

**As part of the celebrations for Scotlands first ever Bioeconomy Week
Zero Waste Scotland and the Industrial Biotechnology Innovation Centre
are very pleased to present:**

All About Biochar

**A solutions focused knowledge exchange and cocreation workshop
Digital event: Wednesday 4th October 12:30 – 14:00**



Welcome – All About Biochar


BIOECONOMY20
WEEKSCOTLAND22



Working
together
to create
a circular
bioeconomy

About the partnership



Working together to create a circular bioeconomy



Working together to create a circular bioeconomy

Our aims

A three-year partnership designed to drive innovation and growth in Scotland's circular bioeconomy by:

- Identifying opportunities based on sector focussed research;
- Supporting innovators with resources and funding; and
- Bringing stakeholders together to network and collaborate.



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Our activities

- Co-funded bioeconomy accelerator R&D projects
- Zero Waste Scotland funded Whisky Co-product project
- ‘All about Biochar’ webinar (today)
- ‘Sustainable fisheries’ workshop (Nov 3 – Stirling)



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Today's agenda

- What is biochar?
- What are its applications?
- How is biochar currently regulated?



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Opportunities and challenges in the production of engineered biochar

Prof Ondřej Masek

Chair of Net Zero Emission Technologies

UK Biochar Research Centre

University of Edinburgh



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The use of biochar in agriculture: Risks and benefits

Prof Bob Rees

Professor of Agriculture, Horticulture and Engineering
Sciences

Scotland's Rural College



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The use of biochar in agriculture: Risks and benefits



Prof Bob Rees
SRUC Edinburgh

Leading the way in Agriculture and Rural Research, Education and Consulting

Biochar

- C-rich, charcoal-like product, recalcitrant organic C
- Produced by burning biomass in absence of O_2
- Long history of application to agricultural soils.
- What are the benefits and potential risks of biochar application?



