# REA consultation response: Scottish Bioenergy Policy Statement

The Association for Renewable Energy & Clean Technology (REA) is pleased to submit this response to the above consultation. The REA represents a wide variety of organisations, including generators, project developers, fuel and power suppliers, investors, equipment producers and service providers. The REA has dedicated member forums focused on biomass power, biomass heat, green gas and hydrogen, renewable transport fuels, thermal storage, and energy from waste (including advanced conversion technologies). Members range in size from major multinationals to sole traders. There are around 500 corporate members of the REA, making it the largest renewable energy trade association in the UK.

1. **Do you agree with the overarching principles for use of bioenergy, as set out in this document?**

Yes, the REA largely agrees with the overarching principles for the use of bioenergy, and more broadly, supports a principles-based approach, where policy supports desired outcomes such as emissions reductions or sustainability factors, rather than just end uses. This approach provides a helpful future direction for the sector that all bioenergy sectors can deliver against. However, it is important to understand the different nuances across bioenergy use in power, heat, and transport in Scotland, ensuring these principles build on both the existing sectors and their associated regulatory frameworks. Different feedstocks and conversion technologies have different characteristics, further underlining the importance of having a wide variety of bioenergy technologies.

The sector is keen to see progress on the development of the Cross Sectoral Sustainability Framework, as committed to within the UK Biomass Strategy, and stands ready to support the next UK Government in its delivery. We also are keen to work with individual devolved Governments to ensure the evolution of a bioenergy sector meets each countries needs and standards.

**Support beyond the Renewables Obligation**

We also stress the time scales for which clarity is needed in relation to the Scottish Government's overarching approach to bioenergy. As many biomass power assets approach the end of their Renewables Obligation (RO) contracts (from 2027), getting clarity on future sustainability requirements is critical, particularly as the UK Government is considering transitional support arrangements for large-scale generators. Considering the parallel workstreams already undertaken (and that we expect to continue post-General Election) by the UK Government in relation to biomass and Bioenergy, Carbon, Capture and Storage (BECCS), ensuring clarity and consistency within contracts is important. Similarly, we support the call for biomass to be independently monitored and verified and are confident generators would continue to use voluntary schemes like the Sustainable Biomass Program (SBP) to audit and demonstrate compliance with relevant sustainability regulation.[1]

It is important to recognise that the market already dictates and operates an economic cascading principle, ensuring wood is only used for bioenergy when other timber markets, who require high-quality material and can typically pay more, are unable to take the material. This includes offcuts, thinnings and sawmill residues which would otherwise be wasted. The EU Council agrees that "a market-based approach[2]" when it comes to resource efficiency is most favourable. However, the

[1] Sustainable Biomass Program, https://sbp-cert.org/

[2] Council of the European Union, (2018) *"Guidance on cascading use of biomass with selected good practice examples on woody biomass",* https://data.consilium.europa.eu/doc/document/ST-14544-2018-INIT/en/pdf

REA agrees with the principal of using bioenergy technologies that promote circular economies, particularly on a localised basis. These could include on-site Anaerobic Digestion (AD), where agriculture or agri-food waste is used onsite to provide energy for further commercial activities. Similarly, localised wood chips or locally grown energy crops within biomass heat or CHP sites should be promoted, provided they come from sustainable sources.

Electricity generation from landfill gas, with 38 active sites in Scotland, is in a similar position to solid biomass power generation in that over 85% of current capacity loses support from 2027. The REA has commissioned independent consultants (WSP) to analyse the costs of generation. Their report demonstrates that almost no current generation would be financially viable if dependent on power sales revenue alone. We have shared this report with officials across the UK Government and would be happy to do the same with the Scottish Government. We fully support UK and Scottish policies to avoid biodegradable material going to landfill, but even the material that is already in the ground will continue to produce methane for decades to come.

Given that methane is a far more potent greenhouse gas than $CO_2$[3], it is essential that the experience and know-how in capturing this gas is not lost as even a small decline in rates of capture would be significant. Modelling by WSP shows that a 1% change in methane capture rates across the UK over 2028-2037 means emissions of 1.1Mt$CO_2$ being avoided. This gives an undiscounted financial value of £321m over the period.[4] This shows the scale of the opportunity if the right policy is in place. It also highlights what is at risk, as the same values would apply if policy inaction leads to an equivalent increase in methane emissions.

Given that decisions on whether to decommission engines and disband operational teams need to be taken urgently, there is a need for interim support to maintain the status quo while a long-term policy is put in place. Maximising efforts to capture landfill gas would fit well within principle 4 of this draft strategy, and the electricity produced would fit with principle 2 as this would be making use of the bioenergy for material that cannot be put to any other beneficial use.

