REA Response:

Scottish Draft Energy Strategy and Just Transition Plan

The Association for Renewable Energy & Clean Technologies (REA) is pleased to submit this response to the above call for evidence. The REA represents industry stakeholders from across the whole heat sector and includes dedicated member forums focused on green gas & hydrogen, biomass heat, biomass power, renewable transport fuels, thermal storage and energy from waste (including advanced conversion technologies). Our members include generators, project developers, heat suppliers, investors, equipment producers and service providers. Members range in size from major multinationals to sole traders. There are over 500 corporate members of the REA, making it the largest renewable energy trade association in the UK.

Chapter 1 – Introduction and Vision

1. **What are your views on the vision set out for 2030 and 2045? Are there any changes you think should be made?**

Whilst we broadly support the vision we see several actions that can be taken to improve the 2045 vision. We support Scotland's ambitions for increasing the deployment of a range of renewable generation technologies. Including ambitions for solar, hydro, marine energy and hydrogen in particular

There are however a number of areas and technologies the plan could be expanded on:

Commercial and industrial heat sector:, 51% of Scotland's energy consumption now goes towards heating. The Scottish government should consider how a Contract for Difference (CfD) for heat or a fuel switching tariff could be implemented to provide financial incentives for businesses and households to switch from fossil fuel-based heating systems to renewable alternatives, which in turn would lower bills and help decarbonise the sector.

Recognise an ongoing role for biomass: We recognise that the draft transition plan is written in advance of developing a full Bioenergy Action Plan. However, it would be beneficial to see clear commitments within the transition plan to maintaining a strong bioenergy sector across energy applications. In particular the transition plan lacks specific clarity around the role of biomass heat, despite its ability to address hard-to-treat buildings and providing a significant source of low-carbon heat and power for Scottish consumers. The Vision should recognise the benefits of immediate carbon reductions from established bioenergy sectors.

Geothermal Energy: there is no mention of the potential for Geothermal energy, either in terms of power or heat generation within the transition plan, This is despite the Scottish Government's own independent review, conducted in 2013, which identified potential given the presence of abandoned mine workings, hot sedimentary aquifers and petrothermal sources. (see here for further information: https://www.gov.scot/policies/renewable-and-low-carbon-energy/geothermal-energy/)

Landfill gas: Once organic material has gone to landfill it decomposes to produce methane, and this continues for decades afterwards. Support under the Renewables Obligation (Scotland) has incentivised site operators to maximise the capture of methane and burn it to generate

renewable electricity. This support is due to end in 2027. We suggest the Energy Strategy should incorporate Recommendation 23 of the Decarbonisation of residual waste infrastructure report[1]: 'the Scottish Government should consult with landfill owners and operators to address the consequences of the withdrawal of current landfill gas management financial incentives'

Addressing Planning Delays: Aside from grid capacity constraints, which are considered in the transition plan, planning permission processes remain one of the largest barriers to renewable and clean technology deployment. Ensuring appropriate planning processes and well resourced planning authorities should also be a focus of the transition plan.

Chapter 2 – Preparing for a Just Energy Transition

2. What more can be done to deliver benefits from the transition to net zero for households and businesses across Scotland?

To deliver benefits from the transition to net zero for households and businesses across Scotland, several actions can be taken. One key area that should be addressed is the commercial and industrial heat sector, as noted in the strategy 51% of Scotland's energy consumption now goes towards heating. The closure of the GB-wide Non-Domestic Renewable Heat Incentive (NDRHI) has created a gap in policy for this sector. This has hit non-domestic energy consumers - who are unprotected by the national relief scheme for high prices- particularly hard. It is important to fill this gap in order to decarbonise the sector and meet Scotland's net-zero targets. One potential solution is to implement a Contract for Difference (CfD) for heat, which would provide a stable revenue stream for renewable heat projects and encourage investment in the sector, which in turn would bring in more renewable heat switching for Scottish consumers, lowering bills. Another potential solution is to implement a fuel switching tariff, which would provide financial incentives for businesses and households to switch from fossil fuel-based heating systems to renewable alternatives. This would help ensure consumers are "brought along" for the net-zero transition.

Another important area to focus on is biomass, which will particularly benefit rural households and businesses. Biomass can play a key role in decarbonising hard-to-treat buildings, particularly those that are off the gas grid, lowering bills for rural consumers. This can be done by implementing financial incentives to encourage the deployment of these technologies.

Another area to focus on is deep geothermal energy, which has the potential to provide a significant source of low-carbon heat and power for Scottish consumers and provides the opportunity to retrain Scottish workers in the oil industry whose skills otherwise may be lost in the transition. However, the technology is still relatively new and there are currently limited commercial-scale projects in operation. To encourage the development of deep geothermal in Scotland, a route to market for deep geothermal energy (preferably within a targeted mechanism or within a future CfD for heat) should be considered.

One area that could help deliver these benefits is through the implementation of Contracts for Difference (CfD) supply chain plans. CfD supply chain plans have already shown their ability to create jobs and generate investment in the offshore wind sector. By extending these plans to

[1] 4.6 Heat Networks - Decarbonisation of residual waste infrastructure: report - gov.scot (www.gov.scot) – text quoted is under 4.9.1. The recommendation incorrectly states that existing subsidies for landfill end in 2037. This is correct for most other technologies, but is much earlier for landfill. The vast majority of landfill electricity generators lose support in 2027**,** with the remainder in the following 2-3 years.

more projects, we can create a ripple effect that benefits not only the immediate stakeholders but also the wider economy. The development of a robust supply chain can help to create local employment opportunities, support the growth of small and medium-sized enterprises, and promote sustainable economic growth in the region.

Moreover, the implementation of CfD supply chain plans can also help to strengthen Scotland's position as a leader in the renewable energy sector. By providing a predictable and stable revenue stream for renewable energy projects, these plans can encourage further investment in the industry and lead to more ambitious projects that help Scotland reach its net-zero targets.

However, it's important to recognise that CfD supply chain plans are just one tool in the toolkit to deliver benefits from the transition to net zero. To ensure that households and businesses across Scotland can fully benefit from the transition, it's important to implement a range of complementary policies that support the growth of sustainable industries, encourage energy efficiency, and promote social and environmental justice.

