Biomass feedstock supply innovation programme

Supplier Day

1 March, 2021

Department for Business, Energy & Industrial Strategy

Fighting coronavirus

Support a safe return to work, restoring livelihoods and rebuilding consumer confidence

Help businesses to bounce back, and provide the roadmap to recovery and renewal

Accelerate the development, manufacture and **deployment of a vaccine** in the UK and overseas to protect lives

Backing business

Make the UK the best place in the world to start and scale a business and seize the opportunities of global free trade

Increase opportunity by levelling up economic activity across all parts of the UK and help business create jobs

Promote **regulations that supercharge growth** and investment

Leading Britain's recovery

Unleashing innovation

Make the UK a science superpower - backing ideas, eliminating bureaucracy and supporting talent from home and abroad

Double investment in &D to release potential and drive discovery that improves lives

Increase productivity and create high-value, better paid jobs, by boosting our world-class sectors

Tackling climate change

Drive the green recovery, boosting growth and employment through becoming a leader in clean technologies, infrastructure and energy

Achieve net zero greenhouse gas emissions and end our contribution to global warming by 2050

Host a successful COP26 climate summit that accelerates urgent climate action to protect our planet

Introduction to the Science and Innovation for Climate and Energy (SICE) Directorate

HOW WE SUPPORT THE BEIS MISSION AND PRIORITIES

Fighting coronavirus

Backing business

Unleashing innovation

Tackling climate change

The SICE mission is to use science, engineering and innovation to enable the UK's transformation to a net zero economy and accelerate international action

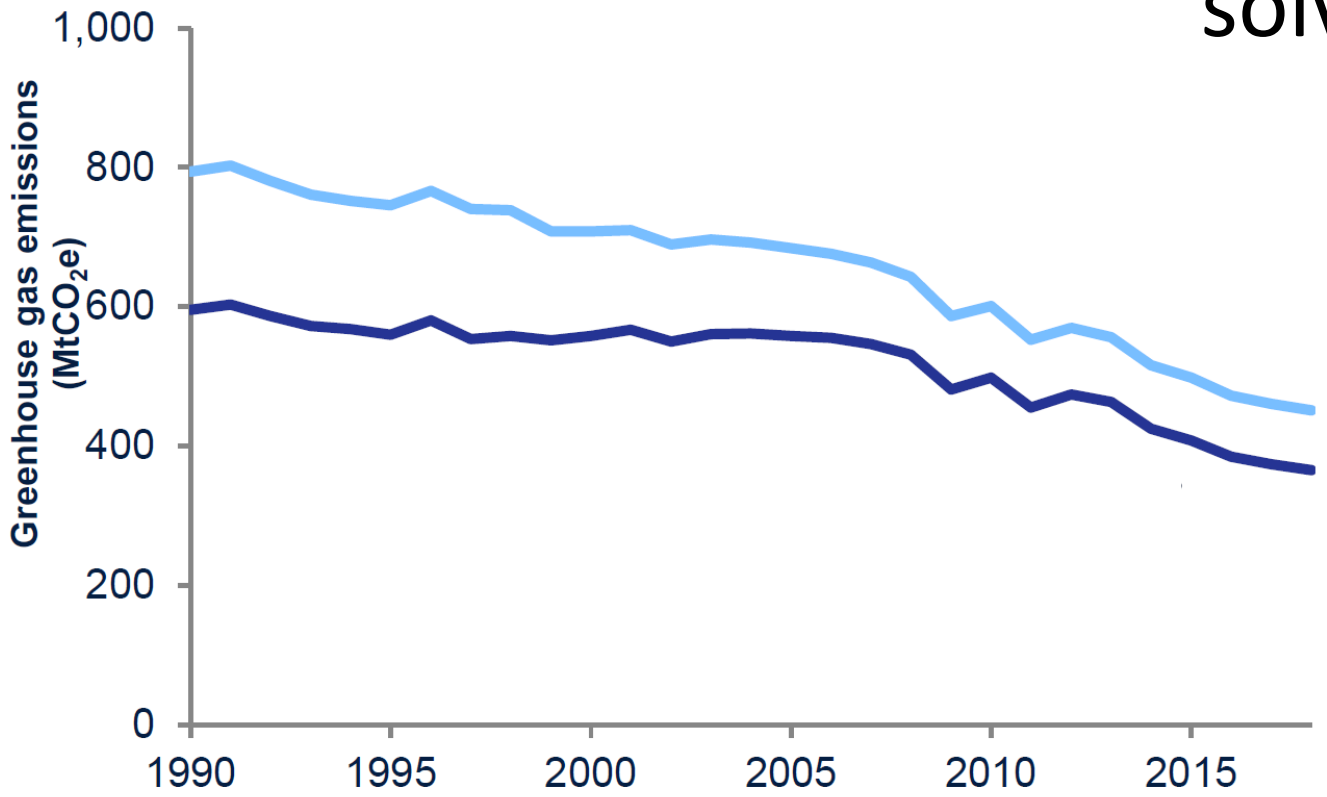
Energy Innovation Portfolio
Deliver £1bn+ over SR period for innovation in clean technologies and other ways to meet UK Carbon Budgets

