems, and the clarity from setting of 2030 and 2040 interim targets is welcomed. A clear approach will support Scotland's ambitions to be an attractive place for innovative business development and will help maximise the low carbon economic potential for Scotland.

4 The Climate Bill should allow the interim 2030/40 and 2050 emission reduction targets to be updated, with due regard to advice from the CCC.

The interim and 2050 emission reduction targets should be updated through secondary legislation, provided that objective advice from the CCC is taken fully into account. Scotland's existing legal framework, the Climate Change (Scotland) Act of 2009 (Reference 7) sets out the long-term target to reduce net emissions of greenhouse gases by at least 80% in 2050 relative to 1990, with an interim target to reduce emissions by 42% in 2020 on a 'net' basis. Secondary legislation has also set a series of annual emission reduction targets for 2010 to 2032. The Scottish Act also sets out that for each year in the period 2020 to 2050, absolute targets must be set at least 12 years in advance by an amount that is consistent with a reduction in the Net Scottish Emissions Account over that period which would allow the 2050 target to be met, and at least 3% less than the target for the preceding year.

5 The Climate Bill presents opportunities and challenges for businesses and organisations in Scotland.

The development of innovative low carbon solutions with highly energy efficient and non-polluting fuel cells can help deliver targets for power, heat and transport. The use of 'green hydrogen' for high grade process heat or as feedstock into carbon dioxide utilisation (CDU), also known as carbon capture utilisation (CCU) processes can support the wider transition to a low carbon economy and help develop leading Scottish expertise in deep decarbonisation.

SHFCA supports the Option 3 proposed in the partial Business and Regulatory Impact Assessment (Partial BRIA, Reference 8). This would introduce a new Climate Change Bill which sets more ambitious targets for future emissions and changes the form of future emissions targets; change the frameworks for reviewing and updating targets, accounting for emissions, and reporting progress. Identified benefits from Option 3 include stretch emission reduction targets with a clearer, more transparent carbon accounting framework. This would help raise awareness and understanding of progress towards a low carbon economy and engagement in future policy objectives.

To achieve GHG emissions reduction to 90% of baseline levels is likely to require overall negative emissions of CO2 in order to offset difficult to control emissions of other GHGs. This may present significant challenges to existing energy intensive industries.

The Partial BRIA (Reference 8) highlights that if a decision is made that decarbonisation from the industry is required above the EU ETS rate, then there is an increased risk of reduced competitiveness leading to industry relocating to another country with less stringent climate policy (offshoring of carbon). Policies would be needed which would avoid placing additional burden on industry to mitigate this risk. These could include the purchase

of international emissions credits, further incentives for industrial emissions reduction, and to consider steps to avoid re-importing of 'offshored carbon' in goods and services.

Energy efficiency presents complimentary opportunities for GHG emissions reduction together with increased employment and business growth. Innovative technologies such as heat batteries produced by SHFCA member Sunamp in Fife will play a key part in optimising energy use, and this use of compact phase-change heat storage can also complement hydrogen and fuel cell technologies used in distributed micro-CHP fuel cells. This is particularly relevant for the provision of localised heat storage in residential and commercial buildings to meet diurnal heat demands. Micro-CHP fuel cells are already being demonstrated at the University of St Andrews for more efficient use of conventional gas in clean distributed power generation.

There should be a review carried out for the role for new technologies and fuel sources, including fuel cell and hydrogen opportunities for Scotland. This should explore the potential for hydrogen and fuel cells to contribute to the delivery the low carbon targets in heat, transport, and power sectors both at the community level, but also at city scale.

Further consideration should be given to the use of low carbon energy and sustainably sourced hydrogen in developing low carbon industry and manufacturing clusters in Scotland, such as the role of 'green hydrogen' for sustainable chemicals manufacture using both conventional and bio-feedstocks. This will help identify opportunities for collaboration between industry and academia on innovative projects in Scotland, such as those involving 'green hydrogen' in sustainable chemicals and other added value energy intensive manufacturing processes.

SHFCA would welcome further discussions about the potential scope and timing of this proposed review into the role for new technologies and fuel sources, including fuel cell and hydrogen opportunities for Scotland.

6 The Environmental Report used to inform the Climate Bill does not address the challenge of reducing Scotland's Carbon Consumption

The Strategic Environmental Assessment and Environmental Report (SEA, Reference 9) which covered both the Draft Climate Change Plan (Reference 10) and the Scottish Energy Strategy (Reference 11) provides a very comprehensive and balanced perspective of relevant evidence. However there appears to be no mention in this SEA regarding carbon embedded in imported goods and/or services.