3. **How can we ensure our approach to supporting community energy is inclusive and that the benefits flow to communities across Scotland?**

No comment

4. **What barriers, if any, do you/your organisation experience in accessing finance to deliver net zero compatible investments?**

No comment

5. **What barriers, if any, can you foresee that would prevent you/your business/organisation from making the changes set out in this Strategy?**

No comment

6. **Where do you see the greatest market and supply chain opportunities from the energy transition, both domestically and on an international scale, and how can the Scottish Government best support these?**

No comment

7. **What more can be done to support the development of sustainable, high quality and local jobs opportunities across the breadth of Scotland as part of the energy transition?**

To support the development of sustainable, high-quality, and local job opportunities across Scotland as part of the energy transition, the government and private sector can take several actions.

Firstly, the government can provide financial and regulatory support for the development of renewable energy projects, such as offering tax incentives for companies investing in clean energy and providing grants for small-scale renewable energy projects.. This will help attract private investment and encourage companies to invest in renewable energy projects in Scotland, leading to the creation of new jobs in the sector.

Secondly, the government can invest in the development of the grid infrastructure required to support the integration of renewable energy into the power system. This includes upgrading the transmission and distribution systems to support the integration of large-scale renewable energy projects, and investing in the development of smart grid technology to manage the integration of intermittent renewable energy sources. All of this will produce high quality jobs across the breadth of Scotland as we work to upgrade the grid.

Thirdly, the government can support the development of the supply chain and manufacturing industries in Scotland by supporting the creation of industry and academic partnerships that promote high quality training aligned to the skills required by low carbon sectors.. This will support the training and education of workers in these industries, and working with industry leaders to establish manufacturing facilities in Scotland. This will create new job opportunities in the manufacturing and supply chain sectors, allow for the transition of workers into new low carbon sectors and also help to reduce the costs associated with renewable energy projects.

Fourthly, the government can support the development of local communities by providing funding for local energy projects, such as community-owned renewable energy projects, and investing in programmes that provide training and education for local workers. This will help to create new job opportunities for local residents and also help to promote the development of sustainable communities.

Lastly, the government can work with the private sector to create a conducive environment for the growth of the renewable energy sector. This can be achieved by providing regulatory stability, promoting a level playing field for all players in the sector, and encouraging collaboration between different stakeholders in the sector.

8. **What further advice or support is required to help individuals of all ages and, in particular, individuals who are currently under-represented in the industry enter into or progress in green energy jobs?**

The Scottish government should look to establish a database of training courses focused on low carbon skills that is free to access, so that people wanting to retrain can easily find all the information they need about suitable courses in one place.

Grants and low interest loans should also be made available so that such training courses are easily accessible.

Chapter 3 – Energy supply - Scaling up renewable energy

9. **Should the Scottish Government set an increased ambition for offshore wind deployment in Scotland by 2030? If so, what level should the ambition be set at? Please explain your views.**

Yes

10. **Should the Scottish Government set an ambition for offshore wind deployment in Scotland by 2045? If so, what level should the ambition be set at? Please explain your views.**

Yes

11. **Should the Scottish Government set an ambition for marine energy and, if so, what would be an appropriate ambition? Please explain your views.**

As identified in the call for evidence there remains significant potential in Scotland for wave and tidal energy developments. The Plan should focus on delivery of the existing pipeline to demonstrate the commercial viability of projects and help bring the cost of capital down. It is

then appropriate to also state ambitious targets for further developments, recognising both the potential for predictable energy.

12. What should be the priority actions for the Scottish Government and its agencies to build on the achievements to date of Scotland's wave and tidal energy sector?

Ensuring there is a reliable and investable market for commercial scale projects. It is important that the success of existing projects is promoted to encourage investors into the sector. Directly underwriting projects with government money or utilising the UK Infrastructure Bank could be instrumental in doing this.

Barriers to deployment in relation to grid capacity constraints and planning delays must also be quickly resolved and the whole process speeded up.

13. Do you agree the Scottish Government should set an ambition for solar deployment in Scotland? If so, what form should the ambition take, and what level should it be set at? Please explain your views.

Yes. It is clear from the substantial pipeline of potential projects that the Scottish Government could dramatically increase the total capacity of solar power available. It is also one of the cheapest forms of generation, meaning that little fiscal support is required. However, it is essential that the Scottish government resolves the key barriers to deployment, which include delays in planning and grid capacity constraints. Speeding up planning procedures, and investing in country-wide grid reinforcement will help the deployment of all renewable technologies.

Scotland should also consider how co-location with energy storage can be better rewarded and promoted with solar sites, ensuring an attractive market for flexibility services.

When considering planning, the Scottish government should also consider how to ensure all new-build houses are fitted automatically with solar, while also encouraging factories and car parks to utilise available space to install solar arrays.

14. In line with the growth ambitions set out in this Strategy, how can all the renewable energy sectors above maximise the economic and social benefits flowing to local communities?

The REA are supportive of seeing communities receive direct benefits from local generation sites. It is important that communities and industry are encouraged to engage from the start of such projects, but also for there to be plenty of room for innovation in business models that enable the pass through of a variety of benefits to communities. There are now strong examples across the UK of how community benefits can be facilitated, from local cheaper energy bills, community funds, and benefits to environment and local spaces. Good practice case studies should be produced, and communities empowered to engage in discussions with developers to seek rewards suitable to local needs.

15. Our ambition for at least 5 GW of hydrogen production by 2030 and 25 GW by 2045 in Scotland demonstrates the potential for this market. Given the rapid evolution of this sector, what steps should be taken to maximise delivery of this ambition?

To maximise delivery of the ambition for at least 5 GW of hydrogen production by 2030 and 25 GW by 2045 in Scotland, it is important to strike a balance between building scale by implementing measures that may not be perfect, but can be improved, and restricting deployment to only totally zero carbon measures which may take longer to scale up.

The Scottish Government should deliver policy support to scale electrolytic hydrogen produced from co-located renewable electricity sources, as this represents a truly zero emission pathway.

In addition, the Scottish Government should ensure the grid is hydrogen ready, as grid-connected electrolysers have an important role to play to support the scale up of the hydrogen sector and deliver the necessary cost reductions.

