

# **Friends of the Earth Scotland representation to the Scottish Government Energy Consents Unit regarding the Peterhead Low Carbon CCGT Power Station Project**

**12th May 2022**

## **About us**

Friends of the Earth Scotland exists to campaign, with partners here and across the globe, for a just transition to a sustainable society. We are Scotland's leading environmental campaigning organisation. An independent Scottish charity with a network of thousands of supporters and active local groups across Scotland. We are also part of the largest grassroots environmental network in the world, uniting over 2 million supporters, 75 national member groups, and some 5,000 local activist groups – covering six continents.

## **Summary**

Friends of the Earth Scotland is calling on Scottish Ministers to reject the application by SSE Thermal Generation (Scotland) Ltd for the Peterhead Low Carbon CCGT Project (ECU00003433).

Further documentation in support of our representation has been submitted to ECU via email due to technical issues on the ECU website outside of our control.

Climate science is clear that use of fossil fuels must be rapidly phased out if we are to meet the critical 1.5°C threshold enshrined in the Paris Agreement, and the principles of equity under the UN Framework Convention on Climate Change require that rich, historical polluters like Scotland act fastest to curb emissions.

Scotland's 2019 Climate Change Act establishes in law the concept of a "fair and safe Scottish emissions budget". Extrapolating from remaining global carbon budgets for 1.5°C and 2°C, leading climate scientist Professor Kevin Anderson has made clear that such a budget "is inconsistent with any realistic interpretation of the roadmaps of CCS-based power generation".

The Scottish Government's overreliance on Negative Emissions Technologies (NETs) in plans to meet the targets set out under the 2019 Act has been heavily criticised, with both Parliamentary Committees and official advisers the Climate Change Committee urging Ministers to come up with a Plan B.

There is a clear historic failure of delivering Carbon Capture and Storage - which this application relies on - at the capture, transportation and storage stages of the process. The proposed development assumes highly optimistic capture rates and timeframes for operation which are not backed up by the evidence. The knock on impact of failure to deliver projected capture rates on our ability to meet climate targets is too high a risk to approve this development.

The proposal expects reduced capacity at the existing Peterhead power station, but does not rule out both plants operating at full capacity. It is not clear whether what is being proposed is in fact an additional rather than a replacement power plant. In the not unlikely event that CCS fails to deliver this could result in substantially increased carbon emissions and seriously jeopardise meeting our climate targets.

The minor and short term benefits of the proposed project are far outweighed by the real risk that it could pose to Scotland exceeding its constrained carbon budgets. Furthermore, research shows that renewables and energy efficiency offer far better value for money in terms of job creation than fossil fuel generation.

This development does not clearly have national development status under the current National Planning Framework (NPF3) since it is for a new power plant rather than retrofit of the existing power station at Peterhead. The draft NPF4, due to be finalised in the coming months, demonstrates a substantial shift in Scottish Government policy that should rule out this development on the basis that it does not "demonstrate decarbonisation at pace", it could potentially "be used to justify unsustainable levels of fossil fuel extraction or impede Scotland's just transition to Net Zero," and it is not clear how it will "ensure the highest possible capture rates in the deployment of these technologies".

## **Climate Science**

Climate science is clear that to remain within the limits of the Paris Agreement, which commits nations to hold "the increase in the global average temperature to well below 2°C ... and to pursue efforts to limit the temperature increase to 1.5°C", there is no atmospheric space for new fossil fuel exploration, production or development and that production must begin to decline now and continue to be phased out over the coming decade.

The United Nations Environment Programme 2021 Production Gap<sup>1</sup> report shows that the world's governments are on track to produce 110% more fossil fuels in 2030 than would be consistent with limiting warming to 1.5°C, and 45% more than would be consistent with limiting warming to 2°C. The report finds that "global fossil fuel production must start declining immediately and steeply to be consistent with limiting long-term warming to 1.5°C." The proposed development for a new Combined Cycle Gas Turbine (GGGT) generating station at Peterhead represents a real risk of undermining both global and domestic efforts to reduce reliance on fossil fuels and begin a managed phase out of oil and gas that is in line with 1.5°C.

