



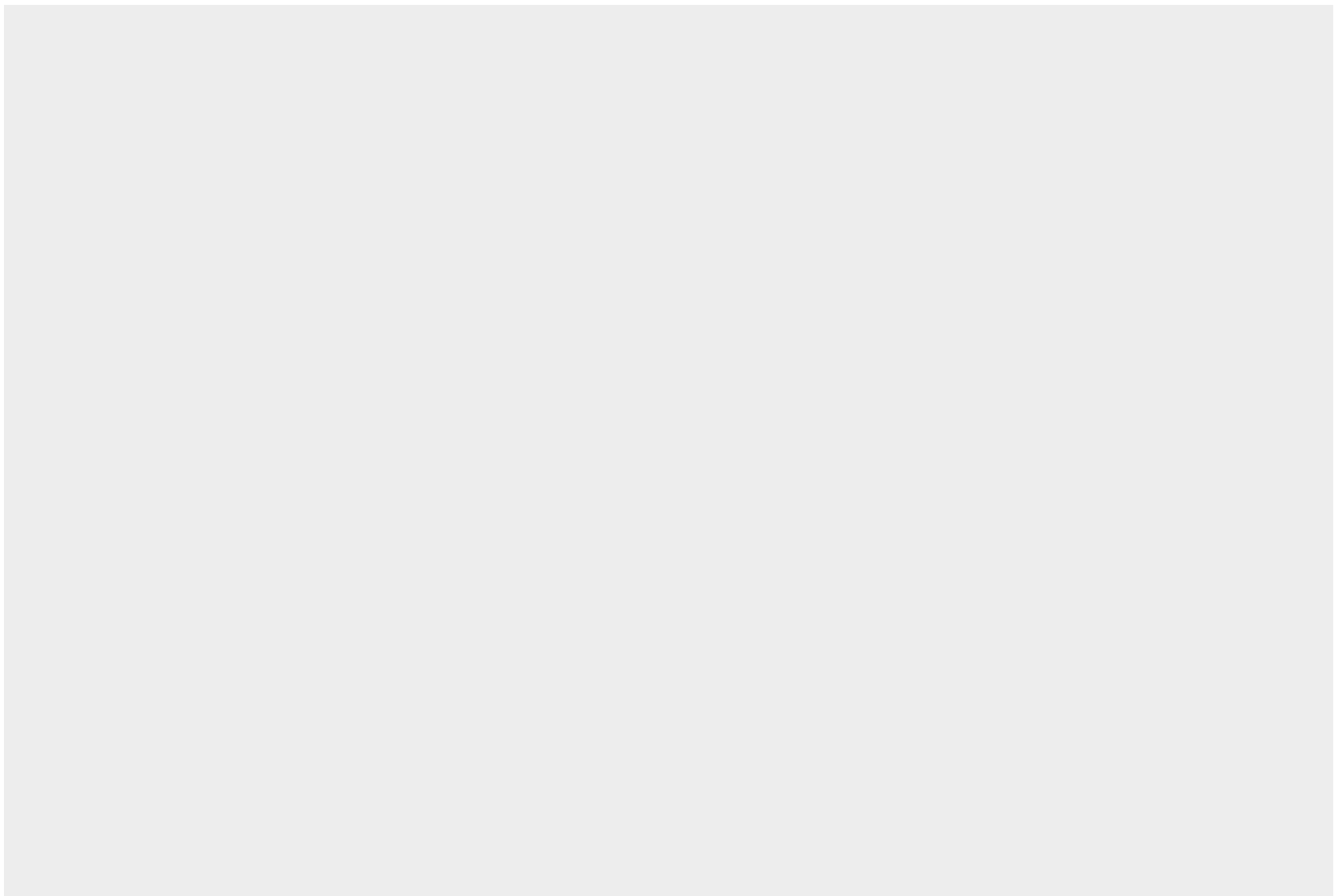
*The Royal Society
of Edinburgh*

KNOWLEDGE MADE USEFUL

Advice paper

May 2023, AP23-2

Scotland's energy strategy and just transition plan



Summary

- The RSE applauds the ambition driving this draft the energy strategy and just transition plan and acknowledges the significant progress already underway in Scotland's transition to net zero. The working group recognised that this energy transition is very complex – economically, politically, and socially - and welcomed the whole system approach that involves the various components essential to make it a just transition. This draft document provides a good initial framework to build on for achieving Scotland's net zero targets, however, details on certain aspects, including the delivery, need to be explored further. The RSE contribution, although not addressing all the questions raised in the consultation, makes some recommendations for core themes/areas to further develop in the final document to ensure the step-change needed to deliver the proposed outcomes.
- The working group stated from the outset that there is limited connectivity between the current situation and the targets set out in this vision. As we explain in this submission, there is a gap between reality and ambition, and this must be addressed in the final strategy.
- In particular, the absence of roadmaps to set out how we make this transition in a way that is *achievable* and in a way that is genuinely *integrated* is concerning. The complexity of this transition will not be lost on any, but the perceived siloed approach which the government and associated agencies are taking when setting some of these ambitious targets has the potential to be unhelpful and counterproductive.
- The RSE would like to see the development of high-level roadmaps and graphical representations in the simplest-to-understand format explaining how the integration and alignment across the areas covered in the plan are to be achieved. This strategy should pay more attention to the outcomes and impacts that arise from setting ambitious targets, whilst building in accountability and risk assessment to mitigate against unpredicted hazards. Altogether, the strategy misses this crucial step.
- One of the primary concerns would be that this strategy will lead to a series of well-intentioned interventions that create unintended consequences across health, wellbeing, and sustainability. There are mechanisms that can be built in to mitigate against these possibilities from the outset and ensure coherence across sectors that will protect both people and planet. These mechanisms are not optional and must be placed front and centre to identify risk and consider impact, which we explore further in this response.
- The working group also believed that circular economy should be at the heart of this plan. It is surprising that circularity is not emphasised more across the strategy, particularly given the efforts of the Scottish Government elsewhere (e.g., the circular economy bill).¹ This comment links to a wider concern that the document appears to take issues in isolation, rather than connected to a wider system/economy.