Greenhouse Gas Inventory Programme
Deliver a UK GHG Inventory on an annual basis in line with domestic and international GHG reporting requirements

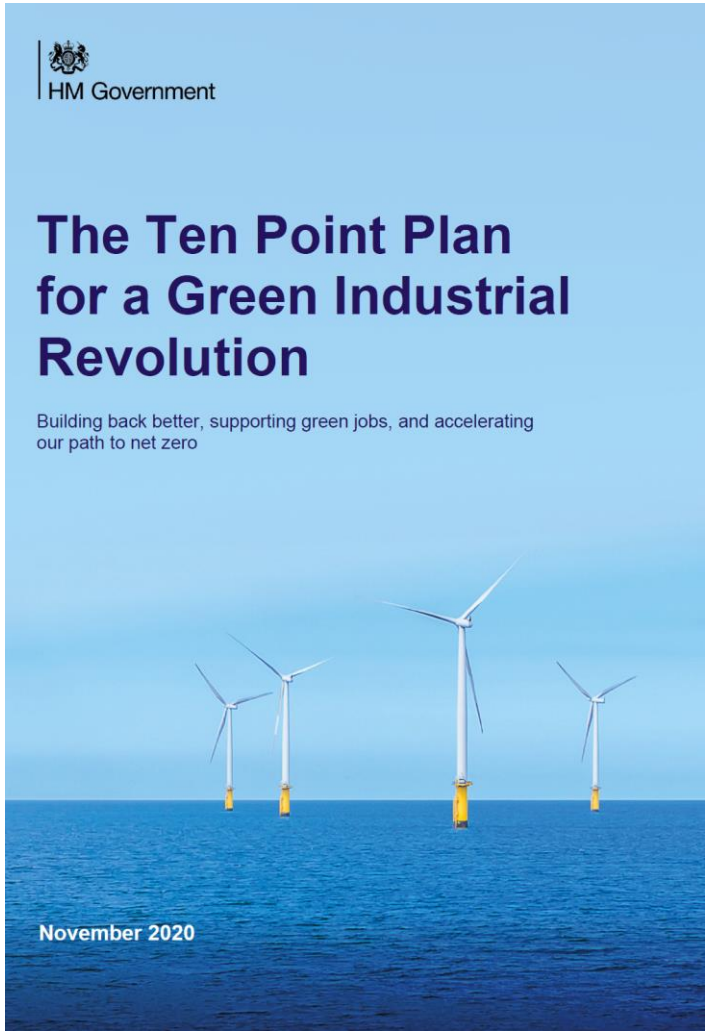
Climate Science Programme
Provide best available climate science to HMG and lead on UK input into international climate change policy

Technical Analysis and Evidence Programme
Provide robust technical evidence, analysis and engineering support to underpin energy policy

What we are trying to solve



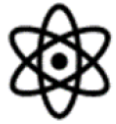
The hard bit



To accelerate the commercialisation of innovative low-carbon technologies, systems and processes in the power, buildings, and industrial sectors, we will launch the **£1 billion Net Zero Innovation Portfolio**. The portfolio will focus on ten priority areas that correspond with this Ten Point Plan, including: floating offshore wind; nuclear advanced modular reactors; energy storage and flexibility; bioenergy; hydrogen; homes; direct air capture and advanced CCUS; industrial fuel switching; and disruptive technologies such as artificial intelligence for energy.