In addition to the principles already set out, we would suggest also including:

***Greenhouse savings in accordance with full life-cycle analysis***
Methodologies for full life cycle analysis of emissions are well established for different bioenergy feedstocks and technologies. Policy should focus on promoting technologies that can achieve the highest greenhouse gas (GHG) savings.

***Ability to deliver carbon storage/and or usage***
In considering full life cycle analysis, carbon storage potential should also be recognised. This is not only post-combustion but across supply chains. For example, carbon removals from AD plants can be stored and growth of perennial energy crops can provide carbon storage at the point of cultivation via carbon fixing within the soil.

However, it is worth noting that many smaller/single biomethane plant operators are often in rural, inland locations meaning access to carbon storage, particularly geological or long-term storage, can be difficult and therefore very expensive. Unless there is a direct pipeline connection to the Track 1 and 2 clusters, or significant support is provided for Non-Pipeline Transport, the ability to join those storage options is not possible. While most newer plants are being considered with the option of

[3] 28 times more potent over 100 years and 80 times more potent over 20 years (sources: IPCC and Global Methane Pledge)
[4] Unpublished analysis by WSP. Figure quoted uses central carbon prices from 2021 green book: https://assets.publishing.service.gov.uk/media/6567994fcc1ec5000d8eef17/data-tables-1-19.xlsx

carbon capture, not all are in the same position as Future Biogas with their Carbon Harvest project[5] to capture, liquify and transport the $CO_2$ to geological storage. Therefore, consideration should also be given to how sites can use carbon, especially in cases where it will displace fossil-based forms and deliver significant GHG savings. The capture and use of $CO_2$ is preferable to the option of venting. Unless a cooperative collection and transport (like a transfer station or hub) can be created, then sites will continue to look further afield – as is the case for Future Biogas – for storage options, while smaller sites may be unable to make the necessary storage investments, risking the loss of critical GHG savings.

***Rewarding energy conversion and scale efficiencies***

Direct production of heat from biomass has the highest conversion efficiency, approaching 90%. Improved efficiencies, in energy conversion, scale should therefore be promoted in bioenergy policy, to ultimately provide the best economic and GHG returns. However, it's important for Government to recognise that scale efficiencies are likely to benefit larger plants, and therefore where possible, should be designed in a way to ensure the sustainable benefits of smaller plants, like digestate management and use of local feedstock, are not disadvantaged.

***Rewarding further environmental benefits***

Bioenergy policy should be designed in conjunction with environmental land management policies so that further environmental benefits beyond carbon abatement are also rewarded and encouraged. For example, growth of domestic biomass feedstocks, when done right, can improve biodiversity, encourage sustainable agricultural practices, carbon sequestration in soils, as well as flooding and wildfire management. Such policies would also help deliver the 40% increase in hedgerow length as recommended by the Climate Change Committee (CCC).[6] These benefits should be rewarded through land management policies, building them into Scotland's Agri-Environment Climate Scheme, which would also support the land regulations set out by the Scottish Environment Protection Agency (SEPA). Given this, we call for the Scottish Government to ensure that this Bioenergy Policy Statement is developed in conjunction with the Agriculture and Rural Communities (Scotland) Bill, ensuring they complement one another.

**2. Do you agree with the priority uses of bioenergy, as set out in this document?**

Yes, the REA agrees with the priority uses identified in the policy statement, and we are pleased to see short, medium, and long-term considerations, which should in turn drive policy goals, ensuring investor confidence is maintained while driving innovation in bioenergy technologies. In the policy statement, the Government says, "where possible, we support early adoption of Carbon Capture Utilisation and Storage (CCUS) paired with bioenergy applications." While the REA supports this approach, utilisation can be varied, so we would encourage Government to prioritise projects that can demonstrate using and storing carbon over the long-term. The uses remain fairly high-level, and Government could be more explicit in its vision. It is critical that the Bioenergy Policy Statement builds on all the existing bioenergy sectors already established in Scotland. These sectors should be directly recognised within the Policy Statement including:

***Biomass power***

In the short-medium term, maintain generation from existing biomass power plants beyond current support mechanisms to ensure continuing benefits from low carbon electricity generation. As well as supporting new biogas CHP plants, Government should also support the expansion of the use of

[5] Future Biogas, *"Bioenergy with Carbon Capture and Storage: A New Generation of Anaerobic Digestion Plants",* https://www.futurebiogas.com/beccs/

[6] CCC (2019) *"Net Zero – The UK's Contribution to stopping global warming",* https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/

residual biogenic wastes (e.g., waste wood) including those from municipal and commercial and industrial waste streams (after economic reuse and recycling activities), waste wood and other waste fuels low carbon generation such as landfill gas. These forms of biomass power are well established in Scotland providing both low carbon power and essential waste management capacity. Urgent clarity on their future is required, especially as they come to the end of existing contract arrangements under the Renewables Obligation.