The International Energy Agency (IEA) report, 'Net Zero by 2050: A Roadmap for the Global Energy Sector'<sup>2</sup>, states that to reach global net zero by 2050 "There is no need for investment in new fossil fuel supply". Further, the Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change<sup>3</sup> noted this year that

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<sup>1</sup> <https://productiongap.org/2021report/>

<sup>2</sup> <https://www.iea.org/reports/net-zero-by-2050>

<sup>3</sup> [https://report.ipcc.ch/ar6wg3/pdf/IPCC\\_AR6\\_WGIII\\_FinalDraft\\_FullReport.pdf](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf)

“if investments in coal and other fossil fuel infrastructure continue, energy systems will be locked-in to higher emissions making it harder to limit warming to 2c or 1.5”.

According to the principle of common but differentiated responsibilities enshrined in the Paris Agreement, wealthy countries like the UK with high historic carbon emissions and low economic dependence on oil revenue should cut emissions much faster than the global average, and phase out extraction faster than the countries for which it would be much harder. The recent Phase out Pathways for Fossil Fuel Production<sup>4</sup> report by the Tyndall Centre for Climate Research has calculated equitable phase out dates for oil and gas producing countries and finds that for a 67% chance of limiting warming to 1.5°C the UK, and other rich nations, must end oil and gas production by 2031. This proposed development should not be permitted on the basis that it will lock us into continued oil and gas production and combustion well past this deadline.

## **Climate Change Legislation**

The Scottish Parliament passed legislation in 2019 updating Scotland's climate targets in light of the increased ambition and emphasis on limiting temperature increases to 1.5°C under the 2015 Paris Agreement. Under the Climate Change (Scotland) Act 2019 the Scottish Government is legally obliged to deliver emissions reductions of 75% on 1990 baseline levels by 2030, and reach net zero by 2045. Ministers regularly reaffirm their commitment to the 1.5°C goal, including recently at COP26 in Glasgow.

The 2019 Act includes criteria to enable the variation and setting of targets. The criteria include "the objective of not exceeding the fair and safe Scottish emissions budget", and the "fair and safe Scottish emissions budget" is defined in the Act as being consistent with "holding of the increase in global average temperature to well below 2°C above pre-industrial levels, and pursuing efforts to limit the temperature increase to 1.5C above pre industrial levels".<sup>5</sup> However, the Scottish Government set the target to reach Net-Zero emissions by 2045, without actually establishing what a "fair and safe Scottish emissions budget" for either "well below 2°C" or "pursuing ... 1.5°C" would be, and current climate science indicates that such a budget would require zero emissions sooner than 2045.

Professor Kevin Anderson providing evidence<sup>6</sup> on CCUS to the Net Zero, Energy and Transport Committee (March 2022) extrapolating from IPCC global carbon budgets, notes that, "on a territorial basis, and including emissions from international aviation and shipping, Scotland's current annual emissions of carbon dioxide are in the region of 33.5MtCO<sub>2</sub>. At this rate, Scotland will consume its "fair and safe" carbon budget for 2°C in under nine years and for 1.5°C in a little over four years." Anderson also notes that "in line with not exceeding 1.5-2°C this entails rapid decarbonisation, beginning now and being all but complete within one to two decades. Such a tight timeframe is inconsistent with any realistic interpretation of the roadmaps of CCS-based power generation."

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<sup>4</sup>[https://www.research.manchester.ac.uk/portal/en/publications/phaseout-pathways-for-fossil-fuel-production-within-pariscompliant-carbon-budgets\(c7235a8e-e3b1-4f44-99de-c27958c03758\).html](https://www.research.manchester.ac.uk/portal/en/publications/phaseout-pathways-for-fossil-fuel-production-within-pariscompliant-carbon-budgets(c7235a8e-e3b1-4f44-99de-c27958c03758).html)

<sup>5</sup> <https://www.legislation.gov.uk/asp/2019/15/enacted>

<sup>6</sup>[https://www.parliament.scot/-/media/files/committees/net-zero-energy-and-transport-committee/correspondence/2022/20220310\\_ccus\\_anderson.pdf](https://www.parliament.scot/-/media/files/committees/net-zero-energy-and-transport-committee/correspondence/2022/20220310_ccus_anderson.pdf)

The IEA Greenhouse Gas Research and Development Programme<sup>7</sup> also show “scenarios for a constrained global carbon budget, especially for 1.5°C and high probability well below 2°C cumulative budgets, have limited fossil fuel CCS energy production”.

