Comments on the Scottish Government's Draft Energy Strategy and Just Transition Plan

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Centre for Energy Ethics | University of St Andrews

Submitted by the Centre for Energy Ethics' Director of Policy (policy.cee@st-andrews.ac.uk) on behalf of the contributing authors and the Centre.

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The Centre for Energy Ethics

The Centre for Energy Ethics at the University of St Andrews was launched in February 2021. The Centre takes an interdisciplinary approach to exploring one of the most fundamental challenges facing humanity today: how to balance rising energy demands while addressing anthropogenic climate change.

With the aim of fostering interdisciplinary collaboration, the Centre is home to over 70 researchers at University of St Andrews across the Arts, Humanities, and Social and Natural Sciences, as well as over 30 affiliated researchers located around the world.

To find out more about the Centre, please visit our website: www.energyethics.ac.uk

Contributors

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Professor Adrian Finch specialises in critical element deposits; how to find them and how they form. He consults for several Exploration Geology companies interested in searching for and extracting critical metals from alkaline and peralkaline rocks and is one of a few UK academics working actively with the exploration sector to bring European sources of critical metals to the UK market. (www.adrianfinch.co.uk)

Dr Nicholas Gardiner is Senior Lecturer in the School of Earth and Environmental sciences, and is a geochemist whose research focuses on the processes that have shaped the evolution of Earth's lithosphere, and the development of its battery metal resources. He worked for nearly a decade in the global commodities markets and retains an interest in how developing nations can sustainably exploit their natural mineral resources. He is the Theme Leader for the Geological Society's "Energy Transition" theme. (https://www.st-andrews.ac.uk/earth-sciences/people/njg7)

Dr Mette High is a Reader in Social Anthropology, Director of the CEE and Expert Advisor to the Government Office for Science's UK Net Zero Strategy foresight project. She has extensive research experience in economic anthropology and anthropology of energy, focussing on energy industries, commodity markets and global finance. She leads a six-year European Research Council-funded project 'The Ethics of Oil: Finance Moralities and Environmental Politics in the Global Oil Economy' and leads the multi-year Scottish Research Alliance for Energy, Homes and Livelihoods funded by the Scottish Funding Council.
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Jessica Hogan's research has often looked at conflict. Currently completing her PhD on communities' experiences living near wind energy, she is particularly interested in energy justice including how participating in the wind farm development or receiving benefits may influence acceptance/opposition.
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Dr Lethy Krishnan Jagadamma is a UKRI-Future Leaders Fellow at the University of St Andrews. Currently, she is establishing the Energy Harvesting Research Group at the School of Physics and Astronomy, University of St Andrews. While a Post-doctoral fellow at KAUST she expanded her research expertise to the field of solution-processed photovoltaics and contributed to the development of record efficient organic and quantum dot solar cells. (https://energyethics.st-andrews.ac.uk/people/lethy-krishnan-jagadamma/)

Dr Emilka Skrzypek is a lecturer in Social Anthropology and the deputy director of the Centre for Energy Ethics. Her research explores the nexus of interdependencies that form around resource extraction, and the interplay between global economic and political forces, and local processes, ontologies and realities – particularly in the context of a 'just transition' to low carbon energy systems. Her current research is focused on issues associated with supplying so-called energy transition metals from the Pacific for the global energy transition, and the expansion of the extractive industries in the Pacific under conditions of climate change.
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Introduction

The Scottish Government's *Draft Energy Strategy and Just Transition Plan*, published January 2023, sets out a bold strategy for rapidly decarbonising Scotland with the ambition of reaching net zero by 2045. The draft strategy and plan calls for the upscaling of onshore and offshore wind energy production, the rapid expansion of green hydrogen, a reduction of residential and industrial emissions, and the establishment of a national public energy agency. In the process, it also calls for a 'green' industrialisation that leverages the nation's existing industrial strengths and its energy-rich resource endowments to usher in a new era of economic prosperity and a 'just' energy transition for communities closely tied to Scotland's oil and gas sector.

Following the opening of the consultation period by the Government, the Centre for Energy Ethics solicited feedback from its specialist researchers on the plan overall and, specifically, on the questions outlined in Annex B. In line with the Government's instructions to only reply to questions that members felt comfortable responding to and within their areas of research expertise, the Centre provides the following comments in the pages hereafter.