***Biomass heat in decarbonisation***

Biomass plays a vital role in decarbonising the manufacturing sector in Scotland, with many sites actively installing biomass heat systems. This includes whisky distilleries and the wider food and drink industry, the wood sector, paper industry, and chemical manufacturing. For many of these sites, without connections to the grid or suitable transport and storage infrastructure, biomass heating systems provide a viable alternative, enabling businesses to get on with decarbonisation quickly and more cost effectively.

The Government should therefore be careful not to create uncertainty around the vital nature of biomass in delivering low carbon heat for these users. It is important that changes in policy do not result in businesses moving away from bioenergy prematurely and reverting to higher carbon alternatives because of restrictions on the use of bioenergy.

***Biomass heat in homes***

We are pleased to see that that the Scottish Government recognise a role for bioenergy in heating. Bioenergy can have a role to play where electrification may not be the most suitable solution, such as rural and island communities with poor grid connections, certain non-domestic buildings requiring high heat loads, and complex-to-decarbonise homes. However, we note that in the long-term the Government may look to limit this use and we would disagree with this. Many complex-to-decarbonise homes, of which 512,230 are off-gas-grid in Scotland (around 2/3 in rural areas and 1/3 in Highlands and Islands)[7], will still not be ready to install a heat pump after 2035. If the Government were to limit its use too narrowly it would leave many consumers without adequate, financially feasible options to decarbonise. It should also recognise that decarbonising rural areas is very different to urban areas. It is essential that current consultations considering building standards and retrofit applications, recognise an ongoing role for biomass heating in heat decarbonisation.

We therefore welcome Minister Gillian Martin's recent announcement that a review of *The Building (Scotland) Amendment Regulations 2023* is underway. We hope that the review recognises the importance of bioenergy for meeting the renewable heating needs of rural communities – and that even in new builds, biomass boilers may represent the lowest-cost, most sustainable and lowest carbon choice for consumers, and should therefore be given an exemption under these regulations. Allowing bioenergy and hybrid-heat-pumps with bioenergy options would help give choice of heat supply for consumers, particularly those in rural and island communities, and off-gas-grid areas – who may be concerned about both the lack of connection to the electrical grid, and the robustness of the grid system.

Bioenergy can play a key role in the just transition in Scotland and ensure rural communities aren't left behind. Biomass is also an important tool in addressing fuel poverty – which is particularly high in remote rural areas (where 29% of households are in fuel poverty) and was highest for those using electricity as their primary fuel[8].

[7] House of Commons Library (2023) Constituency data: Households off the gas grid https://commonslibrary.parliament.uk/constituency-data-households-off-the-gas-grid

[8] Scottish Government (2023) Scottish House Condition Survey: 2021 Key Findings https://www.gov.scot/publications/scottish-house-condition-survey-2021-key-findings/pages/3-fuel-poverty/

Furthermore, it would be counterproductive to allow bioenergy to be used in individual buildings or in heat networks in the short-term but then make changes post-2035. This is particularly true in heat networks as you'll have already invested in the infrastructure and pipework. Failure to do so would create a waste of public money, when an appropriately low carbon heating source is already in place. Furthermore, a heat network operating at 80 degrees wouldn't be the same as a heat network running at 50-60 degrees from a heat pump, and would be a waste of resources to have to switch this back over again.

Those who have proactively chosen to install bioenergy systems already, or install systems in the short term should be allowed to continue using these systems in the long term, for the following reasons:

- These properties are already contributing to the Scottish Government's renewable heat target;
- Many of these properties will be in receipt of the Renewable Heat Incentive, and we do not believe it would be fair or reasonable for the term of the RHI to be cut short; and
- The reasons that led to the owners of these properties installing biomass rather than other forms of no/low carbon heating may continue to present barriers to the deployment of a heat pump.

In the medium to long-term, acknowledge the use of renewable liquid fuels (such as bioLPG or rDME) in buildings and industry as a drop-in fuel using existing heating systems, especially in hard to treat off gas grid homes. Similarly, Government should encourage the conversion of solid biomass or waste gasification for expansion of biomethane supply for gas grid injection or hydrogen production. When coupled with CCS technology this can deliver negative GHG emissions (BECCS).

In the longer-term, the production of biohydrogen from steam methane reforming of biomethane could also be considered. However, Government need to include a clear definition of biomethane beyond 2035, particularly regarding the assurance of a gas grid or perceived future beyond 2035.