The Scottish Government should also support the development of biohydrogen production pathways. When biomass feedstock is used, this carbon dioxide has been captured from the atmosphere through photosynthesis and its storage generates negative carbon emissions. Bioenergy with carbon capture and storage (BECCS) is crucial to help offset residual emissions from sectors that are extremely difficult to decarbonise.

16. What further government action is needed to drive the pace of renewable hydrogen development in Scotland?

It is important to reduce carbon emissions as swiftly as possible. The extent to which non-zero emission hydrogen production methods such as electrolysis when the grid is not carbon free, or SMR/ATR when carried out on fossil fuels, can be viewed as acceptable to stimulate the transition, has been subject to debate. While these methods may provide a way to quickly scale up hydrogen production, they do not necessarily align with the goal of achieving zero emissions. Therefore, it is important that the Government delivers policy to ensure that the carbon emissions associated with these methods are captured and stored, or used in an application where the carbon is permanently sequestered.

The Scottish Government should also continue to support the growth of renewable sources of energy, which provide the opportunity to achieve zero emissions hydrogen (via electrolysis). The Scottish Government should also support negative emissions of hydrogen (via bioenergy with carbon capture and storage – BECCS).

The Scottish Government should also promote hydrogen's crucial role to help balance the increasing shares of renewables in the system, reducing curtailment of renewable electricity and providing seasonal storage, which will be key to enabling large scale balancing of the networks between the peaks of energy generation and demand.[2] In this respect, there is significant spare capacity in the gas transmission network in Scotland, which is otherwise never likely to be used, given declining volumes of north sea gas production.

Finally, it is important to move away from categorising different pathways with colours and label them according to their lifecycle carbon intensity instead. The LCHS (Low Carbon Hydrogen Standard) should be the baseline standard for all the hydrogen produced in the UK, as well as supplied from abroad. It is important Scottish regulations match the UK LCHS as closely as possible to avoid industry confusion. This will ensure that all hydrogen produced and used in the UK meets the necessary standards for reducing carbon emissions and will also facilitate marketing of Scottish-produced hydrogen for export.

17. Do you think there are any actions required from Scottish Government to support or steer the appropriate development of bioenergy?

The Scottish Government can take several actions to support the appropriate development of bioenergy, which is a key source of renewable energy in the UK. This includes:

- The Scottish government should demonstrate a firm commitment to bioenergy, specifically recognising that it has an important role to play, alongside other low carbon

[2] Benefits of long-duration electricity storage (publishing.service.gov.uk). See para 6.2 in particular.

technologies, in enabling Scotland to meet its net zero targets. This will ensure confidence is maintained in the market, as Scotland develops its Bioenergy Action Plan.

- Scotland should review and update existing evidence of both domestic and global biomass feedstock availability. It is important that this considers all biomass supply chains, not just virgin pellet supplies. This needs to recognise the role of the waste wood market in Scotland, where biomass is also helping divert such material from landfill. In addition, such a review will need to consider energy crops, and a wide variety of waste streams, all being used within the bioenergy production.
- The Scottish government needs to make clear its next steps in relation to moratorium on new energy from waste sites and set out how it will help existing assets to install carbon capture and storage technologies. It should also exempt innovative uses of waste from such a moratorium, such as advanced conversion technologies that will be critical to renewable transport fuel and hydrogen production.
- The Government should recognise the strength of existing biomass sustainability governance arrangements, which are amongst the strongest in the world. In reviewing the existing arrangements, it is essential that this is done from a position of understanding how existing arrangements work and the context for how they have developed across different supply chains.
- Government should recognise the role of biomass in hard-to-treat sectors, especially heat and transport. For example, the role of biomass boilers is underplayed in the existing transition plan despite it being the largest provider of low carbon heat in Scotland to date. Biomass heat will continue to have an important route to play both in domestic and industrial applications. This should not be forgotten in the development of the bioenergy action plan.
- In considering the 'best use of biomass', the Government should aim to build on existing bioenergy sectors, letting the market direct resource use, rather than trying to restrict biomass to one end-use. Instead, the government should take a broad principle-based approach that drives all bioenergy sectors to deliver further desirable environmental, social, and economic outcomes. The sector itself will be able to respond to changing demands as the energy transition evolves, with use of different biomass supply chains dictated by the characteristics of the biomass supplies involved. It is important that this market process is actively enabled, if further strategically important bioenergy uses are to be delivered, coming from the successful growth of existing sectors
- Scotland must consider appropriate delivery pathways for carbon capture and storage on a range of bioenergy applications, at a variety of scales. BECCS is the only available technology for the delivery of both negative emissions and power generation, as such it will be critical to delivering net zero. To date BECCS policy development has been focused on large scale applications. These will continue to be important, but Scotland also has a significant number of medium scale bioenergy assets also looking to invest in BECCS. To date such assets have no clear route to market for future investment. This needs to be rectified.
- Support for research and development of innovative uses of biomass needs to be maintained, specifically recognising the role of advanced conversion technologies (like gasification and pyrolysis) in delivering strategically important products like hydrogen and Sustainable Aviation Fuels.
- The Bioenergy Action Plan should also consider the sector's interaction with the wider, and evolving bioeconomy. Bioenergy supply chains drive Scottish job creation, particularly in rural areas where biomass feedstock production is concentrated in the forestry sector. According to the REA Review 2021, the bioenergy sector in 2018/19 contributed £9.2bn to the UK economy and provided over 54,000 jobs, including those in

biomass feedstock production.[3] By supporting the growth of the bioenergy sector, the Scottish Government can help to create jobs and promote green growth in the nation.