Energy Innovation Programme (2015-21)

The aim of the BEIS Energy Innovation Programme (EIP) is to accelerate the commercialisation of innovative cheap, clean, and reliable energy technologies by the mid 2020s and 2030s.



£180m Nuclear

Driving down costs and building new UK supply chains and skills

£15m Renewables

Driving down the cost of low carbon electricity at scale

£100m Industry & CCS

Low carbon options for industry, lowering energy costs

£90m Built Environment

More cost effective energy efficiency and low carbon heating

£70m Smart Systems

Scaling up flexibility and looking for new storage options

£50m Cross Cutting

Supporting disruptive innovations (particularly for SMEs), including using innovative finance.

Net Zero Innovation Programme (2021-25)

Portfolio structure and possible programmes

- **Advanced Nuclear**
- **Offshore Wind**
- **Smart Energy & Energy Storage**
- **Built Environment** (Heat Pumps & Retrofit)
- **Bioenergy**
- **Hydrogen**
- **Industry**
- **Advanced CCUS**
- **Disruptive technologies**
- **Greenhouse gas Removal**

Underpinning Climate, Science and Engineering programmes

- **Climate Science Programmes**
- **International Research and Innovation**
- **Engineering & Research Programmes**
- **Green House Gas Inventory development**

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The biomass context

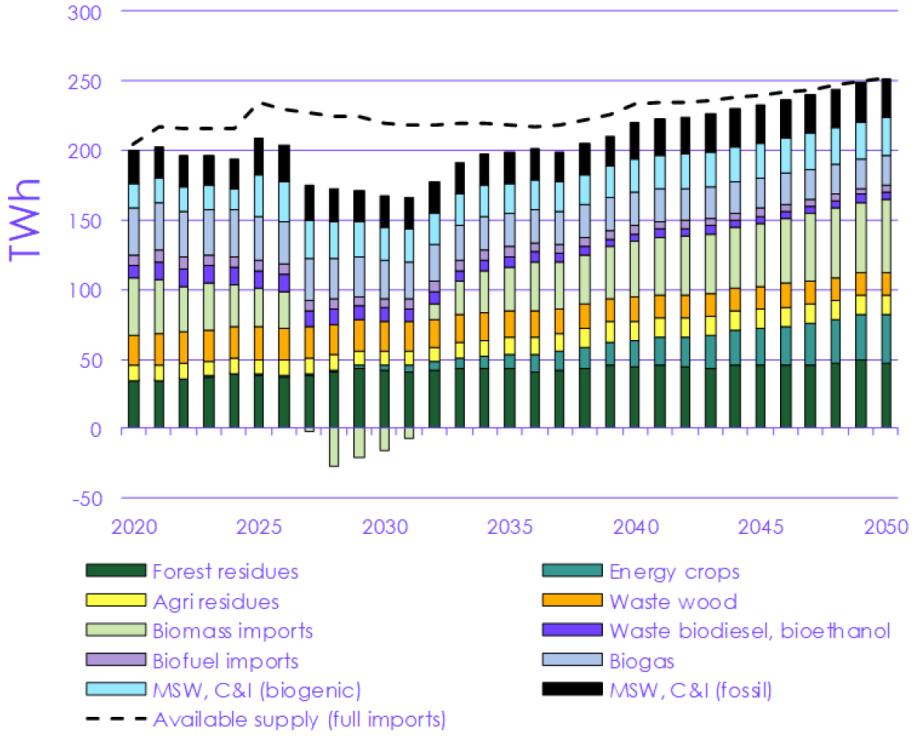
Why bioenergy?