¹ Scottish Government (2022). *Delivering Scotland's circular economy - proposed circular economy bill: consultation*. Available at: <https://www.gov.scot/publications/delivering-scotlands-circular-economy-consultation-proposals-circular-economy-bill/> (Accessed 10.03.2023).

Summary

- Additionally, this strategy omits one of the most evidenced demand reduction policies, namely, encouraging people to use less to gain more (extracting/consuming less resources whilst increasing prosperity). Whilst we do not underestimate the political challenge of presenting such an argument, the ties between economic growth (increasing output) and prosperity must be challenged and this will require a powerful public engagement strategy to drive behavioural change.
- Overall, there is a certain level of overconfidence in Scotland's geopolitical stature in the world (in terms of trade negotiation and purchasing power of critical raw materials, for instance). This complex reality requires some serious consideration and work with UK Government, including over ongoing post-Brexit trade agreements. As the RSE has emphasised in various submissions on related matters,² cooperation between UK and Scottish Governments and coherence across devolved and reserved policies will be key for the successful delivery of this strategy.
- Given that this was a long-anticipated document, there is a lack of new information presented that wasn't already available across other policy departments. In addition, given the scope and importance of this plan at a national level, the structure, format, and wording of the final energy plan will need to be more inclusive. The draft strategy fails to provide an accessible plan where individuals from all ages and backgrounds can understand what this means for them and engage with it. The RSE would recommend that the final strategy include an accessible short report that can be understood by the average citizen (e.g., through an easy read version, or similar). If the Scottish Government really wants honest and inclusive feedback, the final plan needs to be more accessible.

² See for instance the RSE's contribution to the Scottish affairs committee's inquiry in renewable energy in Scotland mentioned later in this document.

Introduction

The Royal Society of Edinburgh (RSE), Scotland's National Academy, welcomes the opportunity to respond to the Scottish Government's consultation on the draft energy strategy and just transition plan. The RSE has been active in the area of energy policy in recent years, including publishing a major inquiry into Scotland's energy future in 2019 and preparing policy advice for national consultations on the hydrogen action plan (2022), Scotland's supply chain (2021) and renewable energy in Scotland (2022). The working group preparing this paper was comprised of Fellows and Young Academy of Scotland members, all of whom have significant knowledge of Scotland's energy landscape and workforce and occupy various roles across academia, industry, policy, and other sectors.

Chapter 1: Introduction and vision

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

1. The RSE states from the outset that the vision set out for 2030 and 2045 is laudable, however, some of the targets seem too ambitious, given that key issues around supply chain capabilities and resilience haven't been properly considered. From a skills perspective, there are problems related to the availability of a skilled workforce to achieve some of the output targets. The energy strategy should be accompanied by a complementary education and skills investment strategy to deliver desired workforce development (e.g., we address this later in Chapter 4 – energy demand – heat in buildings in relation to skills in the built environment).

2. The RSE recommends that a robust delivery framework accompanies these targets, measuring the wider *outcomes* and *impacts* of these policies in the long run and setting out the mechanisms to deliver them. The strategy, as presented, excludes risk altogether and, as a result, misses a vital opportunity to build risk assessment into the plan and mitigate against negative outcomes. The RSE understands the need for decisive, ambitious action, however, consideration of what *could* go wrong must be incorporated from the start to prevent even greater obstacles further down the line.

3. The RSE understands that the just transition plan is clearly trying to deliver across many outcomes,

including participation in the labour market and wider socioeconomic outcomes for citizens. There are a lot of aspirational words describing what a fair, equal and just society will look like for the workforce, but while energy-related benchmarks are more developed, workforce-related benchmarks are undeveloped and the plan falls short in outlining how we can quantify and measure this transition to assess impact.

4. Furthermore, throughout the document, there are contradictory targets. For instance, this is clearly visible in the section on oil and gas, which reads like a standalone section, despite the interconnectedness to wind and hydrogen capacity. The absence of a clear roadmap and infrastructure for capturing and storing green energy to cover the needs of the population creates significant issues around reconciling competing targets.