The report on Scotland's Carbon Footprint 1998-2014 (Reference 3) was published in December 2017. This report on Scotland's Carbon Footprint provides estimates of Scotland's greenhouse gas emissions on a consumption basis. This refers to greenhouse gas emissions which are associated with the spending of Scottish residents on goods and services, wherever in the world these emissions arise together with emissions directly generated by Scottish households, through private heating and motoring. These

greenhouse gas emissions are often referred to as “consumption emissions” to distinguish them from estimates relating to the emissions “produced” within a country’s territory or economic sphere.

Since 1990, the UK’s economy has continued to move from a manufacturing base towards the services sector. One of the consequences of this is that more of the goods and services we buy and use are now produced outside the UK. Chart 2 from Reference 3 shows how Scotland’s carbon footprint over the period from 1998 to 2014 can be broken down into three main components, namely:

- Greenhouse gas emissions embedded in imported goods and services from overseas. These accounted for 53.4 per cent of Scotland’s carbon footprint in 2014; up from 38.6 per cent in 1998.
- Greenhouse gas emissions embedded in UK produced goods and services. These accounted for 30.8 per cent of Scotland’s carbon footprint in 2014; down from 45.3 per cent in 1998.
- Greenhouse gas emissions directly produced by Scottish residents. These account for 15.8 per cent of Scotland’s carbon footprint in 2014; down from 16.1 per cent in 1998.

Chart 2. Scotland’s Carbon Footprint, by main component, 1998 to 2014. Values in $MtCO_2e$

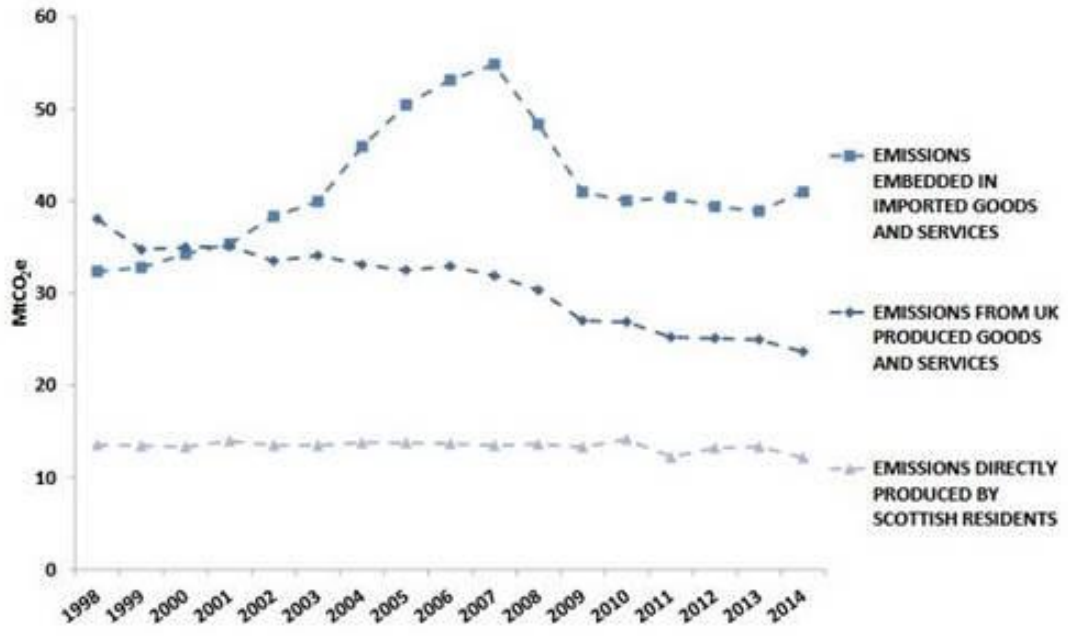


Chart 2 from Scotland’s Carbon Footprint 1998-2014 (Ref 3)

The setting of targets and reporting of territorial emissions is a key requirement in measurement of carbon emissions, but from the above it is clear that the implications of Scottish consumption of imported goods and services have far-reaching and very significant consequences for global carbon emissions.

7 There is a need to better understand the scale of addressing Scotland's Carbon Consumption and the importance of taking leadership

There is a very large 'embedded carbon footprint' associated with imported goods and services into Scotland. This is already higher than the of overall reported Scottish territorial GHG emissions, and represents the overall global emissions footprint associated with Scottish consumption of goods and services.