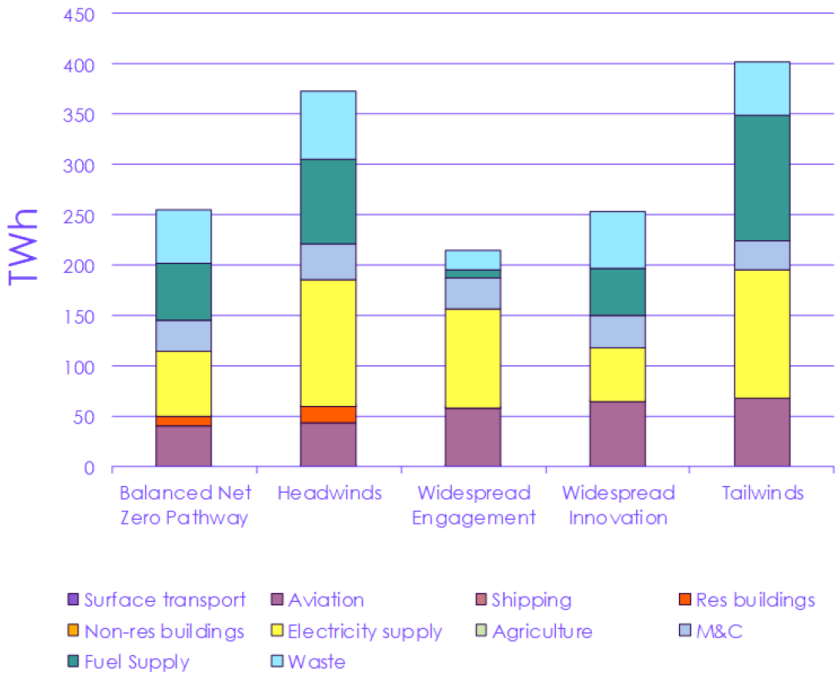
	Most effective use today	2020s and 2030s	By 2050
Bioeconomy	Wood in construction	Wood in construction, potentially other long-lived bio-based products (within circular economy)	
Buildings	Biomethane, local district heating schemes and some efficient biomass boilers in rural areas		Only very limited additional use for buildings heat: niche uses in e.g. district heat and hybrid heat pumps
Industry	Biomass use for processes with potential future BECCS applications		BECCS in industry alongside other low-carbon solutions
Power	Ongoing use in power sector in line with existing commitments or small scale uses	Demonstration and roll out of BECCS to make H_2 and/or power	Biomass used for H_2 production or power with CCS
Transport	Liquid biofuels increasingly made from waste and lignocellulosic feedstocks	Liquid biofuel transitioning from surface transport to aviation, within limits and with CCS	Up to 10% aviation biofuel production with CCS

CCC – Biomass in a net zero economy https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/

“Sustainable bioenergy is essential for reaching net zero”
“Domestic bioenergy comprises the large majority of our supply estimates”
“Bioenergy resources increase in line with expanding UK production of forestry residues and perennial energy crops”

CCC, Sixth Carbon Budget Advice





Energy crop area (kha)	Year
10	2020
23	2025
115	2030
266	2035
720	2050

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Aims of the competition

- We want to use innovation to make a positive contribution to domestic biomass supply
- Produce innovations that can help improve the business case for planting feedstocks
- Produce innovations that can be commercially adopted at the end of the programme

- We know there are broader challenges and barriers to overcome. This programme will not, and does not aim to, fix all these issues

Our proposed innovation programme

A scoping study has informed our thinking

Sustainable Bioenergy Feedstocks Feasibility Study
Final Report

Report for Department for Business, Energy and Industrial Strategy
DUNS Number: 218606679

	Innovation impacts						
	Costs	Risk	Wider production impacts	Applicability	Timeframe	GHG	Oth
Description of innovation	C1	C2	C4	C5	C6	C3	C7
Breeding/screening for rhizome cultivars with improved	✓✓✓	✓✓	✓	-	✓✓	✓✓	✓
Breeding/screening for seed cultivars with improved traits	✓✓✓	✓✓	✓	-	✓✓✓	✓✓	✓
Adapted machinery methods for Miscanthus seed	✓✓	-	✓✓✓	-	✓✓✓	✓	-
Improved rhizome production, storage and transportation to	✓✓✓	-	✓✓✓	-	✓✓✓	✓	-
Production sites for generating planting material need	✓✓✓	✓✓✓	✓✓	-	✓✓	✓✓	✓