5. The working group noted that the document expected consultees to accept the proposed ambitions and targets and comment on whether the timeframes set out in the strategy are suitable, rather than asking first whether participants agree with those ambitions in principle. For example, there was consensus that the strategy was trying to cover too much ground across renewable energy generation, instead of focusing on output ambitions suited to Scotland's economy and workforce.

6. It is important to note that many of the initiatives and projects outlined in this strategy do not depend exclusively on Scottish Government powers and resources for delivery and will require UK Government legislation and cooperation, particularly in areas such as the built environment and electricity. The importance of this should not be overlooked, however, we will focus this response on issues devolved to the Scottish Government mainly.

7. The working group noted that circular economy thinking should be brought front and centre in the vision. There is a huge opportunity for both managing resources and delivering a just transition that is currently being missed. Activities such as the decommissioning of oil and gas fields and the reintroduction of some of those materials back into the economy require huge reskilling/multiskilling of the workforce and represent growth opportunities for businesses and industry.

8. There is a focus on blue and green hydrogen in the strategy, as elements of significant growth potential in the renewable energy area. Longstanding issues such as problems with water management³, are not accounted for, however. Moreover, the development of pink hydrogen in the UK, which will likely be more competitive in the long run, is overlooked. This should be carefully considered in the development of a vision for hydrogen.

³ Royal Society of Edinburgh (2022). *Scottish Government Draft Hydrogen Action Plan*. Available at: <https://rse.org.uk/expert-advice/hydrogen-action-plan/> (Accessed 10.03.2023).

Chapter 2: Preparing for a just energy transition

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

9. Overall, the strategy sets out an ambition to have an energy system that provides maximum community and economic benefits. However, the Scottish Government can only deliver so much of this plan and must recognise that its success relies greatly on the actions of the UK Government. Additionally, one of the big themes in this document is the just transition and providing affordable solutions. However, there are limited real proposals to make energy more affordable in the short term through national policy interventions, despite this being the biggest problem people face now.

10. There are opportunities to deliver benefits from the transition to net zero for households and businesses that the Scottish Government can act upon, for example, through introducing Passivhaus or equivalent building standards that reduce energy bills and increase energy efficiency. The working group was encouraged to see Alex Rowley's MSP members bill and the Scottish Government's commitment to subordinate legislation within two years to give effect to the proposal.⁴ However, the RSE recommends that the plan includes references to these standards, and similarly ambitious targets as other sectors are developed to map out a strategy that prepares Scotland's supply chain and workforce to deliver these high standards.⁵

11. More broadly, the RSE welcomes the ambitious renewable energy generation and demand reduction targets but expresses some concerns over the preparedness of Scotland's workforce and supply chain resilience to deliver such targets for 2030 and 2045.

12. Sitting at the heart of a just transition should be procurement models that give confidence to the pipeline and overcome the existing ecosystem challenges. Such procurement models should move away from short term lowest cost and focus on longer term, whole system and societal, value instead. Government and public sector agencies should procure on value and recognise that the higher upfront cost is offset significantly by lower long-term operational costs and better outcomes. The RSE recognises the challenges this poses when faced with year-on-year targets, however, the absence of a value-

based procurement strategy will hold back the proposed ambitions and delay the development of a resilient and mobile supply chain and labour market.

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

13. The RSE was pleased to see inclusivity questions included in this consultation and believes that a priority must be to ensure no one is left behind in this transition. There is a significant opportunity for benefits to flow to communities, particularly in areas with an abundance of local natural and sustainable materials e.g., forestry, particularly in rural Scotland, which can develop new industries such as mass timber systems and wood fibre insulation products. As a result, some communities could potentially benefit from this transition – but there will be others who will not have access to these opportunities. It is important to consider what actions could be taken to ensure a better balance between the production and distribution of different types of energy at the Scottish and UK levels.

14. The final plan will need to include clear actions to build a stable, resilient, and capable supply chain, that has to be balanced across the country, which ensures job creation, and where possible, high-value job creation, harmonised across the strategy itself and at local authorities' level.

15. This links to a wider issue around inclusion and community benefits, even if we draw the boundaries around Scotland. Recent Social Attitudes survey results show that only a small percentage of the Scottish population believe that they have any influence over their local council. The 2020 Scottish household survey,⁶ for example, found that only 25% of the population believed they could influence decisions affecting their area.

16. This is also reflected in low turnout for local authority elections (44.8%).⁷ As a result, there is a need for a serious renewal of Scotland's local democracy, local government, and local community interactions in order to derive appropriate community benefits. Local governments, local councils, and related bodies must have this written into their strategies. Otherwise, we will likely witness very selective community benefits which would probably accrue to those who are somewhat better off, better resourced, and better able to engage in projects like community solar co-operatives.

⁴ Scottish Parliament (2022) *Proposed Domestic Building Environmental Standards (Scotland) Bill*. Available at: <https://www.parliament.scot/bills-and-laws/proposals-for-bills/proposed-domestic-building-environmental-standards-scotland-bill> (Accessed 23.03.2023).

⁵ The Scottish Fuel Poverty Strategic Working Group (2016) report outlined the benefits of houses built to these standards (e.g. reducing energy demand).