***Transport***

We agree that the focus in the short-medium term should be on the expansion of bioethanol and biodiesel use by ramping up the blending levels. Government should look at the use of Biomethane as replacement of diesel, notably for logistics and HGV sectors using existing gas infrastructure. It can also be used to fuel non-road mobile machinery including agricultural and forestry tractors. They should also support the use of higher blends of liquid renewable fuels, where this is the preferred option, using rebates on fuel duty to drive uptake. There are possibilities of co-production benefits with biofuels used in heating, such as bioLPG.

We agree that in the longer-term, the focus is likely to be on the replacement of aviation and shipping fuels with sustainable biofuels as they become available to provide carbon reductions. We are aware that the Scottish Government has formed a working group to evaluate the opportunities presented by the production of Sustainable Aviation Fuels (SAFs). This is a positive step, however there is limited discussion in the draft statement on the potential use of co-production opportunities presented by SAF (bioLPG for example) to maximise the use of domestic biomass feedstocks.

In the UK context, policy work on an equivalent level for maritime is at a very early stage and in light of the General Election, no further updates have been given in relation to renewable transport fuels in road transport. Since policy for road transport has only been set to 2032, there needs to be a far

greater sense of urgency if policy is to be put in place in time for fuel producers, infrastructure providers and fuel consumers to respond.

**3. Do you agree with the intention to phase out unabated combustion of biomass?**

While we agree that in the long-term that the majority of unabated combustion of biomass should be phased out, it is important to recognise the important role biomass currently plays. Any long-term ambition must build off and support the current sector, recognising the critical role bioenergy already plays in helping to decarbonise the power, heat, transport, and as outlined above, manufacturing sectors in Scotland. This means that the Policy Statement must provide a realistic pathway by which abatement technologies can be installed, without putting the existing sectors at risk of contraction, for example by impacting R&D or production pathways for the development of advanced biofuels.

As the second largest producer of low carbon energy, biomass power accounts for about 13% of UK electricity generation,[9] providing consistent power, complementing other forms of renewable energy, like wind and solar, and ensuring the UK has a continuous, secure energy supply with a mix of technologies in the system. The scale of its contribution to the UK grid, and ability to offer consistent makes it a unique low carbon technology, critical in helping the UK transition away from fossil fuels.

We also need BECCS for the delivery of critical negative emissions. With the right Government support, BECCS can be deployed commercially and cost effectively, helping us get to Net Zero more quickly. It's why the CCC[10], International Energy Agency[11], and UN InterGovernmental Panel on Climate Change[12] all recognise the role it can play in removing carbon from the atmosphere and meeting our Net Zero targets.

The UK Biomass Strategy also recognised the role that biomass could play in hard to decarbonise sectors that may not be able to universally deploy BECCS, like aviation, maritime, and off gas grid properties. As such, while the use of unabated biomass is likely to fall in the medium term, until fossil fuels have been entirely phased out and zero carbon energy systems have reached maturity, maintaining a proportion of unabated biomass power generation will be important in helping transition and decarbonise and safeguarding UK energy security.

The Government should not look to stop unabated biomass use for heat in rural areas. As mentioned in Question 2 it is important to recognise that rural properties are not the same as urban properties, and that a different approach is required when decarbonising these properties. Furthermore, biomass has strong links to the forestry sector and generates many local circular economy benefits in rural areas. Indeed, one biomass boiler installation can support 10-15 supply chain jobs[13], which is particularly valuable in rural areas – Dumfries and Galloway and Highland have the highest concentrations of biomass installations and it is a valuable employer in these areas. Furthermore, research proves that managed forestry, leads to healthier and more productive woodlands that

[9] DESNZ (2023), "*Digest of UK Energy Statistics*", https://www.gov.uk/Government/collections/digest-of-uk-energy-statistics-dukes
[10] Climate Committee Change, (2020) *"Sixth Carbon Budget",* https://www.theccc.org.uk/publication/sixth-carbon-budget/#key-recommendations
[11] International Energy Agency, (May 2021) "*Net Zero by 2050*", https://www.iea.org/reports/net-zero-by-2050
[12] UN IPCC, (2023) AR6 Synthesis Report, https://www.ipcc.ch/report/ar6/syr/
[13] Biomass Heat Works (2022) Wood Heat Conference Update on Biomass Heat Works Campaign https://www.r-e-a.net/wp-content/uploads/2020/10/S4-WH2020-Neil-Holland-Biomass-Heat-Works.pdf

sequester more carbon than unmanaged woodlands[14]. Therefore, limiting its use in the long-term would impact job security, the health of woodlands and reduce financially feasible options to decarbonise for rural consumers which could have negative repercussions on fuel poverty, as mentioned in question 2.