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Overarching programme design considerations

What we will be funding:

1) Second generation energy crops and forestry (long and short rotation)
2) Activities within the farm gate or forestry road

What we won't be funding:

1) Any activities beyond the farm gate/forestry road boundary
2) Any feedstock conversion processes

Overarching programme design considerations

1) Target the whole production process
2) Support understanding with a multi-site demonstrator
3) Innovations must be broadly technological or biological in nature

Potentially promising innovation opportunities – energy crops

1) Planting material production scale-up
2) Increasing planting establishment success
3) Breeding/screening for yield improvements
4) Harvesting improvements, from optimising harvest time to machinery developments
5) Improved on-site storage systems

Potentially promising innovation opportunities – forestry

1) Species or genetic selection for desirable traits
2) Analysis of provenance to identify beneficial characteristics
3) Developments in harvesting technology (e.g. for difficult to access sites)

You do not have to propose any of these options to be eligible for the competition. Just meet be within our scope and have a strong idea

Potentially promising innovation opportunities

- Delivering cultivars which deliver greater biomass yield with minimal fertiliser inputs
- Increased robustness of plants to increase potential for establishment success
- Targeted regional adaptation to extend the geographic range for cultivation of *Miscanthus* genotypes further north and east in the UK and improve climate resilience (e.g. drought, frost and flood tolerance) (Kalinina, et al., 2017)
- Hybrids which can exploit land areas less suitable for food crop production e.g. marginal and contaminated land. This will require the development of stress tolerant novel hybrids.
- Varieties which will reduce pre-treatment costs for 2nd generation biofuels and bioproducts (Lewandowski, et al., 2016)
- Cultivars with high seed production for scaling up planting stock supply (Clifton-Brown, et al., 2018).
- Scalable and adapted harvesting, threshing and seed processing methods for producing high seed quality
- Reduced costs of propagation to enhance scalability .e.g. plug-plants, micropropagation, direct sowing, Microencapsulation of stem and bud sections for planting using the "Crop expansion, encapsulation and delivery system (CEED™) (Xue, et al., 2015).

- A shorter 2-year rotation length may be possible with improved agronomy/precision farming and would allow smaller harvesting machinery to be used reducing soil damage and GHG emissions. This needs trialling.
- Machinery innovation to enable winter harvesting of SRCw at wet sites This would result in a harvest that is less stressful to the plant and produces biomass with a lower moisture content which is beneficial for the processing and end-use and would reduce damage to soil structure. Track based machinery is being trialled in Sweden which could be appropriate (see Appendix A).
- Harvesting windows are currently very wide to accommodate the fact that there are only a few contractors with harvesting machinery, and they want to get best value out of their investments. Harvesting outside of the winter dormant window may reduce yield, overall plantation life and reduce fuel quality. The consequences for yield of variable harvest time-points need further testing through trials or accessing data from commercial farms and potentially modelling.

Testing innovations through a multi-site demonstrator

- We have budgeted for the possibility of a multi-site demonstrator
- Trialling innovations, where appropriate, under different climate and soil regimes
- Has the potential to trial separate innovations in conjunction
- Could be used as a means to market promising innovations to a wider audience

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Proposed programme details

We intend to procure through SBRI contracts

SBRI

- SBRI = small business research initiative. Designed to support SMEs (though NOT just limited to them)
- Simple (relatively) to apply for
- Ownership of IP will rest with innovators
- No match funding
- The proposal will need to match our requirements and demonstrate a route to market