Potential benefits



Improved nutrient use efficiency



Improved soil quality

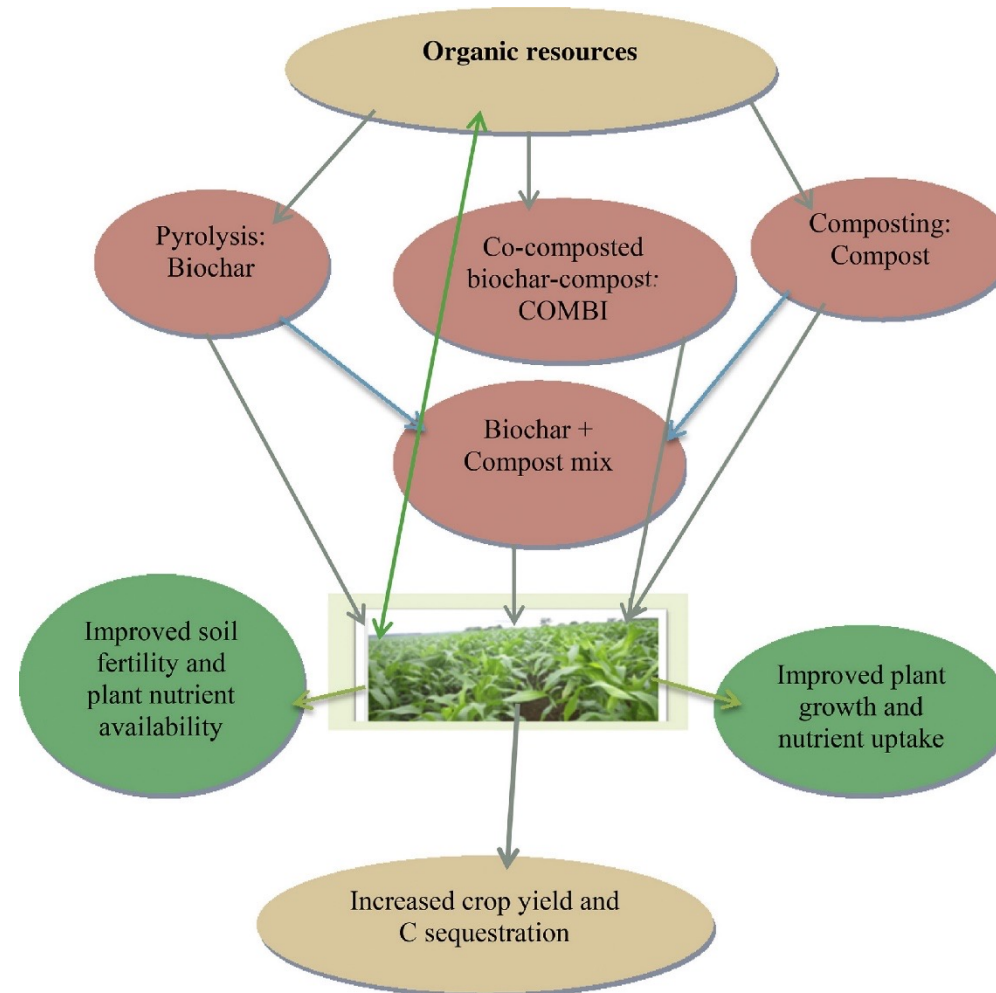


Reduced greenhouse gas emissions



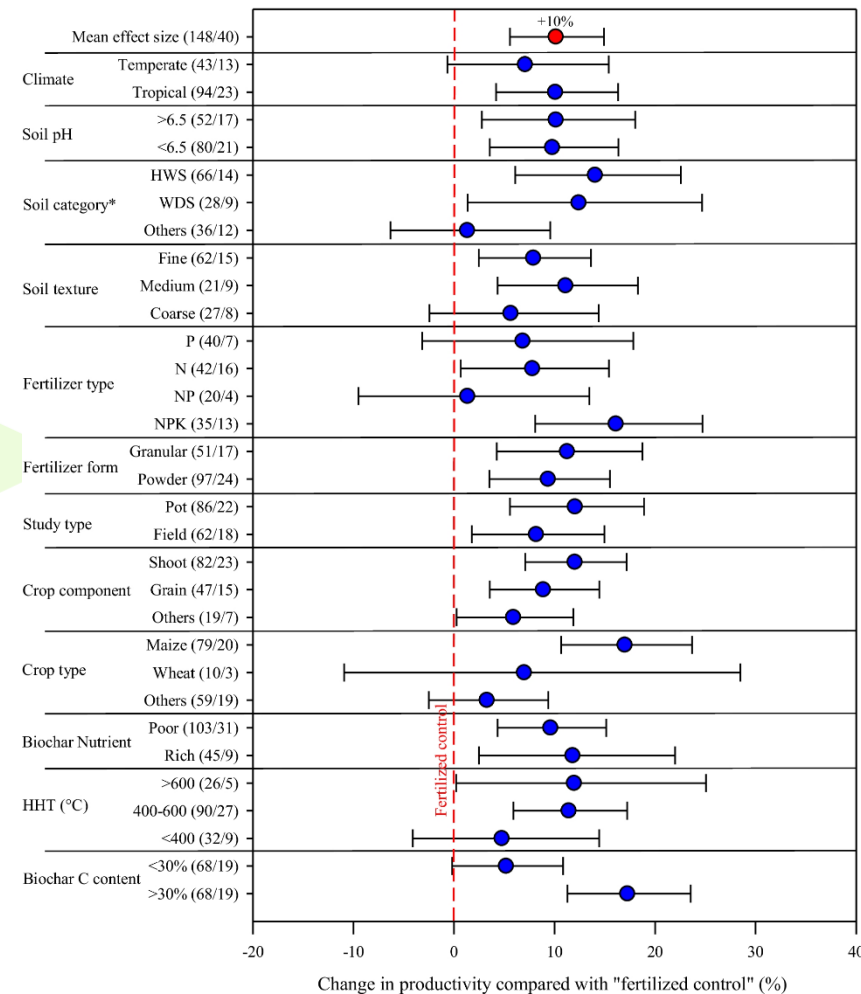