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Anaerobic Digestion (AD)

We have provided recommendations in relation to biogas as an energy source in this section. It could also be included in the chapter on energy supply and is also relevant to development of networks and grids. We also make some specific comments on spreading of digestate to land in the agriculture section. This range of relevant areas is one of the strengths of AD in that it can provide a range of benefits:

1) Optimal treatment technology for certain waste streams – recognised as recycling under the waste hierarchy
2) Where crops are used, this supports a wider range of crops planted and diversification of income for farming businesses. The existing support schemes impose stringent sustainability requirements for crops used in AD and we would expect those to be maintained and strengthened as needed
3) Biogas can be used on site for power and/or heat or be upgraded for use as a transport fuel or directly injected into the gas grid
4) Biogas is approximately 50% methane and 50% CO2. When upgraded for use as a transport fuel or grid injection the CO2 is separated out. This can be used for a variety of applications in the food and drink sector. When CCS becomes available it can also provide negative GHG emissions as the CO2 being stored was previously absorbed by plants and animals during their lifecycle
5) The residue from the process (digestate) contains valuable nutrients, which can reduce the need for mineral fertilisers – supporting the circular economy and wider soil health aims, as well as reducing GHG emissions from the production of mineral fertiliser that is no longer needed

The key policies that have driven the development of AD to date are mostly GB-wide. The main current policy is the Green Gas Support Scheme, which supports injection of biomethane to the gas grid. This is only open to new applications until November 2025. DESNZ recently launched a consultation[4] on potential mid-scheme changes. This includes the potential for extending the life of the scheme and broadening its eligibility so that it can include expansions of existing plants. Although this policy is owned by the UK Government, it requires consultation with Scottish ministers prior to making policy decisions, so we would encourage the Scottish Government to engage to ensure this scheme is as effective as possible.

The UK Government has stated the intention to bring in a long-term replacement to the GGSS, although thinking on this is still at a very early stage. It is essential to ensure there is no gap between the current scheme and its successor and we would encourage the Scottish government both to support this point and engage on the policy development more widely to ensure it is well suited to Scottish energy, agricultural and waste management needs.

There are also significant areas for intervention in relation to agricultural and environmental protection policy that are directly under the control of the Scottish government. We cover these points in our response to question 35 (agriculture).

18. What are the key areas for consideration that the Scottish Government should take into account in the development of a Bioenergy Action Plan?

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4 Green Gas Support Scheme: mid-scheme review - GOV.UK (www.gov.uk)

Given the evidence-based approach being taken by the UK Government in relation to the Biomass Strategy, we would encourage Scotland to consider the same issues, and build on the evidence that has already been collated to make it more specific to the Scottish context. As such the areas to consider should include:

1. Increasing domestic biomass feedstock availability: The Action Plan should promote sustainable practices in the production of bioenergy feedstocks by increasing domestic biomass feedstock availability through financial incentives or subsidies for tree planting, woodland management, and innovative energy crops including willow and miscanthus. This can be done by appropriately rewarding landowners and developers for the environmental benefits provided.

2. Ensuring sustainable practices in the production of bioenergy feedstocks (both domestic and imported): The Scottish Government should start from a position of understanding how detailed and strong existing governance arrangements already are. The REA are confident that existing sustainability requirements are fit for purpose, however, also accept the need to evolve the sustainability regime as demand for biomass feedstocks increases, technologies and the science evolves, as well as other global biomass markets (both in terms of production and use) open up. Such evaluation should:
    a. Remain science-led and be done in collaboration between Government and industry.
    b. Be proportionate and not hinder current proven approaches to sustainable biomass provision.
    c. Continue to use principle-based approaches over blunt prescriptive criteria which could fail to recognise regional differences in forests and management requirements.
    d. Ensure that business and investor confidence is maintained by the Government publicly showing long-term support for the sector and sustainability governance regime.

3. Supporting the growth of the bioenergy sector: The Action Plan should recognise the economic benefits of the bioenergy sector and actively work to support its growth, which will create jobs and promote green growth in the region. This particularly includes the growth of the Scottish forestry sector, essential to increasing tree cover.

4. Ensure Long-term stable offtake markets for biomass feedstocks when considering priority use frameworks: The Action Plan should ensure that long-term stable offtake markets for biomass feedstocks are in place, which will provide a stable income stream for forest and energy crop developers, as well as their investors, encouraging more investment in the cultivation of biomass feedstocks. This is essential when considering principles for 'best-use' and driving desirable outcomes across bioenergy industries.

5. Innovation: Ensure clear routes to market for strategically important innovations including bioenergy carbon capture and storage and advanced conversion technologies. These will be crucial to the future development of the bioenergy sector.

19. How can we identify and sustainably secure the materials required to build the necessary infrastructure to deliver the energy strategy?

The Scottish Government should look to reward strong domestic supply chain activities, adhering to sustainability principles, a part of any support for new low carbon developments.

North Sea Oil and Gas

20. **Should a rigorous Climate Compatibility Checkpoint (CCC) test be used as part of the process to determine whether or not to allow new oil and gas production?**

No comment

21. **If you do think a CCC test should be applied to new production, should that test be applied both to exploration and to fields already consented but not yet in production, as proposed in the strategy?**

No comment

22. **If you do not think a CCC test should be applied to new production, is this because your view is that:**
    a. **Further production should be allowed without any restrictions from a CCC test**
    b. **No further production should be allowed [please set out why]**
    c. **Other reasons [please provide views].**

No comment

23. **If there is to be a rigorous CCC test, what criteria would you use within such a test? In particular [but please also write in any further proposed criteria or wider considerations]**
    a. **In the context of understanding the impact of oil and gas production in the Scottish North Sea specifically on the global goals of the Paris Agreement, should a CCC test reflect –**
        i. **a) the emissions impact from the production side of oil and gas activity only;**
        ii. **b) the emissions impact associated with both the production and consumption aspects of oil and gas activity (i.e. also cover the global emissions associated with the use of oil and gas, even if the fossil fuel is produced in the Scottish North Sea but exported so that use occurs in another country) – as proposed in the Strategy;**
        iii. **c) some other position [please describe].**
    b. **Should a CCC test take account of energy security of the rest of the UK or European partners as well as Scotland? If so, what factors would you include in the assessment, for example should this include the cost of alternative energy supplies?**
        i. **Should a CCC test assess the proposed project's innovation and decarbonisation plans to encourage a reduction in emissions from the extraction and production of oil and gas?**
        ii. **In carrying out a CCC test , should oil be assessed separately to gas?**

No comment

24. As part of decisions on any new production, do you think that an assessment should be made on whether a project demonstrates clear economic and social benefit to Scotland? If so, how should economic and social benefit be determined?

No comment

25. Should there be a presumption against new exploration for oil and gas?

No comment

26. If you do think there should be a presumption against new exploration, are there any exceptional circumstances under which you consider that exploration could be permitted?