4. **Should there be a minimum threshold at which carbon capture should be considered for bioenergy technologies and should refurbishment of plants also be included?**

Appropriate requirements should be implemented via decarbonisation readiness requirements applied through environmental permitting, as is currently being proposed for England. [15] This allows for appropriate CCS requirements to be in place where they are possible and provide a reasonable timetable for their delivery. This can then include minimum thresholds appropriate to the biomass use in question, where it is physically possible to do it. Similarly, the Scottish Government should seek to align policies around minimal thresholds or plant refurbishment with those in place in the rest of the UK. Any requirements should apply to both new and 'substantially refurbished' plants. We refer to the definition in the Energy Efficiency Directive, and accepted by SEPA, for 'substantially refurbished' plants.[16] Appropriate allowances should also be made for use of bioenergy systems in hard to decarbonise situations, where it remains the best solution for decarbonisation, even if carbon capture is not a realistic option.

Government should be mindful that the lack of a current commercial route to market to see CCS retrofitted may remain a barrier for installing carbon capture on certain sites, particularly if the cost of retrofit is uncommercial, or the environmental benefit remains low. As such, any requirements must be proportional, especially for small to medium scale plants where space requirements may mean that carbon capture is not possible.

5. **From what date should any mandate to consider carbon capture technology be implemented for bioenergy plants?**

Given need for decarbonisation and negative emissions, all plants should be looking into this now, but wider policy and a viable commercial CCS market needs to be established, so that plants can realistically look to fit carbon capture technology. This could be facilitated by decarbonisation readiness requirements being built into environmental permitting for relevant bioenergy uses. Ensuring bioenergy plants have plans in place and the ability to decarbonise will ensure the sector is prepared, while support mechanisms for CCS and the negative emissions market are established. This is likely to be more effective than setting an arbitrary date which industry would not yet be able to commit to meeting due to the nascent nature of the market.

It should be noted that only certain bioenergy technologies can install carbon capture technology. Smaller installations, such as many biomass boilers, are unlikely to be able to support carbon capture technology given their size. However, this should not be used as a means to limit deployment of biomass boilers which will continue to have a role to play in helping to decarbonise hard to

[14] Forest Ecology and Management (2023) https://www.sciencedirect.com/science/article/pii/S0378112723004383?via%3Dihub

[15] DESNS (2023) Decarbonisation Readiness: updates to 2009 Carbon Capture Readiness Requirements https://www.gov.uk/Government/consultations/decarbonisation-readiness-updates-to-the-2009-carbon-capture-readiness-requirements

[16] SEPA, *"a medium combustion plant will become a new or medium combustion plant if it is either substantially refurbished and the refurbishment costs are more than 50% of what a new comparable MCP would cost,"* https://www.sepa.org.uk/regulations/pollution-prevention-and-control/medium-combustion-plant/#Legislation

decarbonise sectors and homes, such rural off gas grid areas. Many modern biomass boilers utilise particulate emissions abatement technologies – for instance, electrostatic precipitators which filter out 99% of particles. Furthermore, innovation is happening all the time in the sector to further drive down emissions.

6. **Should decarbonisation options other than fitting carbon capture and storage technology be considered suitable as part of decarbonisation requirements for biomass plants, for example use of waste heat as part of a combined heat and power (CHP) plant or heat network?**

Yes. Scotland will need a wide range of technologies to get to net zero, and bioenergy has the potential to play multiple roles, especially in complex to decarbonise areas. Both CHP bioenergy sites and connecting waste heat to heat networks will help deliver future ambitions of heat decarbonisation and should be allowed as part of decarbonisation requirements. New applications could be viewed with this in mind and opportunities to link up to heat network systems should be investigated. Future flexibility should also be considered given the role of bioenergy in production of renewable fuels, SAF and hydrogen, all of which should be considered applicable decarbonisation routes.

***Biochar***

Biochar should also be included as an option. Biomass plants can utilise pyrolysis, gasification, or hydrothermal carbonisation to produce e-fuels and biochar, the latter of which sequesters $CO_2$ in solid form. Biochar has previously been recognised in Scottish Government's Negative Emissions Technologies) NETS feasibility study as a versatile form of carbon storage that does not require connection to $CO_2$ transport and storage networks and can also act as a soil conditioner.

Given appropriate Monitoring, Report and Verification (MRV) to ensure carbon stays sequestered, it should be recognised as having substitutability with CCS technologies for biomass plants utilising advanced conversion technologies – especially for smaller scale plants where fitting CCS technology is less feasible.