Increased carbon storage

Improved soil quality

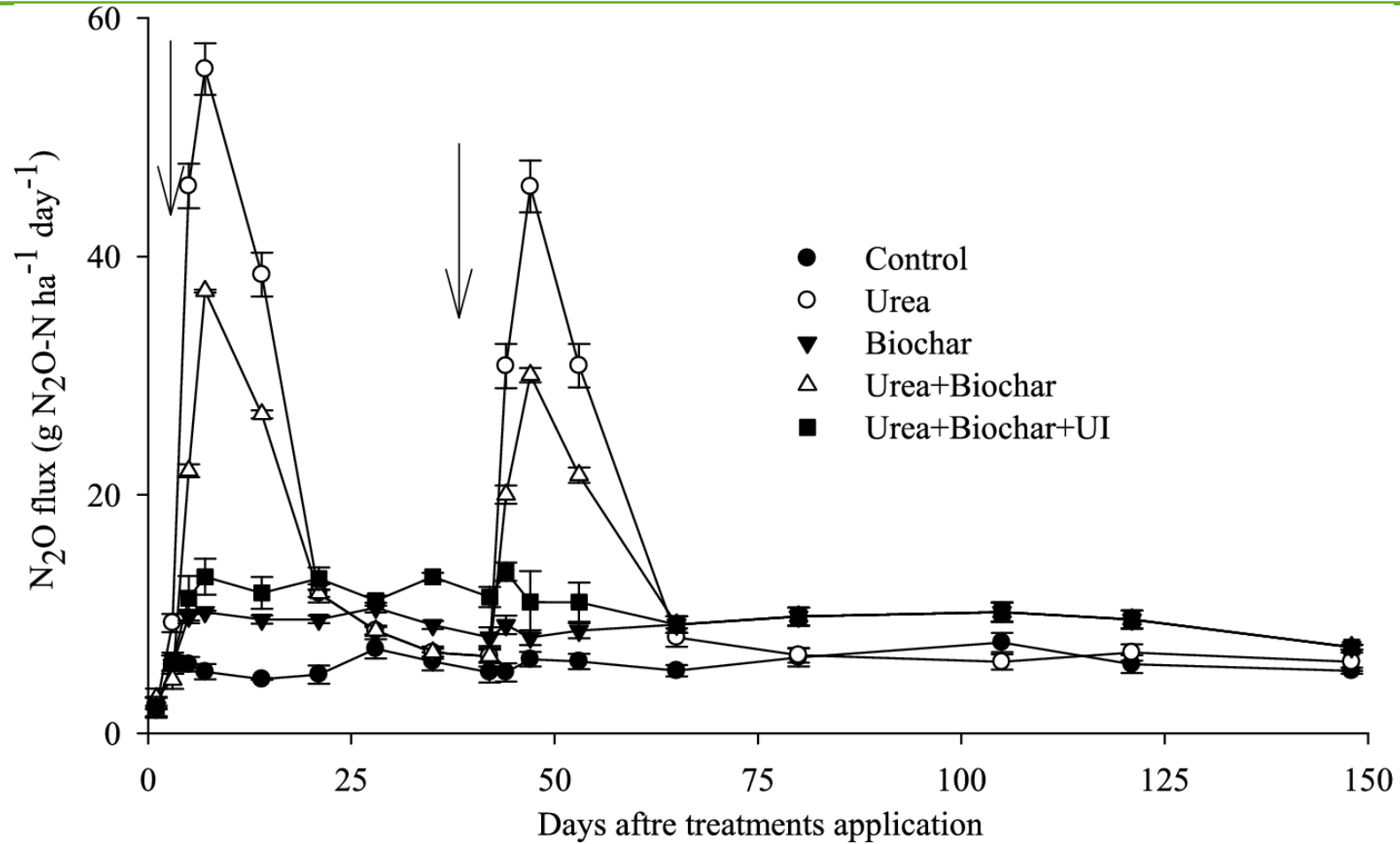


Crop response to biochar

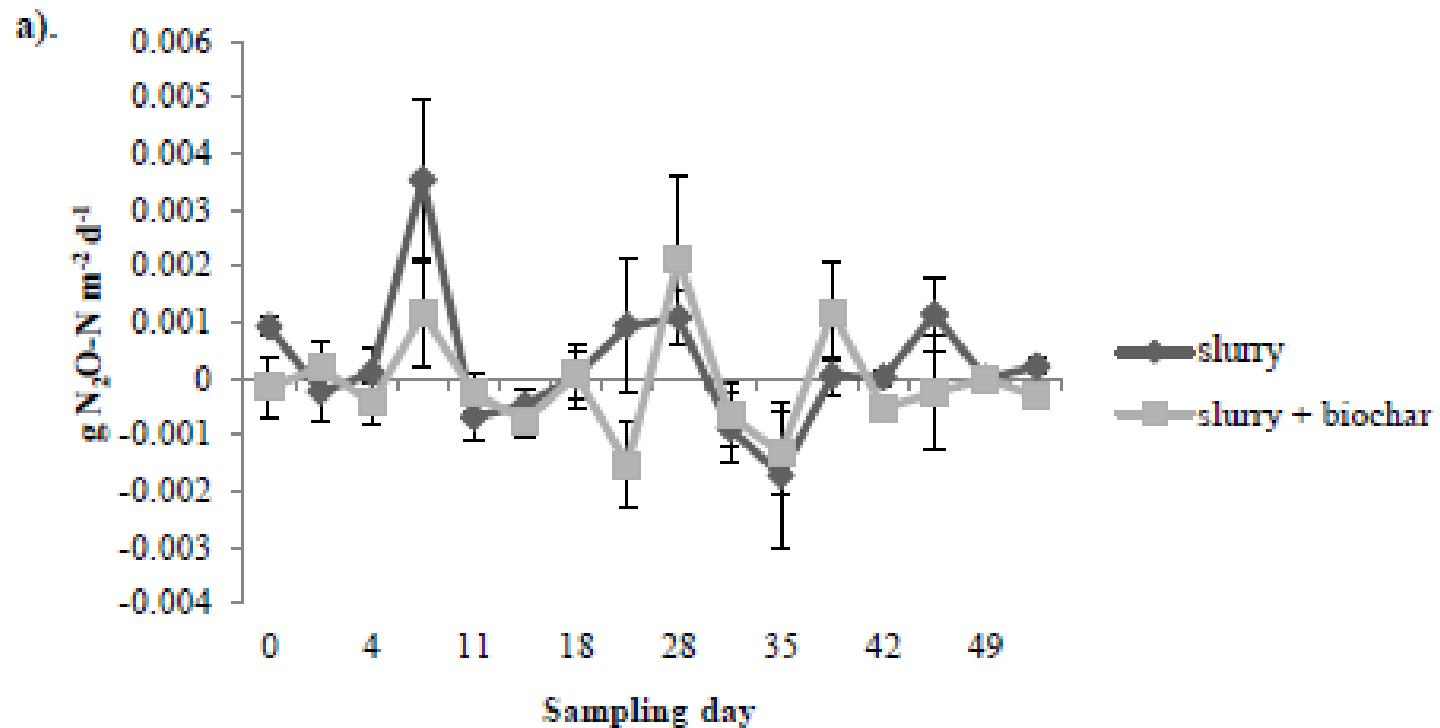
- On average, BBF applied at very low application rates (mean of 0.9 t ha^{-1}) increased crop productivity by 10% compared with fertilized controls and 186% compared with non-fertilized controls.