⁶ Scottish Government (2020) *Scottish Household Survey 2020*. Available at: <https://www.gov.scot/publications/scottish-household-survey-2020-telephone-survey-key-findings/pages/7/> (Accessed 10.03.2023).

⁷ Electoral Commission (2022). *Report on the May 2022 Scottish council elections*. Available at: <https://www.electoralcommission.org.uk/who-we-are-and-what-we-do/elections-and-referendums/past-elections-and-referendums/scotland-local-council-elections/report-may-2022-scottish-council-elections> (Accessed 10.03.2023)

17. There is also a geographical/spatial element to this question, where the strategy seems to treat Scotland as a whole entity, which is true from a governance point of view. However, there are important geographical differentials, such as those between cities and rural communities, that should be noted and accounted for, particularly when considering community benefits. In addition, climate variations across the country should be considered also, as houses placed inland and towards the South will have different requirements to houses that are situated further up North and towards the coast or on the islands.⁸

18. The RSE is concerned that this document is missing, in many respects, the *vision* of what the energy strategy and just transition plan means for towns and rural Scotland. Taking heat networks as an example, obviously, the strategy will start with cities where there will be big returns on investment. However, implications for rural towns need to be considered also.

19. It is worth noting that the RSE welcomes the Scottish Government's progress in legislating in heat networks more broadly, however, there are still barriers to overcome for heat network developments. Despite the UK Government energy bill setting out the intention to regulate heat networks, the proposal has been deliberated at some length in the House of Lords and could see a potential delay of three-plus years. This strategy must also recognise the challenges of existing infrastructure, such as the existence of old networks that are of poor quality from an insulation perspective and need upgrading. This will require technical standards, as well as aspirational targets, and will be significantly boosted by UK Government legislation. To facilitate the development of new heat networks at an effective scale necessary to capture carbon and cost efficiencies some levers such as obligations to connect for owners of large buildings with significant heat demand should be considered. This could commence with public sector estate and progress to commercial sector when heat system renovation is due.⁹

Question 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?

20. The working group considered one of the greatest market and supply chain opportunities from this

energy transition is to embed circularity in the overall strategy, which will bring benefits both domestically and internationally, and opportunities across the whole energy ecosystem. However, circularity only appears in this strategy sparsely. This is surprising given the Scottish Government's welcome push on the circular economy through, for example, the circular economy bill.¹⁰

21. If we consider the really big problems that Scotland faces, delivering the rollout of different types of energy – particularly around infrastructure, access to critical raw materials, to metals and minerals, and the longer-term ambitions set out for 2045 where Scotland is at the end of the value chain - putting circular economy at the heart of this strategy should be obvious. The RSE calls upon the Scottish Government to embed circularity across the strategy and map out the opportunities this could create.

22. In practice, a circular economy drives new industries offering high value, high skilled jobs, whilst reducing our imprint on people and planet, domestically and abroad. The strategy sets enormous ambitions for scaling up renewable energy and retrofitting buildings, which will demand a significant roll out of skills to operate and maintain this infrastructure. However, this strategy should also be including from the outset management plans for all the materials from, for example, end-of-life wind turbines, alongside the decommissioning of North Sea oil infrastructure, and the resulting opportunities to reintroduce these materials back into the economy through new end-of-life industries.

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

23. The RSE states that in sectors where there is significant industry investment in the workforce, the workforce's competency profile is developing into areas that are likely to be high value/high growth. For example, on the energy generation side, there are some innovative projects, particularly in the Northeast.¹¹ However, on the demand-reduction side, the investment is far more limited, with tokenistic investments, through funds such as the national transition training fund, flexible workforce development fund etc., which are very time-bound, are narrowly targeted and have no real longevity and that have proven very challenging to integrate into the mainstream tertiary system.

⁸ See for instance the reflections included in this report which highlights that climate variation leads to different outcomes for implemented policies, and recommends tailored solutions. Scottish Fuel Poverty Strategic Working Group (2016). *A Scotland without fuel poverty is a fairer Scotland: report*. Available at: <https://webarchive.nrscotland.gov.uk/20210415134522/http://www.gov.scot/publications/scotland-without-fuel-poverty-fairer-scotland-four-steps-achieving-sustainable/> (Accessed 10.03.2023).

⁹ Some further recommendations on efficient development of new heat networks to meet future needs are included in the RSE inquiry report Scotland's Energy Future (2019).

¹⁰ Scottish Government (no data) *Circular Economy Bill*. Available at: <https://www.gov.scot/news/circular-economy-bill/> (Accessed 10.03.2023)

¹¹ See for instance Scottish Renewables (no data) *Renewable Energy – Delivering for North East Scotland*. Available at: https://www.scottishrenewables.com/assets/000/001/905/NE_factsheet_A4_2PP_MSP_-_WEB_original.pdf?1633508805 (Accessed 10.03.2023).

24. This is leading to a disconnect between industry views on skills to be developed through curriculum in vocational education and training and the actual curriculum developed by conventional education providers which leads to an increase in the number of industry-devised academies and private training provisions, particularly in the built environment (e.g. for retrofitting or Passivhaus buildings). The tertiary education system needs to be adapted, with existing long-term models of education spanning over several years balanced with shorter, sharper, industry accredited, more focused training for reskilling and multiskilling.