Some questions which might be considered by the Climate Plan include:

- how could Scotland measure and report this overall global carbon footprint from imported goods and service alongside the territorial GHG emissions?
- what policies might be developed and which actions could be taken to avoid 'offshoring' of carbon emissions and then re-importing them as goods and services?
- what further policies and initiatives might help stimulate the development of new Scottish 'low carbon' manufacturing and service sectors?

These issues will apply in particular to energy intensive industries where energy costs are a primary factor in choice of location. But the same principles apply to all manufacturing and also the service sector. There is a significant opportunity to deploy low carbon technology and the supporting infrastructure in Scotland which will enable Scotland to become a leading destination for low carbon processes and manufacturing. Hydrogen and fuel cells can play an enabling role in delivering the transition from oil & gas energy resources to renewable energies, helping to consolidate progress in decarbonisation of electricity into heat and transport. Hydrogen from sustainable sources can also help maintain and develop energy intensive processes in Scotland which will support employment, adding significant value to local communities and reducing the need for importation of 'carbon heavy' goods and services.

As outlined in the SHFCA response to Consultation on a Scottish Energy Strategy (May 2017, Reference 12) the supply of low carbon energy for heat presents specific challenges around annual variation in demand, as illustrated by the yearly pattern of energy consumption which shows Scottish gas demand (primarily for heat) alongside transport and electrical demands. The winter seasonal peak daily energy demands can be in excess of 300GWh/day, and are currently met through flexibility in the gas storage, transportation, and distribution networks. Hydrogen offers one of the only viable solutions to low carbon seasonal energy storage at the required TeraWatt-hour (TWh) scale.

8 The Role for Hydrogen and Fuel Cells in Delivering Scotland's Climate Targets

The Climate Plan rightly considers the use of moderate amounts of hydrogen in the gas network from the mid 2020's, and should build on this approach to provide a pathway for the substantial decarbonisation of domestic and commercial heating. Hydrogen could deliver low carbon heat at competitive cost with minimal disruption compared to other low carbon heat options. Moreover, it offers opportunities to maintain the wider economic benefits of existing energy supply sectors if hydrogen supply (and any associated transport and storage of carbon captured in hydrogen production) may make use of existing infrastructure, skills and supply chains already developed in the oil and gas extraction and gas distribution systems.

With abundant renewables from wind and marine energy together with access to potential sites for offshore CO_2 sequestration, Scotland is uniquely placed to support the emerging hydrogen economy. Hydrogen can be produced commercially at 100's of MW scale either by electrolysis of water or from steam methane reformation together with carbon capture and storage (CCS). Together these offer opportunities to maximise the utilisation of energy from new wind generation, leverage skills and assets from the existing oil & gas sector, and deliver overall cost savings compared to alternative low carbon heat sources such as electricity or district heating.

Hydrogen and fuel cell technologies offer the flexibility to 'sector shift' renewable or low carbon energy from electricity networks into heat and transport, with the added advantage of potential for cost-effective energy storage at massive TWh scale to address future seasonal energy demand for low carbon heat. Hydrogen could deliver low carbon heat at competitive cost with minimal disruption and need for electricity system upgrading compared to other low carbon heat options. Hydrogen and fuel cells should be considered alongside district heating and electrification for low carbon heat, with these respective heating technologies playing complimentary roles in meeting the overall targets coupled with diurnal heat storage at a local level.

References.

1. The Climate Change (Emissions Reduction Targets) (Scotland) Bill, May 2018: http://www.parliament.scot/parliamentarybusiness/Bills/108483.aspx

2. Committee on Climate Change advice to Scottish Government on new Climate Change Bill, March 2017: https://www.theccc.org.uk/wp-content/uploads/2017/03/Advice-to-Scottish-Government-on-Scottish-Climate-Change-Bill-Committee-on-Climate-Change-March-2017.pdf

3. Scottish Government publication 'Scotland's Carbon Footprint 1998-2014', December 2017: https://www.gov.scot/Resource/0052/00529095.pdf

4. Scottish Government publication 'Scottish territorial GHG emissions 2016', June 2018: https://www.gov.scot/Publications/2018/06/6601

5. IPCC Fourth Assessment Report: Climate Change 2007: https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

6. Turner et al. Framing policy on low emissions vehicles in terms of economic gains Link: https://www.sciencedirect.com/science/article/pii/S0301421518303033

7. Climate Change (Scotland) Act 2009: http://www.legislation.gov.uk/asp/2009/12/contents

7. Partial Business and Regulatory Impact Assessment, June 2017: http://www.gov.scot/Resource/0052/00521892.pdf

8. SEA Environmental Report (for both Climate Plan & Energy Strategy), January 2017: http://www.gov.scot/Resource/0051/00513440.pdf