No comment

Chapter 4 Energy demand - Heat in Buildings

27. What further government action is needed to drive energy efficiency and zero emissions heat deployment across Scotland?

We are concerned by moves in this report to focus on direct zero emission heating solutions, rather than wider low carbon heating solutions. We raise concerns that this approach could impact on the use of biomass boilers, which we expect to still play an important role in decarbonising heat, especially in domestic and non-domestic applications that require high heat loads or where other heating solutions may not be optimal. In order to drive energy efficiency and zero emissions heat deployment across Scotland, the government should take a multi-pronged approach, including supporting biomass and geothermal alongside other technologies like heat pumps.

While the target of converting 170,000 off-grid homes and 1 million on-grid homes to zero emissions heating by 2030 is ambitious, and very welcome, it is concerning that there are currently few policies in place to support this plan.

Ultimately, targets and aspirations are irrelevant without policies to promote action. Is this strategy there are few incentives for heating system owners to switch to renewable heating. Without proper policies and support, this transition will be difficult for many people to make.

Biomass

For biomass heating the average GHG emission value for Biomass Suppliers List Fuels is 10.9gCO2/MJ, which provides an 87.5 % GHG saving compared to the EU fossil heat average. Figures for feedstocks on the Sustainable Fuel register, are on average even lower, depending on the nature of the feedstock.[5]

First, the government should recognise the benefits of immediate carbon reductions from established bioenergy sectors within heat. Biomass is a renewable resource, as recognised by the IPCC, and carbon savings remain a key metric for environmental policy. By promoting the use of biomass heat in specific locations where there isn't grid capacity for connecting heat pumps or there are obvious local feedstocks, the government can help to achieve significant carbon savings.

[5] Lindegaard 'Update on the Sustainable Fuel Register & Perennial Energy Crops' Slide 7 presented at Wood Heat 2020 conference. https://www.r-e-a.net/wp-content/uploads/2020/10/S2-WH2020-KevinLindegaard-Sustainable-Fuels-Register-Update-on-SFR-and-Perennial-Crops.pdf

Second, the government should promote methodologies for full life cycle analysis of emissions for different biomass feedstocks and technologies. This will ensure that biomass is used in a sustainable and efficient way and that the potential for emissions is kept to a minimum. By using established methodologies for full life cycle analysis, the government can ensure that bioenergy is used in a way that maximises GHG savings and minimises emissions.

Third, the government should focus on regulating high-quality installations, maintenance, and fuel standards for biomass heat. By mandating fuel quality standards and promoting certification schemes such as ENplus88 for pellets, GoodChip for wood chips and Woodsure 'Ready to Burn' for a range of wood fuel products, the government can ensure that emissions are kept to a minimum and that biomass is nowhere near the emitting potential of fossil fuels. This will help to ensure that biomass is used in a sustainable and efficient way.

Fourth, the Government should encourage the use of biomass heat in off-grid heating and industrial heating where baseload heat from other renewable heating technologies may not be enough for high heat-load industrial processes. There will also likely be cases where biomass can be a sensible option on the gas grid, especially where higher heat loads are needed such as in public buildings, hospitals or schools. Biomass heat also increases application of the circular economy unlike fossil fuels. Where waste feedstocks are used, biomass heat diverts waste from landfill and makes better use of our waste resources, without competing for virgin biomass feedstocks.

While electricity generation has made progress in decarbonisation, it will be difficult to achieve truly zero carbon emissions. The task will be further complicated if electricity demand increases due to the electrification of heat in all buildings. Additionally, electricity costs for consumers are currently high, and without government support, would be even higher. Sustainable biomass heating is a cheaper and more effective option for some buildings, as it is currently lower carbon and puts less pressure on the electricity grid. It would be a wise policy decision to include sustainable biomass heating as an option for decarbonising heat in buildings.

Geothermal

The Scottish Government's own independent review, conducted in 2013, identified geothermal potential given the presence of abandoned mine workings, hot sedimentary aquifers and petrothermal sources.[6] It is therefore disappointing not to see Geothermal references within the energy plan for either heat or electricity production.

Firstly, financial incentives such as grants, subsidies, or favourable tax treatment can make it more affordable for businesses and developers to invest in geothermal heating projects. The government could create specific programmes to encourage the adoption of geothermal heating and cooling systems, for example, by developing a Geothermal Development Incentive.

Secondly, establishing a comprehensive regulatory framework for geothermal heat production is crucial for ensuring the safe and sustainable development of the industry. This could include regulations for drilling and exploration, as well as standards for the design, construction, and operation of geothermal projects. The government could also establish a bespoke planning process for geothermal projects and create a system for monitoring and enforcing compliance with regulations.

Thirdly, investing in research and development can help improve geothermal technologies and increase understanding of Scotland's geothermal resources. This could include funding for studies on the feasibility of geothermal projects, research on new drilling techniques, and the development of new heat exchanger materials. The REA particularly welcomes the establishment

[6] Geothermal energy - Renewable and low carbon energy - gov.scot (www.gov.scot)

of a Geothermal Innovation Centre in Aberdeen and would encourage the Scottish Government to support further partnerships between industry and academic institutions.

Fourth, collaborating with industry and academic partners to develop geothermal expertise and create opportunities for job training and education in the field is important. Geothermal is an excellent technology for retaining the skills and jobs of those in the oil industry as Scotland transitions to net zero. This could include funding for apprenticeship programmes, training courses, and educational programmes in geothermal engineering and drilling.

Solar Thermal

Solar Thermal also has the potential to provide baseload water heating which may be most suited to domestic or commercial settings with high energy efficiency levels, or low heating requirements. The Scottish government should still consider the potential for solar thermal in the right situations.

4.1 - Energy for transport

28. What changes to the energy system, if any, will be required to decarbonise transport?

To decarbonise transport in Scotland, several changes are required in the energy system. The first step is to increase the availability of high-powered EV charging infrastructure across the country. This will encourage people to switch to electric vehicles, which are a low-carbon alternative to traditional petrol and diesel cars.

Along with electric vehicles, the use of hydrogen and low carbon fuels can also play a crucial role in decarbonising transport in Scotland. Therefore, it is important to establish refuelling stations for these fuels across Scotland.