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?

The Government has set out an ambitious net zero energy strategy and transition plan in this draft document. Addressing rising energy demand whilst combatting climate change in an equitable way is the greatest existential challenge facing the nation. Upon reviewing the document, researchers of the Centre for Energy Ethics highlight challenges that the Government must address if this strategy is to be successful and areas that warrant further consideration before this strategy and plan is finalised.

Professor Adrian Finch emphasises, for example, that renewable energy technologies all rely on raw earth materials (e.g. Nd, Li, Co, Fe, Cu) that Scotland does not currently produce. This material challenge, he suggests, raises important concerns that the Government must address, such as where will the supplies of these materials be sourced and what is the reliability of these supply chains. It also raises concerns about the emissions associated with extracting and transporting these materials to Scotland, and whether a shift to renewable energy production that relies on imported raw materials exports the ethical consequences of energy production. Scotland's utilisation of geothermal energy, he notes, is absent from this draft despite the nation's strategic potential to harness this energy source (see responses to Questions 40 and 41).

Dr Mette High raises concerns about the draft's brief and dismissive consideration of the potential for new nuclear power plants in Scotland, and encourages the Scottish Government to seriously reassess the potential for Small Modular Reactors (SMRs). Unlike conventional nuclear reactors, she notes that SMRs have the potential to offer reliable, low cost, low waste, and low carbon energy. SMRs can also provide the crucial baseload power needed to counter-balance the intermittency of renewable energy generation (see response to Question 41).

Dr Lethy Krishnan Jagadamma emphasises that the Government makes no mention of how 'smart' technologies could reduce energy demand through increased efficiencies. She argues that energy savings of up to 40% are possible but that such technologies are not currently considered in the Government's draft strategy and plan (see response to Question 40).

Jessica Hogan highlights the importance of long-term community ownership of energy producing assets for an equitable energy transition and urges the Government to distinguish between locally-owned from community-owned

assets. She also suggests that the Government could encourage greater investment in residential energy efficiency improvements by adjusting the eligibility requirements of its Home Energy Scotland Grant Scheme whilst guarding against those seeking to exploit the scheme (see responses to Questions 3, 5, 8, and 14).

Dr Sean Field argues that current evidence suggests that Scotland is poorly positioned to take advantage of solar photovoltaic (PV) energy production. Whilst the combination of falling PV panel costs and rising wholesale electricity prices have made this technology more commercially viable, Scotland's geographic location gives it low solar PV production potential (see response to Question 13).

In addition to these specific recommendations detailed in responses to questions 3 through 41 below, Centre researchers have made several related suggestions and comments based on this draft strategy and plan:

i. Dr Gardiner recommends that there is an opportunity for the Scottish Government to invest in training the next generation of geoscientists and engineers specialising in the exploration, mining, and processing of earth materials needed for renewable energy production.

ii. Dr Field cautiously agrees with the Scottish Government's recommendation that Ofgem investigate decoupling UK electricity prices from the wholesale price of natural gas (p 25). Recent analysis has shown that meeting UK electricity demand requires 'mid-range' efficient natural gas electricity producers to supply the grid over 80% of the time. Under the current pricing scheme, the price of electricity sold to consumers is based on the production costs of these suppliers and does not reflect the much lower cost of producing electricity via other means, such as by wind turbines. It is not clear from the draft strategy and plan, however, what the impact of decoupling will be on electricity price volatility or what mechanisms the Government recommends be put in place to guard against this volatility.

iii. Dr Field recommends that the Scottish Government distinguish crude oil from natural gas and craft a plan and strategy that reflects the distinct role of each in the nation's current and expected energy mix. An energy transition from coal to natural gas has been underway in the UK and Scotland since the 1960s. In 1960, 90% of electricity in the UK was generated by coal-fired power plants. Over the last quarter century, natural gas has been the most important electricity generating fuel source in the UK. In 2021, it accounted for 40% of electricity generation, followed by renewables (25%), nuclear (15%), and bioenergy (13%). While

crude oil may play an increasingly small role in the nation's energy mix in the years to come, natural gas will likely continue to play an important role in electricity generation and the heating of buildings.

iv. Dr Skrzypek recommends that, in order to pursue the ethos of a 'just transition', the Government considers justice issues associated with transitioning both out of hydrocarbons, but also into renewable technologies. Building low-carbon energy systems to power a low-carbon economy will require vast amounts of 'energy transition metals' (ETMs) – like cobalt, copper, and nickel among many others – for new technologies and energy infrastructure. A comprehensive strategy must consider how to manage the social, environmental and governance impacts of mining those metals on source locations and countries.