7. **The Climate Change Committee (CCC) advise that the UK will need 700,000 hectares of perennial energy crops by 2050 to meet their pathway to net zero. How much could Scotland contribute towards this figure and what evidence is available to support your view?**

The REA largely agrees with the previous ClimateXChange study on perennial energy crop potential in Scotland. In terms of total area, their geospatial modelling shows a theoretical potential for each crop type in Scotland (based on current data) of:

- 912,600 ha of suitable land is currently available for planting of SRF,
- 219,100 ha is available for SRC and
- 51,800 ha is available for miscanthus.

Full study available here: https://www.climatexchange.org.uk/projects/perennial-energy-crops-and-their-potential-in-scotland-evidence-review/

In addition, figure 1.1 of chapter 2 of the draft policy statement anticipates that perennial energy crops will provide the majority of domestic feedstock, rising from almost zero today to 3.25 TWh by 2045. Assuming an average annual equivalent yield of 10 tonne/ha (in the case of Miscanthus)

around 4000 kWh/tonne, or 81,250 to 120,000 ha would be needed, dependant on the speed of deployment.

If the Scottish Government wishes to participate in wider bio industries, and in line with the draft policy's proposed hierarchy of uses, then perennial energy crops might be better deployed in harder-to-decarbonise sectors such as bio-chemicals. If deployed in addition to bioenergy, then the land required would need to double to between 160kha to 240kha.

8. **What would encourage you to use biomass from domestic perennial energy crops as a feedstock?**

While the UK Biomass Strategy once again highlighted the potential of perennial energy crops, commitment to a long-term strategy for increasing supply remains absent, while current supply is negligible. Without clear direction and ambitious targets for growth, the biomass industry still does not have the confidence they need in long-term availability PECs, so switching feedstocks remains unattractive. Targets should be officially committed to, providing confidence and direction to the market. Following this, a strategic pathway should identify and focus on key regions for growth, supporting farmers and landowners to increase the available hectarage for energy crops on appropriate marginal land. This would help establish the commercial business case for PECs or SRF within geographical regions and grow confidence in the crop.

Along with support for improving the supply of PECs, it is essential that the Scottish Government work with colleagues in Whitehall to maintain a strong offtake bioenergy market. There is concern that given the imminent end of existing Renewables Obligation (starting to come to an end from 2027) or RHI contracts for biomass power and heat infrastructure that this could damage demand, undermining the long-term business case for farmers or landowners to take on PECs or SRF. Government should provide clarity on support mechanisms for the industry and commit to maintaining existing bioenergy infrastructure, as well as helping to facilitate the use of PECs and SRF within bioenergy carbon capture and storage.

9. **What are the opportunities or challenges to growing energy crops and what would encourage planting at a commercial scale in Scotland?**

The UK Government previously attempted to use mandates on bioenergy producers to create a strong offtake market for Perennial Energy Crops (PEC) and Short Rotation Forestry (SFR) feedstocks. In the 2000s, the Renewables Obligation required co-firers to take a certain proportion of their feedstock from PECs, with an increasing proportion over time. While this policy was welcome, the requirements were too high and introduced too quickly. This led to push back from energy generators and resulted in the then energy department, removing the requirement completely. At the same time, DEFRA and Natural England introduced the Energy Crops Scheme (ECS) which offered energy crop establishment grants for farmers in England. However, without the RO requirement, the market for the crop contracted significantly. This damaged landowners, farmers, and investor confidence.

This, coupled with lack of adequate reward for growing energy crops continue to be a challenge. Growing energy crops must be seen by landowners and developers as a long-term profitable exercise, one that is able to compete with other land uses, especially when feedstock cultivation could provide additional environmental benefits.

Scotland’s biggest opportunity for growing energy crops is the amount of potential land available for this purpose. To encourage planting at scale in Scotland, the REA would encourage the Scottish Government to:

***Ensure Scotland's fourth land use strategy includes explicit plans for the amount of energy-crop hectarage that can be feasibly provided to support BECCS development in Scotland.***
It was encouraging to see reference made to BECCS and the additional domestic feedstock required to support its development in Scotland's third land use strategy document[17], but considering the work commissioned by the Scottish Government since its publication, and the initial position in this policy statement, more explicit figures are needed. This will boost investor, landowner, and farmer confidence, giving them the assurance that they will have a market in the long-term.

***Extend the eligibility criteria of the Agri-Environment Climate Scheme to reward domestic feedstock production.***
Extending the eligibility criteria in Scotland's well established Agri-Environment Climate Scheme (AECS) to reward farmers or landowners for planting approved energy crops on their land would incentivise crop growth. Safeguards could be put in place to ensure that applications do not undermine food production and would only be approved for land unsuitable for growing food crops.