We believe the proposed development does not align with a “fair and safe Scottish emissions budget” and will expand upon this in the following subsections.

## **Climate Change Plan update**

The recent Climate Change Plan update (CCPu), which sets out policies and proposals for meeting the targets in the 2019 Act, includes an emission reduction 'envelope pathway' for Negative Emission Technologies (NETs) that includes Carbon Capture and Storage (CCS).<sup>8</sup> In this envelope 0.5MtCO<sub>2</sub> is meant to be captured in 2029 rising to 3.8 in 2030, 4.7 in 2031 and then 5.7 in 2032.

In its response to the Scottish Government following scrutiny of the CCPu the Environment, Climate Change and Land Reform (ECCLR) Committee reported that it had consistently heard evidence that the CCPu: “relies too heavily on Negative Emission Technologies (NETs), with a lack of a contingency (Plan B)”.<sup>9</sup> The Committee also stated that: “[we consider] that the abatement potential and schedule associated with the planned NETs in the draft CCPu needs to be reviewed in light of concerns about the achievability of these commitments as [we are] not convinced that it is realistic to think that the technology will operate for the first time in 2029 at significant scale - with a quarter of the entire gross emissions being delivered by negative emissions technology by 2032. The Committee considers that a Plan B is required given the challenges and dependencies associated with developing NETs and the incredibly tight timescales involved”.

Furthermore, the Scottish Government's official advisers the Climate Change Committee warned in its December 2021 report on Progress in Reducing Emissions in Scotland that the "Scottish Government must make a quick decision on whether to continue with plans for removals to contribute to 2030 target" and come up with a Plan B "if it should turn out that GGR [greenhouse gas removals] cannot be delivered at scale on the necessary timetable, accompanied by a clear date - no later than 2023 - to implement these contingency plans if developments on CCS do not provide confidence that they can deliver by 2030."<sup>10</sup>

The Scottish Government has not responded sufficiently to these fundamental concerns with the feasibility of relying on NETs to meet emissions reduction targets. As we set out in the next section, and as heard by the ECCLR Committee, CCS has a history of failing to deliver that must be taken into consideration in relation to the permitting of this development, and ultimately see it rejected.

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<sup>7</sup> <https://foe.scot/resource/report-carbon-capture-storage-energy-role/>

<sup>8</sup> <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/>

<sup>9</sup> [https://archive2021.parliament.scot/S5\\_Environment/Reports/ECCLR\\_2021.03.04\\_OUT\\_CS\\_CCPu\\_Report.pdf](https://archive2021.parliament.scot/S5_Environment/Reports/ECCLR_2021.03.04_OUT_CS_CCPu_Report.pdf)

<sup>10</sup> <https://www.theccc.org.uk/publication/progress-reducing-emissions-in-scotland-2021-report-to-parliament/>

## CCS feasibility and impact on climate targets

There is a clear historic failure of delivering CCS at the capture, transportation and storage stages of the process. According to the Global CCS Institute, less than fifth of CCS capacity under development in 2010 was operational by 2019. Further, deployment has also been far slower than predicted, with sites in development in 2010 with a potential capacity of 150Mt a year ultimately resulting in just 39Mt by 2020.<sup>11</sup>

The Tyndall Centre for Climate Change Research<sup>12</sup> state that during the initial deployment of CCS in the power sector, capture rates are often around 65% and that fossil fuel-based CCS is not capable of operating with zero emissions “due to “increased energy use and cost penalties” meaning that “current projects usually target 90% capture rate at peak capacity”. Carbon Capture and Storage (CCS) is therefore highly unlikely to be operational at 90% capture rates from the beginning of this project and may never be operational at this level or even at all.