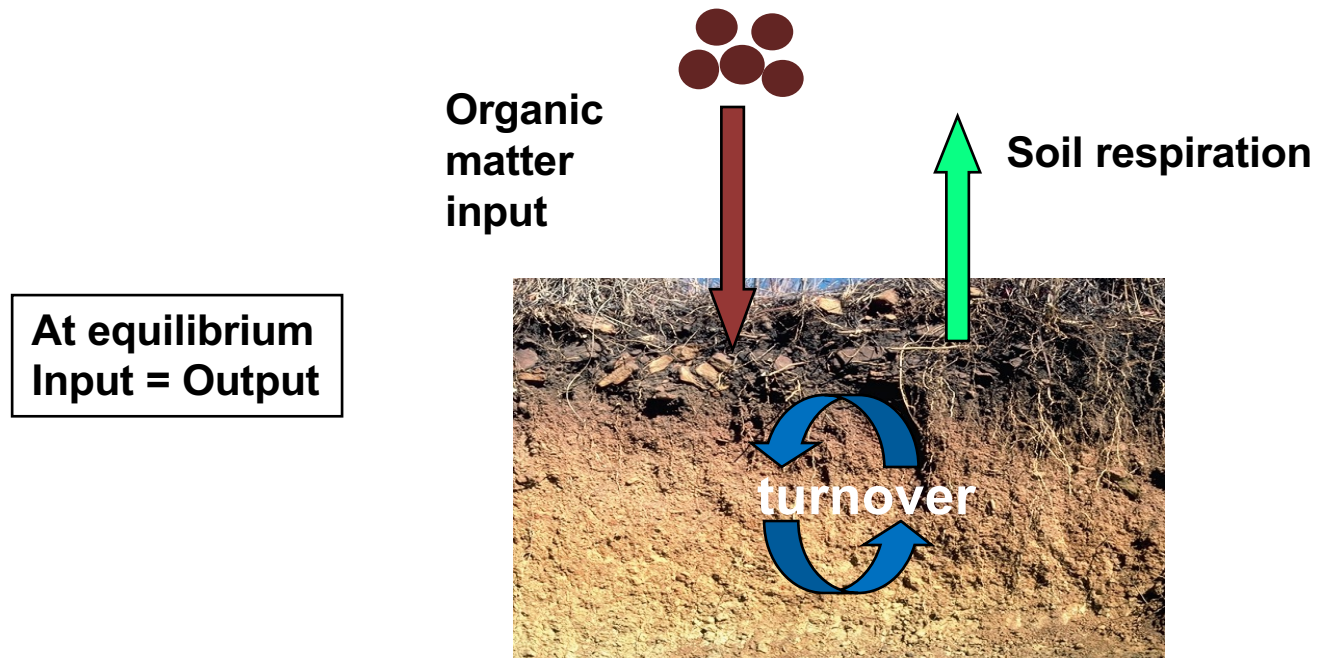
Greenhouse gas mitigation



Greenhouse gas mitigation



What is carbon sequestration?



Carbon sequestration - opportunities & challenges of biochar

Opportunities

- Co-benefits in terms of soil fertility, resilience & crop production
- Widespread opportunity

Challenges

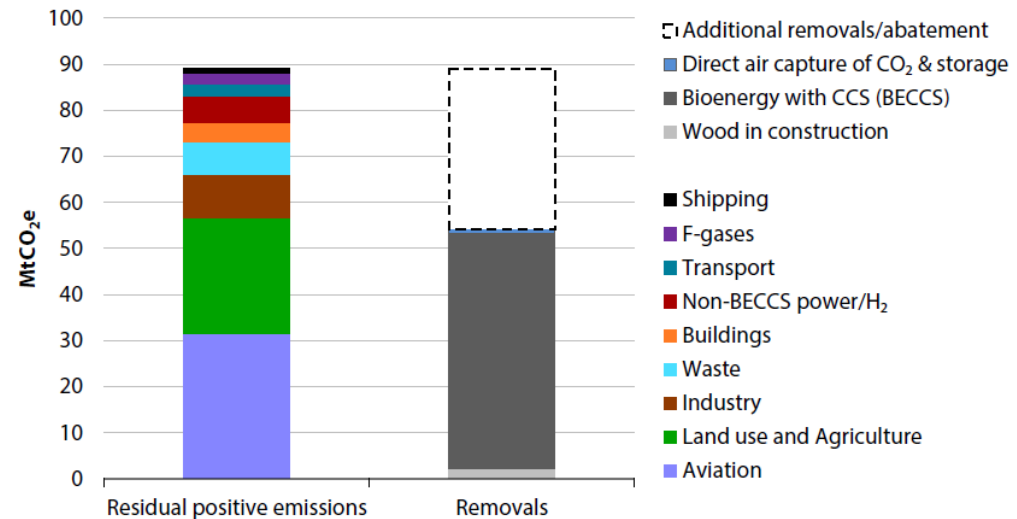
- Costs and regulatory issues
- Non-CO₂ emissions
- Measurement Reporting and Verification

The importance of carbon removals for net zero



- Mitigation is not enough
- Carbon removals needed for residual emissions to reach net zero targets

Balancing emissions & removals by 2050



Committee on Climate Change 2019

Carbon Removals

- Gross emissions from agriculture cannot be reduced to zero due to natural/biological processes
- Role for carbon removal strategies such as:



Forestry /
agroforestry



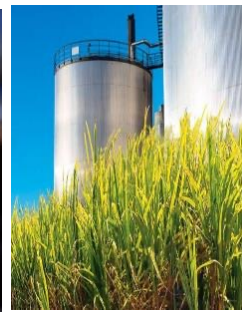
Soil C
sequestration



Biochar



Enhanced
weathering

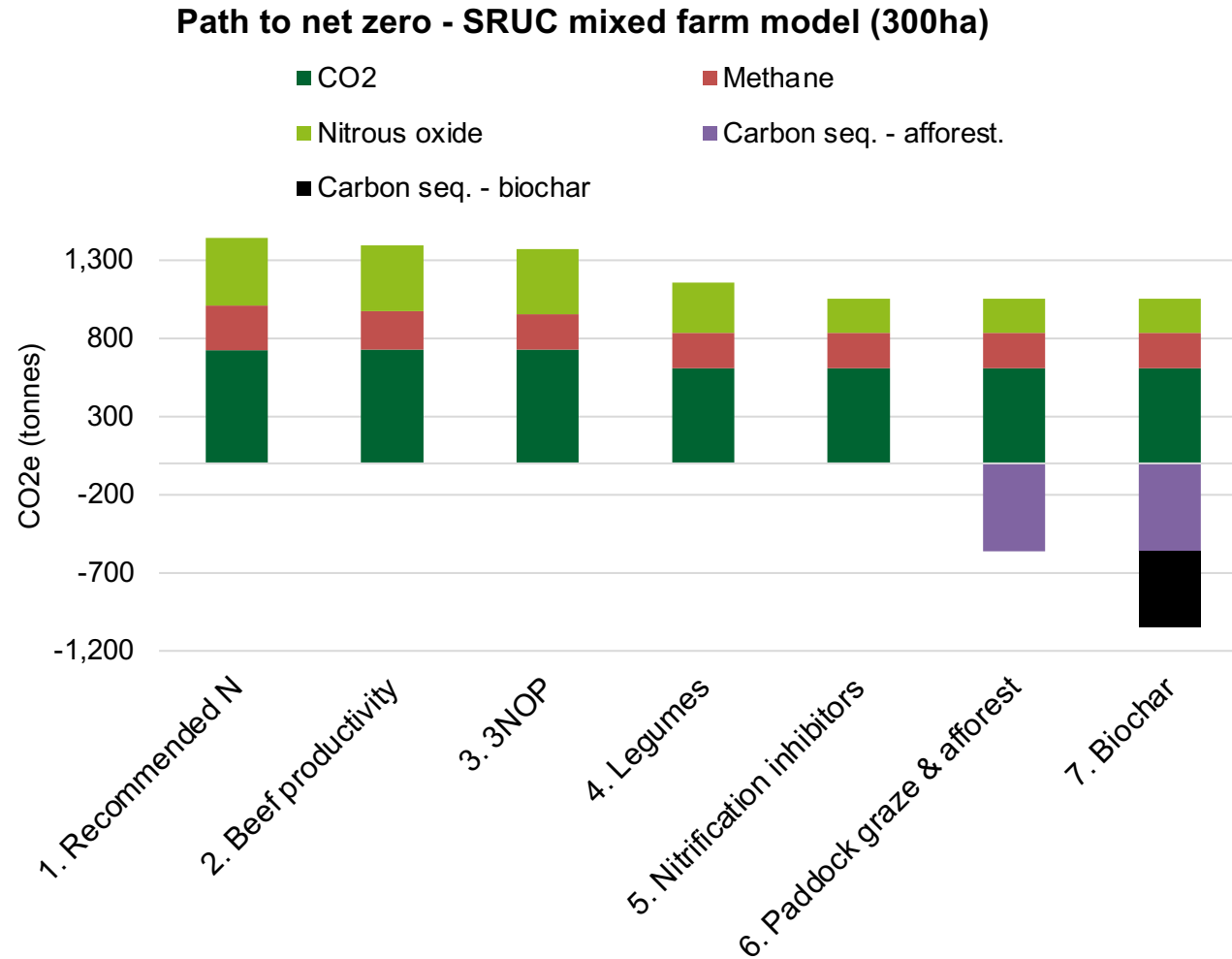


Bio-energy
with Carbon
Capture and
Storage



Direct Air
Capture &
Carbon
Storage

Net zero farming – how to get there?



Management interventions reduce emissions by >30%
Offsets split between afforestation and biochar

Concluding remarks



- Biochar offers opportunities in agriculture to improve soil quality, and nutrient recovery by crops while reducing or offsetting greenhouse gas emissions
- Evidence of carbon sequestration and improved nutrient use efficiency is good, while that for nitrous oxide mitigation is less clear
- Further evidence is required to establish the value of biochar application to Scottish soils
- We need to consider costs and regulatory issues in developing the technology

Thank you



Regulation of Biochar Manufacture and Use

Fiona Donaldson
Senior Policy Officer
Scottish Environmental Protection Agency



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SCOTTISH ENVIRONMENT PROTECTION AGENCY