However, the Scottish Government must also focus on encouraging modal shift. This means encouraging people and businesses to move away from private cars and towards public transport and active travel. This approach can be modelled on the Welsh Government's ban on new road building, which has led to funding being directed towards public transport and active travel.

In addition to these short-term measures, long-term strategies are also required for the aviation, maritime, and rail systems, which are often overlooked. These strategies should focus on reducing the carbon footprint of these modes of transportation and transitioning them to low-carbon alternatives.

29. If further investment in the energy system is required to make the changes needed to support decarbonising the transport system in Scotland, how should this be paid for?

In order to support the decarbonisation of the transport system in Scotland, it is likely that further investment in the energy system will be required. This investment could come from a variety of sources, but one potential avenue is through a review of fuel duties and vehicle taxes.

The Scottish Government should conduct a wide-scale review of these taxes and duties, taking into account the goal of reducing carbon emissions and promoting sustainable transportation. This review could consider a number of options, such as increasing the taxes on high-emission vehicles or introducing incentives for purchasing electric vehicles.

Another consideration for the review could be road usage pricing, which would charge drivers based on how much they use the road network. This could provide a more equitable way of funding the energy system, as those who use the roads more frequently would pay more towards their upkeep and maintenance. Road usage pricing could also incentivize people to use more sustainable modes of transportation, such as cycling or public transit, which could further reduce carbon emissions.

30. What can the Scottish Government do to increase the sustainable domestic production and use of low carbon fuels across all modes of transport?

The key policies that have driven use of low carbon fuels to date are set by the UK Government. These include fuel duty rates and the Renewable Transport Fuel Obligation (RTFO). The RTFO has been effective in driving increased consumption of renewable transport fuels in road transport. It has to some extent also supported domestic production of these fuels, but to a much lesser extent – the proportion of fuel supplied that is produced in the UK remains at around 10%.

To date, fuels supplied under the RTFO have mostly been blended into conventional diesel or petrol at relatively low rates. As battery electric vehicles increasingly become a mainstream choice it makes sense to direct those fuels to harder to electrify areas, such as HGVs. Biomethane as an alternative fuel to diesel has grown significantly in recent years with the increasing availability of competitively priced vehicles and supported by a fuel duty rebate. A similar approach should be taken for high blends of renewable substitutes for diesel, and we understand that there is an increasing willingness in the UK government (including the Treasury) to consider this.

Although both duty and the RTFO are a matter for the UK government, we would urge the Scottish government to take every opportunity to intervene on these issues. Given its relatively low population density, it will be harder for Scotland to provide public transport alternatives to passenger cars, vehicles and trucks. While continuing to pursue policies of electrification where this is viable, we should ensure that the remaining fuels that are burned are as low GHG as possible.

There are also levers that are within the Scottish Government's control that could support use of these fuels. These would include grants for installation of filling stations for low carbon fuels (either publicly available or at particular company/industry sites). It would also be important to make sure that the business rates system treats these investments appropriately and encourages rather than penalises those who install them.

Finally on the fuels side, the UK Government intends to introduce a mandate for consumption of Sustainable Aviation Fuel (SAF) in the UK. This will be modelled on the RTFO so is not in itself a guarantee that it will be matched by UK production of these fuels. Projects are likely to need a range of support in order to get funded and there will be levers available to the Scottish government to support projects in Scotland.

Similarly, the use of SAF will require significant infrastructure investment in transport, storage and handling of these fuels at airports. It may be more challenging for smaller airports to use these fuels – or at least to do so in a cost-competitive way compared to larger airports – so the Scottish government should consider the ability of Scottish airports to use these fuels and what, if anything, needs to be done to ensure this is available. The SAF mandate will create an obligation on fuel suppliers across their portfolios as a whole, so without action from the government it is likely that SAF use will be concentrated at larger airports with smaller ones

missing out. This in turn may put them at a disadvantage when demonstrating to their customers and their wider public what steps they are taking towards net zero.

In addition, the Scottish Government should focus on creating a supportive policy landscape for renewable electricity. This is critical in order to power electric vehicles (EVs) and make them a viable alternative to traditional petrol or diesel-fuelled vehicles. The Scottish Government can do this by promoting the development of renewable energy sources such as wind, solar, and hydro power. It can also provide incentives for the adoption of EVs, such as tax credits or subsidies, to encourage more people to switch to low carbon vehicles.

31. What changes, if any, do you think should be made to the current regulations and processes to help make it easier for organisations to install charging Infrastructure and hydrogen/low carbon fuel refuelling infrastructure?

Two key reforms that could be particularly impactful are reforms to the wayleaves process and reforms to electricity grid connection rules.

Firstly, the wayleaves process could be reformed to grant permission more easily for new renewables connections over private land. This would involve simplifying and streamlining the process for obtaining permission to install charging infrastructure and refuelling infrastructure, particularly in cases where the infrastructure needs to cross private land. By making it easier for organisations to obtain wayleaves, the Scottish Government could help to remove a significant barrier to the installation of low-carbon infrastructure.

Secondly, the Scottish Government could reform grid connection rules to adopt an anticipatory grid reinforcement approach. This would involve moving infrastructure ahead of need, rather than waiting for demand to come. By doing so, the government could help to ensure that there is sufficient grid capacity to support the installation of new charging and refuelling infrastructure. This approach would require the Scottish Government to work closely with energy companies and other stakeholders to identify areas where grid reinforcement is needed, and to take proactive steps to invest in the necessary infrastructure.

Taken together, these two reforms could help to remove significant barriers to the installation of charging and refuelling infrastructure in Scotland. By making it easier for organisations to obtain wayleaves and by adopting an anticipatory grid reinforcement approach, the Scottish Government could help to create an environment that is more conducive to the deployment of low-carbon infrastructure. This in turn could help to accelerate Scotland's transition to a low-carbon economy, while also supporting the development of new industries and creating new jobs.

32. What action can the Scottish Government take to ensure that the transition to a net zero transport system supports those least able to pay

One such action is to influence the Treasury to equalise VAT rates for electricity used in EV charging at public charging sites, which is currently higher than that charged at home. This would help to make EV ownership more affordable for low-income households who may not have access to home charging facilities.

Another action that the Scottish Government could take is to consider a car scrappage scheme. This scheme would provide capital funding to help those on the lowest incomes switch to an EV.