The planning application does not appear to factor in time scales for differing capture rates nor does it give evidence for the suggestion that there could be “potential to capture more [CO2]” [7.19.4] (suggesting that the development is aiming to capture 95%+). This - as noted above - runs contrary to evidence<sup>13</sup> that demonstrates that historically CCS plants have not proven even 90% capture yet alone operated at higher levels. Evidence in the Tyndall Report shows that consistent capture rates on CCS plants - that have now been mothballed due to technical and economic failure - were not achieved due to “increased energy use and cost penalties”.<sup>14</sup> Energy use and energy cost penalties do not appear to be factored into the proposed development plan meaning that capture rate projections are unreliable.

The planning statement states that “construction of the Proposed Development could (subject to the necessary consents being granted) start as early as Quarter 4 2023. Assuming an approximate 3 to 4 year construction programme followed by a period of commissioning, it is anticipated that the low carbon generating station could enter commercial operation around 2027. The timescales for commercial operation are linked to the development of the Acorn Project to which the generating station will connect.” [2.5.15] The proposed 3-4 year construction period is significantly more ambitious than estimates of industry body the Global CCS Institute<sup>15</sup> which states that a “reasonable assumption would be that it takes 6-8 years on average for new CCS projects to progress through the full development cycle”. The proposed development as noted above states it “will contribute toward Scotland’s greenhouse gas emissions reduction targets” [1.1.25] yet the planning application does not outline its potential impacts on those targets if as noted above a slower completion timeline may arise.

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<sup>11</sup> <https://foe.scot/resource/report-carbon-capture-storage-energy-role/>

<sup>12</sup> <https://foe.scot/resource/report-carbon-capture-storage-energy-role/>

<sup>13</sup> <https://foe.scot/wp-content/uploads/2021/01/CCS-Research-Summary-Briefing.pdf>

<sup>14</sup> <https://foe.scot/resource/report-carbon-capture-storage-energy-role/>

<sup>15</sup> <https://www.globalccsinstitute.com/wp-content/uploads/2020/04/Thought-Leadership-Scaling-up-the-CCS-Market-to-Deliver-Net-Zero-Emissions-Digital-6.pdf>

If CCS at this site does not become operational or does not reach promised capture rates - as historical evidence of other CCS plants suggests - there could be significant knock-on effects and a high potential of impacting the ability to meet our legally binding climate targets.

Even if a 90% capture rate was to be achieved there is still a significant release of CO<sub>2</sub> into the atmosphere<sup>16</sup>. Climate science is clear that all greenhouse gas emissions must be globally eliminated (with some emissions remaining in agriculture). This means that the high lifecycle emissions<sup>17</sup> that are attached to CCS (apx 100-300gCO<sub>2</sub>e/kWh) make CCS, especially in the power sector where other options are already readily available incompatible with meeting climate targets under the 2019 Climate Change Act.

### **Replacement or additional fossil fuel power station?**

The Planning Statement notes that "the existing Peterhead Power Station's capacity will be reduced from 1,180 MW to around 300 MW and it will remain available to operate alongside the new low carbon CCGT generating station. However, the existing Power Station is only expected to operate if grid demand cannot be fulfilled by the new generating station." [1.1.11]. Furthermore the Non-Technical Summary of the Environmental Impact Assessment (EIA) says "As a result of the Proposed Development, the output capacity and operating hours of the existing Peterhead power station are expected to be reduced, thereby resulting in a reduction in carbon dioxide emissions from the site as a whole" [6.10]. Section 2.5.16 notes that the new 910MW "will be designed to operate 24 hours per day, 7 days per week".

This does not rule out the possibility for the proposed and existing gas powered plants to operate alongside each other at full capacity, including in scenarios where CCS is operating below the target capture rates or at all. Allowing this development to go ahead without a binding commitment in relation to the reduction of capacity at the existing plant risks potentially almost doubling emissions from the site.

Even if the new 910 MW power station operates alongside the existing 300MW station this would not result in a reduction of emissions across the site as stated but would actually see an increase in MW production and resultant emissions from 1,180MW (existing station) to a total of 1,210MW for both sites combined.