Chapter 2 – Preparing for a Just Energy Transition

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

By Jessica Hogan

To ensure an inclusive approach to supporting community energy projects, it is important to engage and involve communities in the decision-making processes from the outset. This means providing support and resources to enable community members to participate effectively, including access to information, training, and capacity-building opportunities. It is also important to ensure that community energy projects are accessible to all, including those in rural or remote areas, and that the benefits of these projects are equitably distributed.

Community benefits funds are an effective way of ensuring that the financial rewards of energy projects go to local communities. There is evidence, however, that these funds could be more effective. In my research on the topic, several residents indicated that money from these funds could only be used on community projects that benefited a select number in the community. With the steep rise in energy prices, there was interest among some community members in how money from these funds could be used to help residents with their energy bills (see the recent case study by Local Energy Scotland 2023 for further information on this).

Long-term community ownership and management of energy projects are important for ensuring that community members shape these projects and benefit from them over time. To this end, there is an opportunity for the

Government to distinguish community owned projects from locally owned projects (p 40). Only 10% of energy projects are owned by local communities whereas most energy projects – including local energy projects - are owned by private farms and estates (41%). What these descriptive statistics highlight is the need to distinguish between local and community ownership because these categories imply different modes of management, as well as different modes by which the benefits of energy projects are distributed and to whom (Hogan et al. 2022; Slee B & Harnmeijer J 2017).

Responding to the statement "We will encourage developers to offer community benefits and shared ownership opportunities as standard on all new renewable energy projects – including repowering and extensions to existing projects" (p 41):

The Government's encouragement of shared ownership opportunities on all new renewable energy projects is commendable. Research in Scotland has shown that a co-operative model can lead to more equitable energy developments (Hogan et al. 2022). However, it remains to be seen whether all models of shared ownership (e.g., community benefit society) will be as or more effective as the co-op approach. If less effective, it may be a concern that co-operatives are no longer viable due to changes in FCA regulations (Energy4all, personal communication).

Sources:

Hogan JL, Warren CR, Simpson M, & McCauley D. 2022. What makes local energy projects acceptable? Probing the connection between ownership structures and community acceptance. Energy Policy, 171, 113257. DOI: 10.1016/j.enpol.2022.113257

Local Energy Scotland (2023). Local Electricity Discount Schemes (LEDS). Retrieved from: https://localenergy.scot/casestudy/local-electricity-discount-schemes-leds/

Slee B & Harnmeijer J. 2017. Community renewables: balancing optimism with reality. A Critical Review of Scottish Renewable and Low Carbon Energy Policy, 35-64

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

Comment 1 of 2
By Professor Adrian Finch

<u>"Just Energy Transition" and the Export the Carbon, Social and Environmental Footprints</u>

By importing all the raw materials for its green energy transition, Scotland effectively outsources the carbon, social and environmental footprints of its

green energy strategy. For example, the smelting of iron elsewhere in the world uses coal that forms carbon dioxide; the carbon footprint and the potential for environmental damage of rare earth mining have been highlighted. By outsourcing all its raw materials, Scotland loses the ability to trace and minimise the impact of its own economic growth on other parts of the world. It is not that mining for, and production of, raw materials cannot be done in an environmentally and socially responsible way, rather by buying all its raw materials, Scotland loses the ability to account for and minimise these impacts. Because the carbon, environmental and social impacts of these activities occur outside Scotland's jurisdiction, I do not see them as outside the "Just Energy Transition", but I could find no mention of this issue in Chapter 2. By making partnerships with overseas suppliers of raw materials with best practice, Scotland can confirm that best practice in mining is being followed.