25. The RSE calls upon the Scottish Government to empower tertiary providers to act quickly to update their curricula to reflect this evolving job market and produce well-trained and agile graduates that can move into these emerging sectors with ease. Moreover, as the RSE has emphasised in other advice papers, it is important that upskilling/reskilling reflects the heterogeneity of the oil and gas sector to ensure workers in supporting industries are not left behind.¹²

Question 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?

26. The RSE recommends that the strategy could include a section on engaging young people. There is an opportunity to map out what this transition means for young people and initiate important conversations about the environment and sustainability. When young people grow older, they will be driving cultural change and will play an enormous role in the just transition. The working group would like to see the next generation central to the transition by participating in the co-creation of a greener and more sustainable Scotland.

Chapter 3: Energy supply - Scaling up renewable energy

27. Overall, the strategy presents an ambitious view of supply in the energy sector. However, it is important to consider that while a complex ecosystem with different types of energy is needed to achieve Scotland's ambitions

for prosperity while meeting the climate challenge, the strategy should acknowledge there is limited ability to deliver in equal measure for every technology. Different types of energy discussed here mature at different stages and there are barriers related to available infrastructure and skills. Even a relatively mature technology, such as wind, faces challenges due to changing deployment conditions and market demands.¹³ To this end, it might be more lucrative in the long run to select some key areas and focus on delivering the highest possible outcomes for these, rather than setting unrealistic commitments against each technology available today.

28. Scaling up renewable energy supply faces different barriers, some of which are outwith Scottish Government legislation. One key area is that related to planning, and coherence with the recently adopted National Planning Framework 4 will be needed, as considerable development of infrastructure is needed to meet the ambitious proposed targets. The framework encourages the development of underground connections for grid infrastructure, if possible, and recommends planners to weigh multiple types of impacts (e.g. visual changes in landscape, community use of the area, biodiversity, etc) of proposed new developments against contributions to achieving renewable energy targets. Beyond planners' input, however, there are wider social implications and possible lines of contention when local areas are affected (such as through running new power lines through the countryside for instance). While considerable progress has been made on delivering such projects accounting for such issues,¹⁴ more should be done to ensure there are adequate legal and regulatory framework to deliver the best solutions for different stakeholders.

29. The RSE welcomes the ambitious targets set out throughout the strategy, but cautions that within existing parameters there is limited information available by way of a roadmap to achieve these, as well as an explanation on how these were conceived. The roadmap should account for the fact that renewable energy is still intermittent, and supply and demand need to be carefully balanced across the year.¹⁵

30. It is clear that significant infrastructure will be deployed to scale up renewable energies such as wind, for instance, but consideration should be given to the decommissioning of such waste, in line with circular economy thinking. The assignation of responsibility for end-of-life actions needs to be written into such plans from the start. One suggestion would be to include extended producer responsibility, whereby producers cover the costs of recovery also, and end of life costs need to be weighed in against estimated benefits.

¹² Royal Society of Edinburgh (2021). *Renewable energy in Scotland*. Available at: <https://rse.org.uk/expert-advice/renewable-energy-in-scotland/> (Accessed 10.03.2023).

¹³ Royal Society of Edinburgh (2020). *Draft offshore wind policy statement*. Available at: <https://rse.org.uk/expert-advice/draft-offshore-wind-policy-statement/> (Accessed 10.03.2023).

¹⁴ See for example the work of the Continuum Industries company which uses AI technology to develop new linear infrastructure route (e.g. electricity transmission lines and pipelines) <https://www.continuumindustries/>.

¹⁵ Royal Society of Edinburgh (2022). *Scottish Government Draft Hydrogen Action Plan*. Available at: <https://rse.org.uk/expert-advice/hydrogen-action-plan/> (Accessed 10.03.2023).

All proposed targets should be accompanied by environmental prerequisites/specifications and plans of achieving these outcomes in a sustainable way.

31. The RSE has repeatedly noted that Scotland faces significant challenges related to existing storage capacity for different types of energy.¹⁶ There is little discussion in the strategy of what interventions are proposed to increase storage capacity for other types of energy apart from hydrogen. Yet, the RSE has suggested for several years now that 'replenishable storage remains a key part of the whole-system energy equation and one which has not yet been satisfactorily resolved'.¹⁷ Investment and improvements in storage are key to both the supply and demand of each type of energy discussed here.

Chapter 4: Energy Demand

General overview

32. Overall, the RSE working group felt that there needs to be a better representation of embodied energy in the document. There is little reference to this type of energy as opposed to operational energy, yet some of the fields discussed here, such as agriculture or the built environment, are major sources of embodied energy.

33. More could be said for measures to reduce energy demand in different sectors, and this is not clearly discussed here although circular economy principles are referenced, the strategy could draw on the rich corpus of evidence from bodies such as the Centre for Research on Energy Demand Solutions,¹⁸ for instance, on proposed measures to reduce energy use across buildings, transport, and public services without jeopardising economic development goals.