By incentivizing the purchase of EVs and providing financial support to those who may not otherwise be able to afford them, the government can help to ensure that the transition to a net zero transport system is more equitable.

33. What role, if any, is there for communities and community energy in contributing to the delivery of the transport transition to net zero and, what action can the Scottish Government take to support this activity?

As with power and heat, community energy can provide sustainable and low-carbon solutions that can reduce emissions from the transport sector. With the right support from the Scottish Government, community-led initiatives can be an effective means of achieving Scotland's ambitious net-zero targets.

Grant funding and support for up-front costs are essential for community energy projects to succeed. Such initiatives often require significant investment to get off the ground, and without sufficient funding and support, they may not be viable. The Scottish Government can provide financial support to communities through grant programmes and other funding mechanisms. This support can help to cover the costs of setting up community-owned electric vehicle charging stations, shared electric vehicles, or other transport initiatives that promote sustainable and low-carbon transport options.

In addition to financial support, the Scottish Government can provide technical assistance to communities, such as training and expertise in project management, to help them successfully deliver community-led transport initiatives. The government can also promote the benefits of community energy and transport initiatives through education and awareness campaigns, encouraging more people to get involved and support these projects.

34. Electric vehicle batteries typically still have around 80% of their capacity when they need replacing and can be used for other applications, for example they can be used as a clean alternative to diesel generators. What, if anything, could be done to increase the reuse of these batteries in the energy system?

To increase the reuse of these batteries in the energy system, the Scottish Government could take several steps, one of which is to fund best practice guidance for the use of such batteries. Such guidance would be essential in overcoming any perceived safety concerns that may be preventing wider adoption of these batteries for energy storage and other applications.

By providing clear guidelines on the safe and effective use of electric vehicle batteries, the Scottish Government could encourage more businesses and organisations to incorporate these batteries into their energy systems, thereby reducing the need for fossil fuel-based energy sources and contributing to Scotland's overall climate change goals.

Additionally, the Scottish Government could consider offering financial incentives to encourage the reuse of electric vehicle batteries in the energy system. For example, they could provide tax credits or other financial incentives to businesses that invest in battery storage systems using repurposed electric vehicle batteries. This would not only promote the reuse of these batteries but also help to accelerate the transition to a cleaner and more sustainable energy system.

Energy for agriculture

35. What are the key actions you would like to see the Scottish Government take in the next 5 years to support the agricultural sector to decarbonise energy use?

As set out in our response to question 17, the residue from anaerobic digestion (digestate) has a valuable role to play reducing the need for mineral fertilisers. In addition to this, compost recycles organic matter to soils to improve soil health. Advocating the use of recycled organics, along with prioritising soil health helps farmers to reduce their reliance on mineral (fossil-fuel derived) fertilisers and contributes to the decarbonisation of agriculture. Targets and incentives

for farmers to improve or maintain the health of soils, can help to encourage the use of organic materials.

Digestate is the material that remains after the anaerobic digestion of organic matter and it is a renewable fertiliser and a good source of readily available nutrients, especially nitrogen. Around 80% of total Nitrogen content in food-waste derived digestate is readily available to plants / crops in the first year of application. Around 50% of the phosphate and 80% of the potash is available to crops in the year of application. Digestate can also supply useful quantities of sulphur and magnesium. Using digestate can help to reduce a farm's carbon footprint by replacing the need to apply inorganic fertilisers, thus avoiding emissions from their production. Replacing manufactured fertiliser with food based digestate can reduce a farm's carbon footprint by around 20kg CO2 equivalents per tonne of digestate applied.

Compost is an excellent soil conditioner and a source of organic matter. Increasing the organic matter in soils has multiple benefits, such as improving the soil structure and function, reducing erosion, increased water holding capacity and increasing soil biological activity and nutrient retention, and helping suppress plant diseases. In addition, studies have shown that application of compost helps grow more nutritious, nutrient-dense crops.

Compost contains valuable quantities of major plant nutrients, most notably phosphate and potash plus some nitrogen, sulphur and magnesium. Nutrients are slowly released and can help maintain soil reserves with repeated, good practice applications.

It is important that organic materials are applied to soil in the right way, at the right time when the plants are able to make best use of the nutrients and in the right quantities – matching the nutrient content of the materials to the crop demand. The quality of materials recycled to land is also important. The Compost Certification Schemes and Biofertiliser Certification Scheme certify compost and digestates to ensure that they are 'fit-for-purpose' and the end of waste rules in Scotland place additional restrictions on the levels of plastic contamination that are permitted to be in composts and digestates.

There is a great deal of innovation going into digestate processing with various technologies that can transform the nutrient density of digestate, extract or recover nutrients and transform them into specialised products, such as pelletised fertilisers that can help to lock up the carbon and help with some of the challenges of storage and spreading. These developments should be supported to enable the best use of the valuable nutrients. Support could include regulatory support for these technologies alongside grants.

Alongside digestate and biomethane, AD/biomethane plants can produce CO2. The CO2 from the existing plants is largely supplied to the food and beverage sector (and meets the food grade standard for CO2). The technology to capture CO2 from biomethane plants already exists in the UK, it is proven and commercially available and can be practically retrofitted on most biomethane plants. In addition to the plants that are already capturing CO2, there are another approximately 70 operational plants that could easily retrofit carbon capture (if financially viable). This would make a major contribution to the UK demand for CO2, bolstering our domestic supplies, diversifying the sources, reducing travelling distances and protecting the

sector from future shortages. The two actions from Government that would have the greatest impact and help rollout the capture of CO2 at more AD plants in the short to medium terms are:

1. address the market perception around waste derived CO2, including the regulatory status of CO2 derived from wastes, and
2. provide financial support to help the business case for retrofitting or building CO2 capture plants at biomethane plants.

Energy for Industry

36. What are the key actions you would like to see the Scottish Government take in the next 5 years to support the development of CCUS in Scotland?

In the next 5 years, the Scottish Government should take several key actions to support the development of Carbon Capture, Utilisation, and Storage (CCUS) in Scotland. One of the key actions would be to develop a contractual arrangement based on a Negative Emission Payment (NEP) mechanism. This would help facilitate price discovery for a realistic negative emission reference price, which would provide a clear signal to the market for the development of CCUS projects. The NEP mechanism would act as an interim measure, before eventually moving to a CfD Greenhouse Gas Removal (GGR) contract, which would provide long-term stability and certainty for the CCUS industry.