Comment 2 of 2
By Jessica Hogan

The energy efficiency grants and loans offered through the Government's expanded Home Energy Scotland scheme are a positive step in helping households reduce their energy bills and increase the energy efficiency of their homes (pp 102, 106). Yet, there are potential barriers that the Government has the opportunity to address. For example, the cost of running a heat pump can be similar to the cost of a gas boiler, and it may be important to consider additional incentives or financing options to encourage uptake of some home efficiency improvement technologies.

Additionally, the current requirement for individuals to have been living in their homes for at least a year to access the Home Energy Scotland Grant Scheme is a barrier for new homeowners. Given the urgent need to improve the energy efficiency of homes, it may be appropriate to revisit this requirement. To encourage new homeowners to access the scheme yet prevent abuse of the grant scheme by those looking to flip or quickly sell their homes, a stipulation could be added that the grant would turn into a loan if the house was sold within a year of receiving the grant.

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?

By Jessica Hogan

To help individuals of all ages and, in particular, those who are currently under-represented in the green energy industry, it is important to provide targeted advice and support. Additional funding should be made available to encourage specific under-represented groups, such as women and minority communities, to pursue green energy jobs.

One major barrier to entry for these groups is the lack of diversity in the current workforce. Women, for example, make up only 32% of the renewable energy workforce, according to a World Bank post (Deininger and Gren 2022). To address this disparity, it is important to provide inclusive and affordable childcare services to enable women to make a career transition or pursue further education.

Additionally, unconscious biases in the hiring process should be addressed to ensure that qualified candidates from under-represented groups are given equal consideration for job opportunities. The Scottish Government's existing funding for first university degrees is a good start, but further support should be provided for specific under-represented groups to pursue additional degrees that would help them enter the green energy field.

Sources:

Deininger F & Gren A. 2022. Green jobs for women can combat the climate crisis and boost equality. World Bank Blogs; available at: https://blogs.worldbank.org/climatechange/green-jobs-women-can-combat-climate-crisis-and-boost-equality.

Chapter 3 – Energy supply

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.

By Dr Sean Field

Current evidence does not suggest that Scotland is well positioned to be an ambitious producer of solar photovoltaic (PV) energy.

According to the Government's draft plan, Scotland produces less than 0.5 gigawatts of solar energy annually, by comparison with the 161 terawatts of energy it is estimated to consume (pp. 17-18, 71). While the cost of solar PV

panels has fallen by as much as 60% in recent years and wholesale electricity prices have risen – making solar PV generation more profitable - World Bank (Suri et al. 2020) data indicates the UK (and Scotland in particular) has relatively low industrial solar PV production potential.

Solar PV production, thus, is likely to have productive small-scale applications for people in Scotland without access to the electrical grid, but the data indicate that it is unlikely to have productive and cost-effective utility-scale applications.

Sources:

Suri M, Betak J, Rosina K, et al. 2020. Global Photovoltaic Power Potential by Country (English). Energy Sector Management Assistance Program (ESMAP) Washington, D.C.: World Bank Group.

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?

By Jessica Hogan

To maximize economic and social benefits flowing to local communities, it is important to define specific targets for community benefit standards. While the current standard is £5,000 per MW installed per annum, the government should set an ambitious target to increase this amount. This will ensure that communities receive a fair share of the benefits, especially given the high electricity prices currently being charged.

Additionally, the government should continue to encourage shared ownership on projects. While full community ownership can maximize the amount of economic benefits, shared ownership can still provide significant benefits to local communities while also allowing for private investment. This will help to ensure that the benefits of renewable energy projects are spread more widely and that local communities have a greater stake in the success of these projects.

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?

Comment 1 of 2
By Dr Lethy Krishnan Jagadamma

I would like to suggest the following factors be considered with the aim of increasing Scotland's energy security and the resilience of its energy system:

As per Chapter 4 of the Government's draft strategy and plan, one million homes in the UK are expected to be decarbonised and the emissions from non-domestic buildings reduced. However, no mention in the report is made to include 'smart' technologies such as the Internet of Things (IoT) in the 'Energy Management' of buildings. Research shows that with the use of distributed smart sensors in buildings - whether it be for lighting control or heating of buildings - energy savings of up to 40% is possible.