34. Apart from targeted action on specific high-demand industry sectors discussed in the strategy, the measures should consider wide-ranging public engagement and public action that dispels myths related to consumption and presents the opportunities of pursuing prosperity while lowering energy use.¹⁹ We acknowledge that a programme of public engagement is under development by the new public energy agency (Heat and Energy Efficiency Scotland); there is as yet however little available information to enable us to assess the likely effectiveness

of any programme, which is now a matter of urgency. Large-scale engagement is needed to facilitate individual and collective action to reduce energy use at scale. Behavioural economics strategies such as the nudge theory could be useful as one component of such a strategy.

Chapter 4: Energy demand - heat in buildings

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

35. The proposed targets for retrofitting are very difficult to achieve, and there are key supply chain issues to consider. To meet the objectives set out, the pace and scale of retrofitting buildings needs to be significantly increased. Recent data shows that only around 3,000 buildings are retrofitted per year,²⁰ which indicates the challenge of scaling up to retrofitting 1 million homes by 2030. It is important to consider the workforce limitations, both in terms of capacity as well as skills. This issue is compounded by a disconnect between the skills industry requires, and those that are developed through curricula taught in the tertiary education system.²¹ Systematic discussions on what a competent skilled workforce would look like are needed, combined with significant investments in developing the built environment sector to support this transition.

36. Recent evidence the RSE has presented to the Scottish affairs committee²² also noted that rural areas face great barriers to retrofitting, some of these relate to costs and the impact of the cost-of-living crisis, the type of buildings (e.g. stone houses with solid walls) and the availability of skilled tradespeople to implement such repairs. In recent times, the link between health and well being and comfort in people's homes has received more attention, yet there are still significant difficulties in achieving satisfactory retrofitting standards. Problems noted also include the use of unsuitable green technologies that do not account for the house type, or inappropriate retrofit practices can lead to problems related to dampness and mould.

¹⁶ See for instance Royal Society of Edinburgh's 2019 inquiry into the future of energy in Scotland <https://rse.org.uk/expert-advice/inquiries/scotlands-energy-future/>

¹⁷ Royal Society of Edinburgh (2021). *Renewable energy in Scotland*. Available at: <https://rse.org.uk/expert-advice/renewable-energy-in-scotland/> (Accessed 10.03.2023).

¹⁸ Centre for Research into Energy Demand Solutions (no data). Available at: <https://www.creds.ac.uk/> (Accessed 09.03.2023).

¹⁹ An example of research focused on demand reduction: Centre for Research into Energy Demand Solutions (CREDS) 2022. *Research findings*. Available at: <https://www.creds.ac.uk/creds-research-findings/> (Accessed 09.03.2023).

²⁰ Scottish Parliament Information Centre (SPICE) 2022. *Retrofitting homes for net-zero*. Available at: <https://spice-spotlight.scot/2022/01/13/retrofitting-homes-for-net-zero/> (Accessed 09.03.2023).

²¹ Royal Society of Edinburgh (2023) *Tertiary Education Futures Project Report*. Available at: <https://rse.org.uk/expert-advice/tertiary-education-futures-project/> (Accessed 09.03.2023).

²² Royal Society of Edinburgh (2022). *Oral evidence session – The impact of the cost of living crisis in rural Scotland*, Scottish Affairs Committee, UK Parliament. Available at: <https://committees.parliament.uk/event/16488/formal-meeting-oral-evidence-session/> (Accessed 09.03.2023).

37. The 'Passivhaus' building concept, which is more popular in other European countries, could present an efficient model to ensure new housing meets energy efficiency standards that support Scotland's ambitions for decarbonisation and energy reduction in buildings. Although there have been recent efforts to include use of the Passivhaus concept in Scotland, through the rejected 2022 proposed domestic building environmental standards (Scotland) bill for instance,²³ Scotland and the UK more widely continue to remain behind other European countries with a limited supply of high standard housing stock. The RSE working group members noted that there are different barriers to the widespread adoption of such building principles including lack of investment, supply chain issues as well as issues caused by lack of skills in building to a Passivhaus standard. It is hoped that the proposed Scottish legislation the minister for zero carbon buildings, active travel and tenants' rights mentioned is due to be adopted in two years' time, will provide better incentives for the adoption of such energy efficiency standards.

38. While the plan mentions the National Planning Framework (NPF) 4 as being under development, with little mention of the principles or crossovers with the current plan across the document, this should be revised to ensure policy coherence. The NPF impacts the delivery of several outcomes, not only the improvement of the built environment's energy efficiency.

39. In addition, considerations related to procurement models are limited in the proposed document, and these should be better represented in the strategy as they underpin most activities to achieve the ambitious transition. These should take into account aforementioned best practices of procurement that focus on value rather than cost, with the understanding that a higher upfront cost will be offset in the long-term through savings on operational costs.

40. All in all, it was considered that although the aim to retrofit and decarbonise buildings is desirable, more needs to be done to ensure that the ambitions set are achievable during the proposed timeframes. Energy efficiency measures related to the built environment need to be coupled with wider health and wellbeing measures to improve Scotland's housing stock.

Chapter 4: Energy demand - energy for transport

Question 28: What changes to the energy

system, if any, will be required to decarbonise transport?