Another important action the Scottish Government should take is to actively develop its own negative emissions accreditation system. This would involve working closely with academia, voluntary carbon markets, and consulting with industry experts to establish a robust and credible accreditation system. This would provide assurance to investors and project developers that their negative emissions projects are genuine, verifiable, and permanent.

Different technologies will be at different stages of development, and the Scottish GGR Business Model should take this into account when selecting projects. The contract lengths should be based on bilateral discussions initially, recognising different technology CAPEX and OPEX.

In addition, Biochar should also be included in the Scottish GGR Business Model and the government should set out an industry engagement process to enable this to happen. Biochar is a form of carbon sequestration that has the potential to provide multiple benefits such as soil improvement, water retention, and waste management.

Finally, the Scottish CCUS policy should work in conjunction with other existing support mechanisms such as the power CfD, the Renewables Obligation (Scotland), Feed-in Tariffs, and Renewable Transport Fuel Obligation. This would help to create a comprehensive and cohesive support framework for the CCUS industry in Scotland.

37. How can the Scottish Government and industry best work together to remove emissions from industry in Scotland?

The Scottish Government should ensure there are clear routes to market for businesses and industry wanting to decarbonise. This can be done through direct fiscal support or a favourable tax investment environment. In return industry can make strong commitments to decarbonisation and the delivery of jobs this would entail.

38. What are the opportunities and challenges to CCUS deployment in Scotland?

Currently there is a lack of a clear route to market for CCUS, especially for bioenergy carbon capture and storage, which will deliver critical negative emissions. The Scottish Government should push to ensure the speedy development of the green gas removal business models and

wider allocation frameworks that will enable deployment of CCUS. It is critical that this allows for the installation of CCUS across different scales of asset, as currently the UK government has only focused on the largest-scale CCUS projects.

In addition, it is important that Scotland take a lead in the development of a market for negative emissions, both as part of the UK ETS and the voluntary carbon markets. This will need to include the development of strong and bankable standards for negative emissions.

39. Given Scotland's key CCUS resources, Scotland has the potential to work towards being at the centre of a European hub for the importation and storage of CO2 from Europe. What are your views on this?

As identified in the consultation, Scotland has significant potential for CO2 storage capacity. We would encourage Scotland to further develop this industry, which will also help in the just transition of existing high carbon sectors and associated infrastructure.

Chapter 5: Creating the conditions for a net zero energy system

40. What additional action could the Scottish Government or UK Government take to support security of supply in a net zero energy system?

Scotland must also focus on the development of Long Duration Energy Storage Assets, which will be critical to delivery of a low carbon and affordable energy system. The UK Government have stated intentions to deliver a support mechanism for such a system by 2024. The Scottish Government should be working to ensure there are suitable flexibility markets in place to make it worthwhile for all storage assets to be deployed and built. This needs to take place at both the distribution and transmission level.

41. What other actions should the Scottish Government (or others) undertake to ensure our energy system is resilient to the impacts of climate change?

Moves to a more decentralised and low carbon energy system, whereby there are many small generation sites, operating on a smarter and flexible grid system, will mean that the system becomes less reliant on centralised large-scale sites that could go down if disrupted by extreme events caused by climate change.

Chapter 6: Route map to 2045

42. Are there any changes you would make to the approach set out in this route map?

The approach set out in the route map is aligned with the goals of the REA. The route maps goals of at least 50% of the energy used in heat, transport, and electricity demand will come from renewable sources is particularly welcome.

However, we would like to see a stronger focus on alternative renewable sources, particularly the role of biomass and geothermal in the route map. While the route map does mention the use of renewable energy sources and the goal of decarbonising heat, it does not specifically mention the use of biomass, biogas or geothermal energy. These energy sources have the potential to make significant contributions to decarbonising the energy system.

The REA would like to see a more specific mention of these sources in the route map and how they will be incorporated into the plan to achieve the 50% target

43. What, if any, additional action could be taken to deliver the vision and ensure Scotland captures maximum social, economic and environmental benefits from the transition?

No comment

Impact assessment questions

44. Could any of the proposals set out in this strategy unfairly discriminate against any person in Scotland who shares a protected characteristic? These include: age, disability, sex, gender reassignment, pregnancy and maternity, race, sexual orientation, religion or belief.

No comment

45. Could any of the proposals set out in this strategy have an adverse impact on children's rights and wellbeing?

No comment

46. Is there any further action that we, or other organisations (please specify), can take to protect those on lower incomes or at risk of fuel poverty from any negative cost impact as a result of the net zero transition?

No comment

47. Is there further action we can take to ensure the strategy best supports the development of more opportunities for young people?

No comment

Just Transition energy outcomes

48. What are your views on the approach we have set out to monitor and evaluate the Strategy and Plan?

No comment

49. What are your views on the draft Just Transition outcomes for the Energy Strategy and Just Transition Plan?

We support the approach set out to monitor and evaluate the Strategy and Plan. The draft outcomes align with our mission to promote the use of energy from renewable sources and to create a more sustainable energy system.

We particularly support the emphasis on creating more jobs in the renewables sector. This is particularly important in the context of a just transition, as it ensures that workers and communities that have historically been reliant on fossil fuel industries have access to good, meaningful, high-value and sustainable jobs in the renewable energy sector.

Part of ensuring future jobs will be attracting supply chains to Scotland and this is even more important in the current environment in light of recent strong support in the USA and EU for renewable supply chains.

Additionally, the focus on access to jobs in people's local areas and communities is also important for fostering a just transition as it helps ensure that the benefits of the transition are felt by all and not just concentrated in certain regions. We should note that technologies such as

Biomass, Geothermal, AD and Hydrogen all have strong potential to create jobs in rural Scotland, and the Just Transition Plan should support these technologies alongside traditional renewables.

Overall, we believe the draft outcomes are a step in the right direction towards achieving a sustainable energy system.

50. Do you have any views on appropriate indicators and relevant data sources to measure progress towards, and success of, these outcomes?

No comment