Regulation of Biochar Manufacture and Use

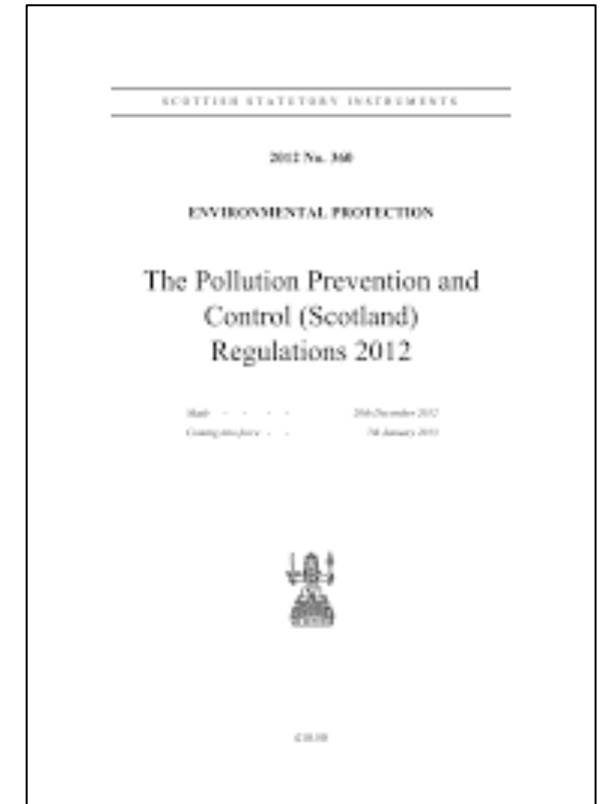
4 October 2022

A PRESENTATION TO THE ZWS/IBioIC Lunchtime webinar- Biochar

REGULATING THE MANUFACTURE OF BIOCHAR

Key questions

- Is the feedstock waste?
 - Important for the incineration question but not pyrolysis question.
- Is any waste **or syngas** produced from waste being burnt?
 - If yes → likely to be a 5.1 Part A incineration activity
- Is the facility pyrolysing carbonaceous material or mixtures, otherwise than with a view to making charcoal?
 - If yes → likely to be a 1.2 Part A (c) pyrolysis activity
 - Likely to be 'No' since although pyrolysis takes place, the main product is Biochar (i.e. charcoal)



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REGULATING THE USE OF BIOCHAR

Key questions

- Is the feedstock waste? If yes, the output is regarded as waste unless...
 - Is there an end of waste position?
 - Local
 - Company or product specific
 - National
 - SEPA e.g. compost and digestate end of waste positions
 - UK, e.g. Fertiliser Regulations
 - If no, potentially a product but must still be used properly (in terms of amounts, location, etc.)
- If waste → Exemption from Waste Management Licensing
 - Use for agricultural benefit or ecological improvement
 - Must meet ‘relevant objectives’ i.e. “without endangering human health and without using processes or methods which could harm the environment” including risk to water, air, soil, plants or animals.

SCOTTISH STATUTORY INSTRUMENTS	
2011 No. 228	
ENVIRONMENTAL PROTECTION	
The Waste Management Licensing (Scotland) Regulations 2011	
<i>Made</i>	<i>16th March 2011</i>
<i>Coming into force</i>	<i>27th March 2011</i>
ARRANGEMENT OF REGULATIONS	
1.	Citation, commencement and extent
2.	Interpretation
3.	Relevant Offences
4.	Notice of Appeal
5.	Time limit for making an appeal
6.	Reports of hearings
7.	Notification of determination
8.	Particulars to be entered in public registers
9.	Information to be excluded or removed from a register
10.	Mobile plant
11.	Conditions of site licences: treatment of WEEE
12.	Conditions of site licences: treatment and storage of batteries
13.	Conditions of site licences: incineration of waste industrial and automotive batteries
14.	Health at work
15.	Waste oils
16.	Exclusion of activities under other control regimes from waste management licensing
17.	Exemptions from waste management licensing
18.	Exemptions from waste management licensing: controlled activities
19.	Exempt activities: registration requirement
20.	Register of exempt activities
21.	Register of exempt activities: registration of information
22.	Register of exempt activities: removal of information
23.	Register of exempt activities: requirements in respect of recovery and storage of scrap metal or waste motor vehicles
24.	Annual requirements in respect of recovery and storage of scrap metal or waste motor vehicles
25.	Register of exempt activities: requirements in relation to certain exempt activities
26.	Annual requirements in respect of certain exempt activities
27.	Annual requirements in respect of WEEE

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CURRENT SEPA POSITION

Position Statement of 2012 (WST-PS-031)