The heating and cooling systems of most buildings are controlled through thermostats. Making use of 'smart' or 'intelligent' heating systems would allow temperatures within buildings to be controlled automatically in response to building occupancy, temperature, and humidity. The 'smart energy meter' introduced in UK homes can also be linked to wireless smart sensors' and, through a feedback loop, the heating/cooling patterns of buildings and maintenance predicted by analysing the data.

The application of smart technologies can also reduce the downtime of power production equipment, such as wind energy turbines and solar panels, through early fault identification and increase the resilience of Scotland's energy system.

Comment 2 of 2
By Professor Adrian Finch

Access to Raw Materials
The green energy transition will only take place if there is access to the raw materials (e.g. Nd, Li, Co, Fe, Cu) that underpin the technologies. Whereas EU and UK-wide analysis have placed security of supply to raw materials as a central issue, it is striking that Scotland's assessment does not mention this concern at all. As the document itself states (p.3) "*maximising opportunities for growing the net zero energy sector… will be critical to a just transition*", yet there is no policy to ensure that a company basing itself in Scotland has access to the raw materials it will need. For example, the failure of the UK company *Britishvolt* (a battery company supporting electric vehicle

production) highlighted the absence of domestic supplies of Lithium and how access to raw materials is an advantage to being based in e.g. the US and China. Scotland produces none of the raw materials that are implicit in the energy strategy. Scotland rules out nuclear as a carbon-free energy source without explanation.

Energy Vulnerability

There is no recognition in the document that Scotland has historically had a privileged position as a producer of oil and gas, being able to generate energy independently of other countries. The green transition will bring to Scotland a fundamental dependence on others for the raw supplies needed to turn its wind and hydro into energy. Scotland is entering a period of energy vulnerability, in which it will be entirely dependent on the good will of other countries for imports of raw parts and materials. Whereas I find discussion on Scotland's vulnerability to periodic weather events, I find no comment on its vulnerability to export restrictions elsewhere in the globe (resource nationalism) or its vulnerability to interruptions of the supply chain through global conflict (cf. Russian gas).

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

Comment 1 of 2
By Professor Adrian Finch

Geothermal

Geothermal energy is notable by its absence from future energy plans, although strangely expertise in geothermal energy is identified as a key Scottish export (p.52). Scotland has several granites and mine-workings that might provide local, rural geothermal energy. Old mine-workings are often within areas of high-unemployment, and expansion in geothermal potentially provides implicit feedback between investment and deprived areas in a way that does not exist for other energy sources.

Comment 2 of 2
By Dr Mette High

The Draft Energy Strategy and Just Transition Plan for Scotland offers a very brief, and ultimately dismissive, consideration of the potential for new nuclear power plants in Scotland (pp. 81-82). It is stated that "*the construction of new nuclear plants will do nothing to alleviate the current energy price crisis, as nuclear power stations take years, if not decades, to build*" (p. 81). This is an extremely short-sighted and outdated approach to the composition of Scotland's low-carbon energy mix. Rather than let current state-of-affairs dictate long-term strategic planning, we encourage the Scottish

Government to seriously reassess the potential for Small Modular Reactors (SMRs, producing up to 300 MW per unit).

SMRs are included in the UK's "Powering Up Britain: The Net Zero Growth Plan" (March 2023), which positions nuclear energy as important in a Net Zero energy mix. This is because nuclear is seen to offer a reliable, cheaper, and low carbon emission source of energy. The UK thus aims to deliver up to 24GW nuclear capacity by 2050 (p. 30).

We ask the Scottish Government to keep the option of SMRs open as these will offer: 1) a crucial baseload power that is needed in a majority-renewables energy mix; 2) significant cost reduction and economy of scale as these are smaller and differently assembled than conventional nuclear reactors; 3) domestic employment opportunities as one of the world's most advanced SMR nuclear technologies is being developed in the UK; 4) significantly less waste than conventional nuclear plants as SMRs have higher fuel burnup and can utilise a thorium fuel cycle, instead of uranium; 5) ideal for grid extensions, mini grids, and district grids serving areas with high electricity consumption; and 6) high energy density low-carbon energy outputs.

With the UK already having the skills and capacity as a world-leader in SMR development and with nuclear having been used reliably and safely in the UK for more than 60 years, the incorporation of SMRs into Scotland's low-carbon energy mix will lead to greater energy self-sufficiency, diversification of energy sources, and a stabilisation of predictable baseload.