The Anaerobic Digestion (AD) sector already includes many agricultural practitioners, demonstrating the ability to grow a range of energy crops within farming rotation and allocating small amounts of land to the use of crops from green gas and other renewable energies. The fears around land use change or fuel vs food have not materialised, in part due to the UK's strong sustainability criteria which is already in place to ensure the growth of energy crops is done in the right way.

***Fund independent advice for landowners and farmers about the advantages of energy crops.***
Knowledge about innovative energy crops, their advantages, and possible returns, is generally low across the agriculture and forestry sector. For many crops there are now demonstration plantations available, with strong data to show their suitability and commercial potential, however, grant support for commercialisation would encourage greater take up. Ultimately, landowners and developers need to see a viable business model to be encouraged to grow energy crops. Scotland should build the Government supported projects on Biomass Connect[18] and Envirocrops[19], both of which are starting to make significant contributions in addressing this issue.

***Consistent policy is needed to drive demand for domestic feedstocks.***
While the REA is aware that schemes like the Renewable Heat Incentive (RHI) for heat and biomethane are not devolved, it is worth stating their importance at a UK-wide level and pushing for more consistent policy and guidance from Whitehall. Both the Non-Domestic RHI (and RO) drove the installation of biomass systems and demand for domestic feedstocks. In addition, both schemes helped bring significant amounts of UK forestry into management, with the revenues from biomass feedstocks forming an important part of the business case for developing and managing sustainable, productive forests.[20]

The lack of any clear policy support for the biomass heat sector is now a major cause for concern in terms of driving further development of domestic feedstocks as the current sectors driving demand decline. Continuing to label the biomass heat sector as 'niche' without providing sufficient evidence

[17] Scottish Government (2021), "*Land use - getting the best from our land: strategy 2021 to 2026",* https://www.gov.scot/publications/scotlands-third-land-use-strategy-2021-2026-getting-best-land/documents/
[18] https://www.biomassconnect.org/
[19] https://envirocrops.com/
[20] Forestry Commission (2020), "*Forestry Statistics 2020*," https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/

the potential size of the market, is itself a barrier to feedstock producers suggesting the market has limited potential for demand growth.

A similar story is true of the renewable transport fuel sector, where a lack of supportive policy has left the sector in limbo and stifled the ability for farmers to sustainably grow energy crops, which continue to have a significant role to play. Industry needs Government to be clear an about the future role of biofuels to open domestic supply chains again. This includes ensuring as ambitious targets as possible under the Renewable Transport Fuel Obligation. At present, policy is only set out to 2032.

In the power sector, clear policy intentions post-2027 are also required. This affects biomass power, energy from waste, and landfill sites currently supported under the RO. For biomass power specifically, those developing biomass feedstock supplies for these sites require long term off-taker contracts, and a lack of certainty around whether such sites will continue after 2027 makes investment decisions difficult and disincentivises landowners developing supplies for such sites. While the REA welcomed the UK Government's consultation on transitional arrangements for large-scale biomass power generators, clarity is needed about potential support for sub-100MW generators.

10. **Can you provide best practice examples which could help integrate energy crops within the landscape and within the agriculture sector?**

Where they can, anaerobic digestion plants are increasingly working with farming businesses to instigate the adoption of wider cropping rotations, with gaps between energy and food crops filled with cover crops. Cover crops can hold plant nutrients, water and help build soil organic matter. In addition, crops which are established using methods that minimise soil disturbance further help farmers limit carbon release from soils and along with this more generative farming can help farming businesses achieve a neutral or even negative carbon footprint.

In addition, there are benefits to effective use of digestate as this can provide a source of nutrients and soil conditioning which when considerately applied avoid the use of fossil based and chemical fertilisers and help limit soil erosion by adding organic matter and soil structure whilst also improving water retention and crop health.

The Supergen Bioenergy Hub works with academia, industry, and Government to develop sustainable bioenergy systems that support the UK's transition to an affordable, resilient, low-carbon energy future. In 2020, they produced case studies, showing how energy crops can used effectively to produce low-carbon power. An outline of the relevant studies are included below.

***Supergen Bioenergy Hub Case Study 6: Bioelectricity with Carbon Capture and Storage (CCS)***[21]
Short rotation coppice (SRC) willow is grown in the UK over 25–30-year rotations and harvested every 3 years, producing about 7-10 tonnes of dry matter per hectare per year. The biomass is chipped for small-scale and pelletised for large-scale power plants close to the source to be transported to a power station. The biomass is combusted in boilers producing steam to power turbines to generate electricity. After combustion, the flue gas is cleaned and $CO_2$ is separated from the flue gas via post combustion capture chemicals, then compressed and transported in pipelines to

[21] Welfle, A., Röder, M., et al. (2020) *"Supergen Bioenergy Hub Case Study Report: Developing the UK bioenergy sector to enable the transition to a sustainable bioeconomy and low-carbon future,"* www.supergen-bioenergy.net/wpcontent/uploads/2020/05/Supergen-Bioenergy-Hub-Case-Studies-Report.pdf

a geological reservoir. The electricity is fed directly into the UK power grid and the $CO_2$ is stored in a geological reservoir.