41. There are positive developments in the introduction of green energy transport, however, more needs to be done, and steps to take include the improvement of existing infrastructure, behavioural change around private car use, as well as the exploration of different models for communal transport, and demonstration of support for walking and cycling/wheeling.

42. Electric cars are often referenced as a solution to transport decarbonisation, yet there are ongoing barriers to widespread adoption. Recent media reports have repeatedly noted that there are significant problems related to charging points for electric vehicles. Different private studies show problems at charging stations and analysis at the UK level²⁴ notes there is uneven, mixed provision of charging points across the country as well as uncertainty around the necessary stock to facilitate an increased adoption of electric vehicles.

43. The working group noted that batteries pose problems also, as there are issues with storage but also with the provision of raw materials included in the manufacturing of batteries as well as the end of life options. Electronic car batteries need to be retired once they have reached 80% capacity and as it stands there are limited options to reuse or repurpose batteries once they reach their end of life, and this is only fleetingly mentioned in the strategy. Yet, research such as that conducted by Zero Waste Scotland²⁵ has shown that there are significant opportunities for the reuse of first-generation electric vehicle batteries for homes and other applications. Based on circular economy principles thus, considering the full life cycle of such products could lead to job creation, however, this needs to be coupled with relevant upskilling to ensure that there is knowledge in place to facilitate the repurposing of these products.

44. The public transport infrastructure for buses and commercial vehicles needs to be developed much further. While there are opportunities presented by the introduction of hydrogen-based transport, such as the first fully integrated hydrogen production and bus refuelling station in Scotland in Aberdeen, significant infrastructure developments are needed to ensure widespread access to such technologies, including in rural Scotland where there are significant conventional public transport challenges anyway.

²³ Scottish Parliament (2022). *Proposed Domestic Building Environmental Standards (Scotland) Bill*. Available at: <https://www.parliament.scot/bills-and-laws/proposals-for-bills/proposed-domestic-building-environmental-standards-scotland-bill> (Accessed 09.03.2023).

²⁴ House of Commons Library (2023). *Electric vehicles and Infrastructure*. Available at: <https://researchbriefings.files.parliament.uk/documents/CBP-7480/CBP-7480.pdf> (Accessed 09.03.2023).

²⁵ Zero Waste Scotland (2021) *Battery use in Scotland now and in the future*. Available at: <https://www.zerowastescotland.org.uk/sites/default/files/ZWS1700%20PRE%20Mapping%20and%20Forecasting%20Battery%20use%20in%20Scotland%20SUMMARY%20DOC%20V2.pdf> (Accessed 09.03.2023).

45. The National Planning Framework extensively discusses the 20-minute neighbourhoods, yet there are no considerations here on how this concept, although difficult to implement in remote rural areas of Scotland,²⁶ could support the ambitions to decarbonise transport in Scotland. More widely, the strategy should consider, alongside technical solutions, wider individual behaviours to be encouraged and supported. Innovative models of vehicle use and ownership such as car sharing or car clubs could be included also as solutions for reducing personal car travels, with consideration given to how these could be implemented in sparsely populated areas also.

Chapter 4: Energy demand - energy for agriculture

Question 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?

46. There are cross-overs in this area with the upcoming land reform bill that is due to be published by the end of 2023, and it is hoped that provisions for decarbonising this sector will be factored in that legislation also. As it stands, there is limited reflection on the proposed measures for this area, apart from signposting to upcoming agriculture legislation and reiterating the ambition 'to become a global leader in sustainable and regenerative agriculture.' Thus, more could be said on what is planned including what economic incentives are envisioned to be used to support the proposed whole-systems approach. Measures in this area could also include addressing the high level of food waste, estimated to be around one million tonne per year in Scotland.²⁷

Chapter 4: Energy demand - energy for industry

47. While the use and storage of hydrogen is commented upon in the strategy, there is no discussion of high temperature storage and this is an area where ongoing innovative solutions are under development²⁸ that should be considered. High and ultra-high energy storage is attractive as such systems minimise heat losses and are thus more efficient than conventional storage. With the development of growing resources of renewable

electricity (wind), which could lead to high temperature resources (above 700 degrees), there is an opportunity to invest in such systems to facilitate the decarbonisation of industry.

48. The plan also mentions ambitious plans for the upscaling of carbon capture, utilisation, and storage (CCUS). While progress has been registered on this in recent years, the RSE has indicated before that there are ongoing barriers to large-scale implementation.²⁹ As the RSE response noted at the time, while there is significant potential for development in this market segment, Scotland's leading position is more aspirational rather than a reality, and it is difficult to envisage moving to the forefront of CCUS in Europe in the timeframe discussed in the strategy.

Impact assessment questions

General comments

49. The working group believes the impact assessment should consider communities and livelihoods that fall out with areas with promising supply chain development opportunities. This links into the inclusivity comments referred to in chapter two. There are some communities with an abundance of local, natural, and sustainable materials, that will really benefit from this transition through the creation of high value, high growth jobs. However, a stable, resilient, and capable supply chain must be balanced across the country and this strategy should acknowledge the challenges facing certain parts of Scotland without natural resources and which already face complex place-based challenges of rural living.