It is worth remembering that for every tonne of carbon emitted from a power station (even those with CCS) is a tonne that cannot be emitted from other sectors. The CCPu shows that there are still huge reductions to be made in areas such as transport. Electricity generation has far more readily available, proven and cost effective solutions to decarbonisation than continued fossil fuel use with CCS. In light of our already constrained carbon budgets allocating emissions to power generation where above evidence suggests CCS has a limited role will mean other sectors must do more

### **Economic benefit**

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<sup>16</sup> <https://climit.no/app/uploads/sites/4/2019/09/IEAGHG-Report-2019-02-Towards-zero-emissions.pdf>

<sup>17</sup> T. Gibon, A. Arvesen, and E. G. Hertwich, "Life cycle assessment demonstrates environmental co-benefits and trade-offs of low-carbon electricity supply options," *Renewable and Sustainable Energy Reviews*, vol. 76, pp. 1283–1290, Sep. 2017, doi: 10.1016/J.RSER.2017.03.078.

The Planning Statement states that the proposed development “will generate a substantial number of jobs during both construction and operation” [7.6.2]. It goes on to note that this will bring a “minor beneficial effect on the local economy from the use of local services and accommodation” [7.6.3] and that during the project's operation [7.6.4] there will also be a “minor beneficial long-term effect on the economy.”

Such minor and short term benefits of the proposed project are far outweighed by the real risk that the proposed development could pose to Scotland exceeding its incredibly constrained carbon budgets, and the impact of doing so on the regional and national economy.

Furthermore, a recent report from the Energy Research Centre looked at evidence from across 15 studies and estimated the number of jobs created per £million invested in different energy technologies. The report found that renewables and energy efficiency can create significantly more jobs than fossil fuel generation per £ invested: fossil fuel generation was found to create an average of three jobs per £million invested, compared to an average of 10 jobs per million for renewable energy technologies, with energy efficiency creating an average of 16 jobs per million invested.<sup>18</sup>

## **National Planning Framework**

While NPF3<sup>19</sup> designates 'Carbon Capture and Storage Network and Thermal Generation' as a National Development, with Peterhead identified in this respect, the emphasis in NPF3 is clearly on retro-fitting the existing power station at Peterhead with CCS rather than developing a new one: "The conversion of Peterhead gas-fired power station can pioneer CCS technology and make best use of existing infrastructure" [3.19]. It also clearly pertains to CCS, not just a Carbon Capture Plant as proposed in this application.

The stated aim of this national development is "to demonstrate that carbon capture and storage is feasible at a commercial scale by 2020, with full retrofit across conventional fossil fuel power stations by 2025-30." [6.5] As demonstrated above, even with the highly ambitious timescales outlined in this application, the proposed development could not possibly meet this aim. Further, there has been no progress towards achieving the aim of the 'Carbon Capture and Storage Network and Thermal Generation' national development in the 8 years since NPF3 was finalised, calling into question the feasibility of the proposal.

A new NPF is currently in draft form and due to be finalised this year. Given the timescales for finalisation of NPF4, and the significant shift in Scottish Government policy between the two NPFs (as outlined below) material consideration should be given to the final NPF4 in coming to a decision on this application.

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<sup>18</sup> [Green job creation, quality, and skills: A review of the evidence on low carbon energy](#)

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<https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2014/06/national-planning-framework-3/documents/00453683-pdf/00453683-pdf/govscot%3Adocument/00453683.pdf?forceDownload=true>

The draft NPF4<sup>20</sup> includes potential for CCS on an existing or new power plant at locations including Peterhead as a national development under 'Industrial Green Transition Zones'.

However the criteria for such developments in the draft document demonstrates a substantial shift in Scottish Government policy by requiring that: "The deployment of hydrogen and Carbon Capture Utilisation and Storage at these locations must demonstrate decarbonisation at pace and cannot be used to justify unsustainable levels of fossil fuel extraction or impede Scotland's just transition to Net Zero." Furthermore, "for projects that utilise carbon capture and storage, we want to ensure the highest possible capture rates in the deployment of these technologies" [Part 2, 8].

Given that, as outlined in the sections above, the application before the ECU is for an additional power station that could run alongside the existing plant, potentially at full capacity and without any guarantee of the CCS element of the proposal - which is to be delivered by another developer - being up and running on the first day of operation, or ever, at the target capture rates, it is hard to envisage how the present application could meet the requirements outlined in draft NPF4.