You will be adhering to standard BEIS T&Cs

BEIS DPF31 - BEIS Standard Terms and Conditions of Contract for Services

Clauses	Index
1	Definitions and Interpretation
2	Acts by the Authority
3	Service of Notices and Communications
4	Assignment and Sub-contracting
5	Entire Agreement
6	Waiver
7	Severability
8	Confidentiality
9	Freedom of Information
10	Amendments and Variations
11	Invoices and Payment
12	Accounts
13	Recovery of Sums Due
14	Value Added Tax
15	Provision of Services
16	Progress Report
17	Contractor's Personnel
18	Indemnities and Insurance
19	Termination for Insolvency or Change of Control
20	Termination of Breach of Contract
21	Cancellation
22	Dispute Resolution
23	Bribery and corruption
24	Official Secrets
25	Special Provisions
26	Conflict of Interest
27	Intellectual Property Rights
28	Exploitation of Intellectual Property
29	Rights of Third Parties
30	Government Property
31	Data Protection
32	Payment of taxes: income tax and NICs
33	Payment of taxes: Occasions of Tax Non-compliance
34	Equality and non-discrimination
35	Welsh Language Act
36	Sustainable Procurement
37	Other Legislation
38	Contractor Status
39	Transfer of Services
40	Law and Jurisdiction
41	Transparency
42	Monitoring and Management Information
43	Information confidential to the Contractor

- In some instances (e.g. on intellectual property) our programme will differ from standard T&Cs – we will make this clear in our documentation
- They will be final and any bids submitted on condition that T&Cs are amended will be effectively submitting a non-compliant bid.
- If you have questions about the T&Cs you can ask them today or during the competition call Q&A window.

Our recently launched GGR programme provides an example

- To get a sense of what our call might look like, see our GGR programme
- There will be differences, but this will give you a flavour of what to expect
- In particular, see the competition guidance notes

Form

Direct Air Capture and other Greenhouse Gas Removal technologies competition

This competition will provide funding for developing technologies that enable the removal of greenhouse gases from the atmosphere in the UK.

[Direct air capture and greenhouse gas removal programme: competition guidance notes]

PDF, 1.54MB, 50 pages

https://www.gov.uk/government/publications/direct-air-capture-and-other-greenhouse-gas-removal-technologies-competition

A two stage programme

- Feasibility stage – deliver detailed proposals (c6 months)
- Demonstration stage – produce the innovations (3 years)

We are currently only launching the feasibility stage, further information on the demonstration stage will follow as your feasibility projects are underway

What does the feasibility stage entail?

We will provide successful entrants with up to £100k to develop their ideas into fleshed out proposals. We have £4m available for this stage.

£100k revised to £200k, supplier day attendees notified by email 22/02/21

At the end of Phase 1, a successful outcome will be:

- A robust project plan and strong evidence of your capacity to deliver Phase 2
- A detailed description of your innovation and the benefits it will bring, focusing on key parameters such as efficiency, yield, cost and profitability. Quantitative where possible.
- A credible plan for the commercialisation of your innovation and the promotion of its uptake by the wider market

What does the feasibility stage entail?

What you might choose to spend the feasibility stage funding on (just suggestions):

- Contract additional support (e.g. project management, economist)
- Desk-based feasibility studies
- Short term real-world feasibility studies
- Staff training, to fill expertise gaps
- Peer review and evaluation
- Stakeholder engagement and market research

Do whatever you feel is necessary to produce a strong proposal

How do I get into the feasibility stage?

Assessment criteria will be published in the ITT and will cover (we will not be scoring on price):

- Description of your proposed innovation – what it is and how you will produce it
- Discussion of the benefits of your innovation and its potential to help achieve the goals of the programme
- Project plan for this stage and the capability of your staff to deliver
- Discussion of social value

The documents will likely be posted on gov.uk. We will notify you when released

Social value requirements

Social value describes **the wider social, environmental and economic effects of an organisation's actions**, and how they contribute to the long-term wellbeing of individuals, communities and society.

Social value is not just what the contract delivers but the **legacy or footprint of the contract**. The supplier should be going **above and beyond** the specified requirements to create added social value through the contract.

We will elaborate more in the call documentation, but social value can include issues like jobs for UK citizens, diversity, mental health and wellbeing.

Entry into Demonstration Phase

You will have to take part in the Feasibility stage to be eligible for the Demonstration Phase

- Assessment criteria will be used to judge eligibility for entry into the Demonstration Phase.
- It is possible that not all projects from Phase 1 will enter into Phase 2. This will be dependent on:
  - The strength of the proposals
  - The budget available
- A ranking system will be used to help guide decisions within the available budget

Demonstration Phase

Produce your innovation and start getting it to market!