50. Further consideration should be afforded to how the Scottish Government and other major sector bodies ensure that job creation, and where possible high value job creation, is set into plans, both within the strategy itself and through local authorities. Additionally, there are concerns that local authorities are developing quite a narrow view around how assets are retrofitted and considering how the retrofitting of assets creates jobs in local communities.

51. The RSE calls upon the Scottish Government to consider the impact of the strategy (particularly in the deployment of infrastructure etc.) on future generations, which is not touched upon. There is an opportunity to draw some inspiration from the Welsh future generations act and commissioner, which sets out to deliver the ambition, permission, and legal obligation to improve social, cultural, environmental, and economic well being.³⁰

²⁶ Royal Society of Edinburgh (2022). *Fourth National Planning Framework (NPF4)*. Available at: <https://rse.org.uk/expert-advice/fourth-national-planning-framework-npf4/> (Accessed 09.03.2023).

²⁷ Scottish Government (2022) *Delivering Scotland's circular economy - route map to 2025 and beyond: consultation*. Available at: <https://www.gov.scot/publications/consultation-delivering-scotlands-circular-economy-route-map-2025-beyond/pages/7/> (Accessed 09.03.2023).

²⁸ Such as this ongoing project at the University of Edinburgh to develop Ultra-High Temperature Thermal Energy Storage (UHTS) <https://www.energy3.eng.ed.ac.uk/home>

²⁹ Royal Society of Edinburgh (2021) *Renewable energy in Scotland: A response to UK Parliament's Scottish Affairs Committee*. Available at: <https://rse.org.uk/expert-advice/renewable-energy-in-scotland/> (Accessed 09.03.2023).

³⁰ Welsh Future Generations Act (2015). Available at: <https://www.futuregenerations.wales/about-us/future-generations-act/> (Accessed 09.03.2023).

Question 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?

52. The RSE response to the recent Scottish affairs committee's inquiry on the impact of the cost-of-living in rural Scotland outlined the challenges that rural communities face, including the effects of the 'rural premium' which includes higher energy demands of alternative fuels for heating. It also advocated a recommendation for any piece of legislation or policy to be 'rural proofed' (e.g. include an in-depth assessment of implication for rural communities) to ensure it meets the diverse needs of different groups, not only those of urban better-off groups. With the cost-of-living crisis and the upheaval on the energy market, more and more people are joining the category of fuel-poor households. With difficulties to meet day-to-day energy demands, more support could be offered at governmental level, to ensure people can look beyond this to consider changes to their energy use.

53. In addition to the recommended actions outlined above in response to the prior questions, we would suggest that, as many aspects of energy governance are still the responsibility of the UK Government, cooperation is needed to ensure segments of the population are not left behind. In the cost-of-living contribution, for instance, the RSE noted that significant economic opportunities could be afforded by a more flexible distribution of energy across the UK.³¹ As it stands, while communities in economically deprived regions of Scotland produce significant amounts of renewable energy, as this gets distributed across the network, see little benefit return.

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

54. The strategy does not mention anything around schools/climate education and the opportunities to develop young people as responsible citizens who will become the future workforce and play an important part in changing behaviours and consumption.

Just transition energy outcomes

Question 48: What are your views on the approach we have set out to monitor and

evaluate the energy strategy and just transition plan?

55. The working group would like to see a reduction in the focus on measuring against outputs and that the final strategy will take a longer-term view and measure against outcomes and impacts instead. Short-term measures have limited reach, particularly when delivered through a number of vehicles and agencies that work with year-on-year targets. Outcome-focused measures will need to underpin this transition to ensure it is indeed just and fair.

56. There is a data deficit in this draft strategy. There are too many vague and spurious assumptions to get these policies through a proper impact assessment. There is a clear lack of details on measurements to monitor this strategy in a robust way over time. Reflecting on the document structure, there are only 3 pages in the strategy on monitoring and evaluation and the language used is passive. The final strategy should include robust measurements which iteratively feed back into the policy making process.

57. The RSE calls upon the Scottish Government to clearly develop measurements and assessments, built into the strategy, which will indicate whether targets and ambitions are producing more harm than good and to ensure accountability. As it stands, risk mitigation is not mentioned, which is a missed opportunity to assess risk and manage it appropriately.

Question 49: What are your views on the draft Just Transition outcomes for the energy strategy and just transition plan?

58. As noted in previous sections, not enough detail has been provided concerning just transition outcomes of the draft strategy. For example, there is significant weight placed on the public energy agency currently called Energy Efficient Scotland. One of their responsibilities is to produce a public engagement strategy. This will be critical to explaining to everyone in Scotland exactly what the kinds of policies and strategies in this document mean for people's daily lives. Such a document should accompany the proposed strategy.

Additional information

Any enquiries about this advice paper should be addressed to Fraser Gillan, Public Affairs Officer (fgillan@theRSE.org.uk) and Dr Cristina Clopot, Policy Advice Officer (cclopot@therse.org.uk). Responses are published on the RSE website (<https://www.rse.org.uk>).

³¹ See also the RSE response to the Scottish Affairs Committee's inquiry into renewable energy in Scotland.



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