9. Draft Climate Change Bill, January 2017: http://www.gov.scot/Resource/0051/00513102.pdf

10. Scottish Energy Strategy 'The Future of Energy in Scotland' December 2017: http://www.gov.scot/Publications/2017/12/5661

11. SHFCA response to Consultation on a Scottish Energy Strategy: The future of energy in Scotland. Submitted on 30th May 2017

12. Climate Change Bill Consultation Paper, June 2017: http://www.gov.scot/Resource/0052/00521930.pdf

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14. Climate Change Bill: Consultation Summary Report (December 2017) ISBN: 9781788515207. Link: https://www.gov.scot/Publications/2017/12/8859

Appendix: About the Scottish Hydrogen & Fuel Cell Association

The Scottish Hydrogen and Fuel Cell Association (SHFCA) supports and promotes the development and deployment of hydrogen and fuel cell technologies. SHFCA is recognised as one of the most active hydrogen & fuel cell industry associations in Europe, with almost 100 members including industry, local authorities, and academic institutions. SHFCA members are mostly based in Scotland but with an increasing number from UK and overseas with active interests in projects and activities in Scotland.

Scotland is now widely recognised as a global leader in addressing the challenge of climate change. This has been largely achieved through stable policies and support from the Scottish Government. 'Green Hydrogen' such as that produced from renewables by the electrolysis of water together with energy-efficient fuel cell solutions can play an increasingly important role in delivering the full potential of Scotland's renewable energy resources and delivering the GHG emission reductions.

SHFCA has many local authority members in Scotland including Aberdeen, Dundee, Fife, and the Orkney Islands who have all recognised the opportunities for local economic development with hydrogen and fuel cell technologies, and are actively working to support the transition to a low carbon economy. Existing and planned hydrogen demonstration hubs in Aberdeen, Dundee, and Fife will become part of an 'East Coast Hydrogen Corridor' from Aberdeen into the central belt of Scotland. This and other similar initiatives will kick-start the wider deployment of hydrogen & fuel cell vehicles throughout Scotland, along with the associated hydrogen refuelling

Hydrogen produced from renewables by the electrolysis of water will play an increasingly important role in maximising the overall energy system benefits from renewable energy in Scotland. Hydrogen can play an important role in the decarbonisation of the energy system, both at local and at city scale. Scotland already has a number of leading demonstration and deployment projects using electrolysers and hydrogen for local grid balancing, such as the Levenmouth Project in Fife and the Surf 'n' Turf and BIG HIT projects in the Orkney Islands. This approach is particularly important for locations which have abundant wind resources, but lack suitable grid capacity such as the Western Isles, Orkney Islands, and Shetland. Many areas of mainland Scotland are in a similar position.

Several SHFCA members are involved in innovative energy system projects in the Orkney Islands, including Orkney Islands Council, the European Marine Energy Centre, ITM Power, Shapinsay Development Trust, Symbio, Calvera, and others. The Orkney Islands has over 50 MW of installed wind, wave and tidal capacity. However their electricity output limited by grid constraints, and the output from tidal and wind turbines is often 'curtailed'. Scottish Government support from the Local Energy Challenge Fund enabled the Surf 'n' Turf project to develop hydrogen production from renewables on Eday, followed by the much larger EU funded BIG HIT project, a world leading pilot and demonstration project, which aims to create an 'Integrated Energy Systems Platform', and put in place a replicable model of hydrogen production, storage, transportation and utilisation for low carbon heat, power

and transport. Further recently announced projects in the Orkney Islands include the HySeas III hydrogen ferry and the EMEC ITEG project, which further reinforce the position of the Orkney Islands as a global exemplar of a clean island energy system.

Scotland has entered a period of hugely significant change, as shown by the recent substantial growth of renewable energy. Renewable energy sources met 15.2% of Scotland's overall energy consumption for electricity, heat, and transport in 2014, more than double the share in 2009. This is a great achievement, but much of the low hanging fruit has been picked. To maintain the pace of decarbonisation will require adoption of new technologies and solutions including hydrogen and fuel cells. Many of the existing skills and supply chain capabilities can be usefully redeployed into the hydrogen and fuel cell sector, to the benefit of local jobs and local economic development. It makes environmental and economic sense to harness all of these assets and expertise, which will support the development and deployment new low carbon technologies and energy sources.

SHFCA promotes the use of Hydrogen and Fuel Cell technologies to realise the potential of the low carbon energy sector in Scotland. We fully support the whole energy system approach together with local energy solutions as outlined in the Scottish Energy Strategy and we will help deliver the Climate Plans targets for reducing Scotland's total GHG emissions.