***Supergen Bioenergy Hub Case Study 1: Hydrogen Fuel Cell***[22]

Miscanthus is grown as a perennial crop in the UK on agricultural land. The typical lifetime is 15 years, and the crop is harvested every year producing about 13 tonnes of dry matter per hectare per year. Alternatively agricultural residues such as straw from cereal crop production or forest residues are used as feedstocks. The feedstocks are baled close to the source and transported to a gasification facility. In an entrained flow gasification system, the biomass is converted to produce a syngas mixture of carbon dioxide ($CO_2$) and hydrogen (H2). In the next step, the flue gas will be upgraded to separate and capture the $CO_2$ during the pre-combustion system. This may incorporate physical absorption process with solvents, solid state removal and pressure swing absorption (PSA), catalytic upgrading, plasma treatment or a combination and range of methods appropriate to the gas composition and desired quality. The captured $CO_2$ will be separated from the solvent/sorbent, compressed, and then transported via pipeline/surface transport/ships to its final storage reservoir. The hydrogen-rich syngas will be electrochemically converted at high efficiency in a fuel cell to produce heat and/or power. Alternatively, the hydrogen-powered fuel cell can also be used for transport.

In addition to the case studies above, energy crops, like miscanthus, can improve soil health. The amount of carbon stored in soils is twice as great as that stored in the atmosphere. As such, any type of soil disturbance, including cultivation and ploughing, is likely to cause temporary losses of soil organic carbon (SOC). Recurrent annual disturbance under arable agriculture lowers the amount of SOC. Converting arable land to Miscanthus can boost carbon sequestration, which in turn can improve soil quality, soil texture, water retention, and fertility, as well as increases in soil organic matter.[23] In addition, the extensive root systems of Miscanthus result in significant belowground biomass storage, which enhances the ability of these plantations to mitigate climate change.

**11. Can you provide best practice examples which could help restore and regenerate biodiversity, alongside energy crops?**

Buffer strips are areas of land either left uncultivated or planted with perennial grasses, shrubs, and trees. Planting strips of perennial biomass crops on existing agricultural land can provide several important benefits in terms of flood management, soil recovery and improvements in biodiversity, in addition to providing a harvestable resource. Agroforestry systems can also provide effective windbreaks, wildlife corridors, and enhance the natural regulation of pests.

Buffer strips containing tall grasses, trees or shrubs act as a physical barrier which slows the run-off of surface water following heavy rains making them effective natural flood management strategies – something that is likely to be increasingly important as we tackle climate change. Similarly, in areas where agricultural land is more intensively managed, nitrate and phosphorous leaching and run-off is known to be a main source of pollution in lakes and waterways. Deep rooting perennial plants and tree species can act as a biological filter which take up and utilise nutrients before they enter watercourses.[24]

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[22] Ibid

[23] Biomass Connect, (2023) *"Environmental and biodiversity impacts of Miscanthus plantations"*, *https://www.biomassconnect.org/wp-content/uploads/2023/05/Environmental-and-Biodiversity-impacts-of-Miscanthus.pdf*

[24] Biomass Connect, (2023) "*Biomass Buffer Strips – using biomass crops in multipurpose land management*", https://www.biomassconnect.org/wp-content/uploads/2023/03/TA-Biomass-Buffers-Final-1.pdf

The application of compost to soils has many benefits to soil health alongside biodiversity and its use should be encouraged and incentivised. Compost can improve soil structure by increasing porosity, water-holding capacity, and reducing soil compaction. This creates better conditions for root growth, water retention, improves plant health and makes soils more resistant to erosion and climate extremes such as drought and flooding. Compost contains beneficial microorganisms that boost soil biodiversity and protect against disease. They can enhance the soil's natural processes such as nutrient cycling and help promote healthy plant growth. Compost offers a sustainable alternative to chemical fertilisers by providing essential nutrients to plants in a slow-release form. By enriching soil fertility, compost reduces the need for chemical fertilisers, thereby lowering the carbon footprint of agriculture and promoting ecosystem health.

Please refer to our response to question 10, setting out how anaerobic digestion plants are working with farming businesses to restore and regenerate biodiversity via the use of cover crops.

**June 2024**