SBRI contracts are typically around £1m but they can be more or less. We will provide guidance in call documentation

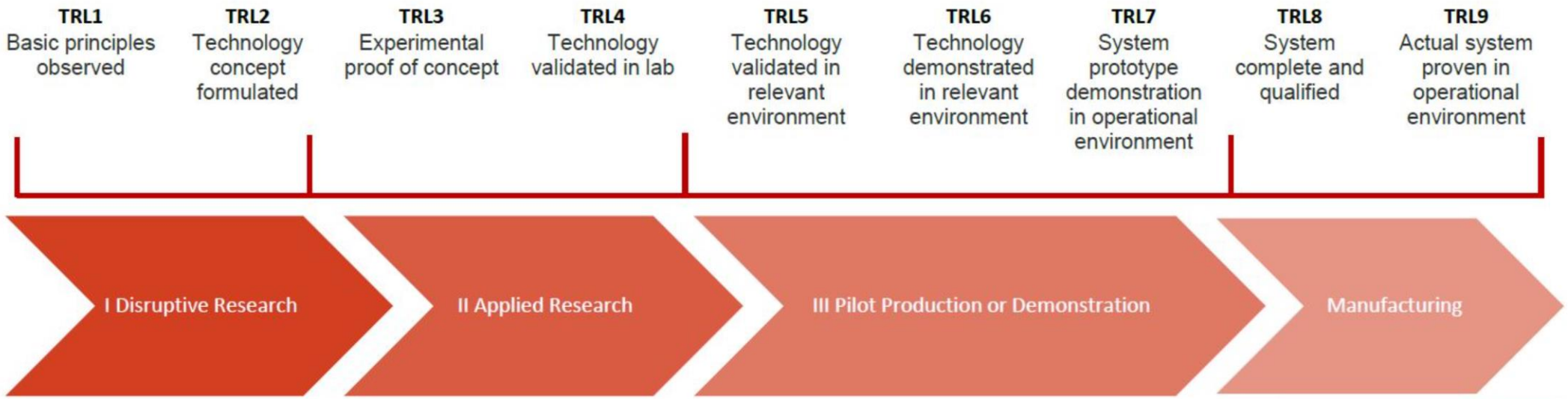
BEIS will be on hand to monitor your projects but also to support, so that their benefits are realised

Multiple bids and consortia

- Consortia are able to bid into the programme
- Participants can be part of multiple bids
- No applicant can act as consortium lead for multiple bids
- We will reserve the right to judge whether your project team has the capacity to deliver across multiple projects

Technology Readiness Levels

We will accept projects as low down as TRL 4, but these must demonstrate a route to market and a commercialisation plan



Provisional timelines

Milestone	Date (subject to change)
Feasibility stage competition opens	March 2021
Competition closes for applicants	May 2021
Successful bidders notified	June 2021
Contract signing	July 2021
Feasibility stage commences	July 2021
Feasibility stage closes	Jan/Feb 2022
Selection of successful proposals	Feb/March 2022
Demonstration stage launches	April/May 2022
Demonstration stage closes	March 2025

Transparency

- In the interests of fairness, today's information will be anonymised and shared with all bidders, including those unable to attend today.
- Includes Q&A from today
- When the call documentation is published there will be an opportunity to ask clarifying questions – substantive Q&A will also be published
- Correspondence will be via climatescience@beis.gov.uk

Any questions……?

Feedback session

1. Could you please tell us a little about your organisation and why you are interested in this opportunity?
2. Based on what you have heard today, are there any particular issues that would prevent you from applying to the competition?
3. Do you think our scope is likely to exclude any particularly promising innovations
4. Is setting up a multi-site demonstrator feasible in the time available? How could it be encouraged?
5. Do you have any other comments to make?
6. We will be sharing the contact details with attendees after the workshop, to encourage cross-organisational communication and join-up, where appropriate. If you would like your email address to be circulated to other attendees here, pleased include it below.

Please send your responses to climatescience@beis.gov.uk