Manufacture

- Limited inputs
 - untreated wood waste from agriculture, horticulture and forestry activities
- Restrictions on the type of plant (not an incinerator)
- No more than 30 tonnes of wastes is stored at the site where they will be used at any one time.
- The production activity must be registered in advance with SEPA

Use

- Biochar produced in accordance with the position statement will still be regarded by SEPA as a waste material in terms of the law and so may only be used in accordance with the relevant waste management controls.
- However, SEPA will consider waste derived biochar produced in accordance with this position as an acceptable waste in an exempt activity (use on land)
- This activity must be registered with SEPA at least 21 days before the activity is due to begin.
- Must demonstrate benefit to agriculture or ecological improvement

A PRESENTATION TO THE ZWS/IBioIC Lunchtime webinar- Biochar

THE FUTURE OF REGULATION?

Integrated Authorisation Framework

- New regime covering manufacture and use on land- permits, registrations, notifications
- Consultation late this year/early next

Fertiliser Regulations- end of waste

- EU Regulation which the UK is implementing. Defra is leading.
- July 2022 amendment brought biochar into scope.
- Limited feedstocks allowed
 - No mixed municipal waste
 - No sewage sludge
 - Animal by-products? Depends on the 'end point'- tbc
- Controls on processing conditions and biochar quality
- Certification scheme





Contact details

Fiona Donaldson

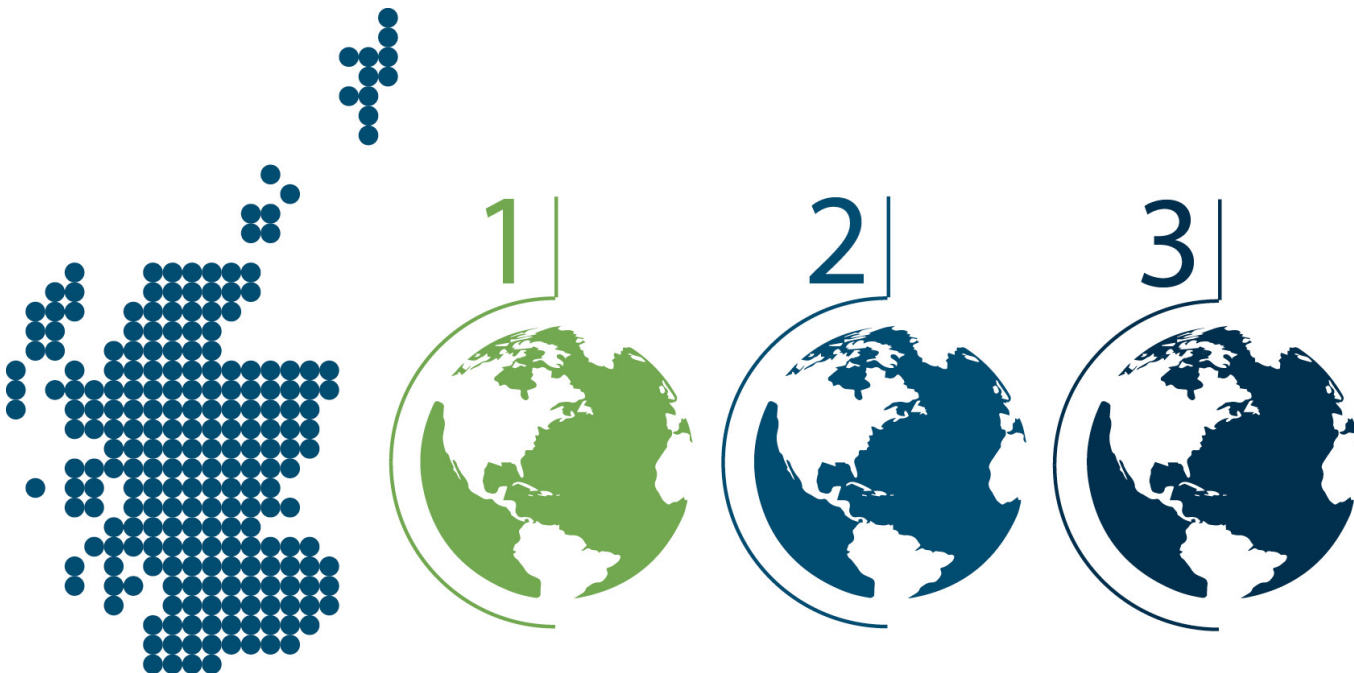
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Thank you

Any further questions please contact

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