



# Scottish Research Innovation Futures

Climate & Environment Theme:  
Transition to Net Zero Landscapes.

SEPTEMBER 7, 2021

A faint, light grey graphic of a globe showing the continents, positioned in the bottom right corner of the page.

Workshop hosted by  
MASTS & SAGES

*“Our response to the Covid-19 crisis could be an opportunity to change our thinking about economics, and about how biodiversity ecosystem services have to be rolled into economics. The challenge of that is to see things in a more ‘overall’ manner... That’s not easy.”*

Scottish Research Innovation Futures is a challenge-focused workshop series, organised by Research Innovation Scotland (RIS) in collaboration with the Knowledge Transfer Network (KTN). The series aims to explore how collaborative research and innovation can tackle grand challenges and help Scotland build back better from Covid-19.

This fourth workshop in the series, ‘Climate and Environment’, focused on prioritisation for landscape planning and economic recovery driven by the UK net zero ambition and how collaborative research and innovation can help.

The workshop was led by two Scottish Research Pools – MASTS (Marine Alliance for Science and Technology for Scotland) and SAGES (Scottish Alliance for Geoscience, Environment and Society) – in collaboration with KTN.

This report was published online in December 2021. All quotes throughout the report come from workshop participants.

 @RIScotland  research-innovation-Scotland  [www.research-innovation-scotland.co.uk](http://www.research-innovation-scotland.co.uk)



## Table of Contents

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Setting the Scene .....</b>	<b>1</b>
<b>2.1 A VIEW FROM THE INNOVATION COMMUNITY .....</b>	<b>1</b>
<b>2.2 A VIEW FROM EUROPE .....</b>	<b>1</b>
<b>2.3 A VIEW FROM NATURE .....</b>	<b>2</b>
<b>2.4 A VIEW FROM INDUSTRY .....</b>	<b>3</b>
<b>3. Insights for Societal Change and Sustainable Recovery: Discussion Session .....</b>	<b>5</b>
<b>3.1 METRICS AND INDICATORS .....</b>	<b>5</b>
<b>3.2 WELLBEING INDICATORS .....</b>	<b>5</b>
<b>3.3 INDIVIDUAL ENGAGEMENT .....</b>	<b>5</b>
<b>3.4 MONETARY VALUES .....</b>	<b>6</b>
<b>3.5 ACADEMIC / INDUSTRY PARTNERSHIPS .....</b>	<b>6</b>
<b>4. Final Points and Next Steps .....</b>	<b>7</b>
<b>4.1 THE FUNDING LANDSCAPE .....</b>	<b>7</b>
<b>4.2 NEXT STEPS .....</b>	<b>8</b>

## 1. Introduction

*“We need all academic disciplines to really make a difference in terms of climate change and mobilising all the areas is hugely important.”*

The theme of the fourth workshop in the Scottish Research Innovation Futures (SRIF) series was Climate and Environment, with a focus on priorities for landscape planning and economic recovery driven by Scotland and the wider UK’s net zero ambitions. The workshop brought together those working in academia, policy, funding, innovation and industry to identify:

- key challenges, opportunities and policy developments
- the collaborations and new ways of working that could address them
- desired next steps and areas of focus for Research Innovation Scotland (RIS) partners and others.

## 2. Setting the Scene

*“Just to remind you, we have a nature crisis which is very strongly coupled to climate.”*

Four presentations marked out the context for the workshop and challenged participants to question existing and ‘accepted’ approaches to net zero, biodiversity and conservation, land use, citizen engagement and innovation.

### 2.1 A VIEW FROM THE INNOVATION COMMUNITY

First up on the virtual stage was **Dr Siobhán Jordan, Director of Interface**. Explaining the role of Interface in connecting businesses and other organisations to Scotland’s universities and colleges for economic and societal benefit, she stressed the urgency of using such connections to help reach Scotland’s and the UK’s net zero goals.

To illustrate how these connections can deliver in practice, she focused on two collaborative projects tackling climate change in different ways: the first through developing disruptive technologies, the second through providing a strategic evidence base on coastal erosion:

- [Sunamp heat batteries and the University of Edinburgh](#)
- [Dynamic Coast project](#), with Scottish Government, NatureScot, Centre of Expertise for Waters (CREW), University of Glasgow and others. One finding from this is that an estimated £1.2bn of Scotland’s buildings, transport infrastructure, cultural and natural heritage may be at risk of coastal erosion by 2050.

### 2.2 A VIEW FROM EUROPE

Next speaker was **Prof Andy Kerr, UK and Ireland lead for the EIT Climate-KIC** (or in long form, the European Institute of Innovation and Technology Climate-Knowledge and Innovation Community), with a presentation called ‘**Future shock – the net zero challenge for different systems**’. The essence

of the presentation was evident in the first words of the first slide: *“Innovation is essential. But not as we have been doing it.”* No easy ride for the audience here, then.

And he continued, *“We need a new model of innovation to tackle the climate emergency: we need to deliver whole-system change across cities, across land use and landscapes, across material systems.”*

Given the recurrence of ‘whole-system change’ as a theme throughout the workshop, his definition is useful: *“Connected innovations acting simultaneously across multiple levels of change to transform places, people, sectors and value chains”*. This, in the EIT Climate-KIC approach, should include working with different sectors and actors on a wide variety of interventions and levers of change, from new technologies through to developing new markets, financial models or governance.

Showing this in practice was a case study of the [Climate-Smart Forest Economy Program](#), in which the Glasgow City Region is a partner. The programme is working with different actors to unlock climate and socio-economic benefits along the forestry value chain:

- increasing woodland creation / forest cover
- accelerating investments
- creating demand for sustainable forest products

Interventions and levers of change exist on multiple layers, from filling knowledge and skills gaps along the value chain to building societal support to promoting resource supply. And Andy’s final point was: *“This needs to be done with civic legitimacy”*, i.e. working with communities and with an investment mindset.



### 2.3 A VIEW FROM NATURE

Also challenging workshop attendees’ thinking was **Dr Clive Mitchell, Outcome Manager: Nature and Climate at NatureScot**, talking about spatial planning, policy development and application post-Brexit. He started by covering off major Scottish ‘reference points’ such as the Scottish Government’s ‘30 by 30’ proposals outlined in its [Statement of Intent on Biodiversity](#) (2020), along with other publications such as the recent [Dasgupta Review](#). He then summarised the challenges faced in addressing climate crisis and land use, some of the implications for research, innovation and policy, and the opportunities for policymakers, researchers and others. Our key take-homes from his presentation include:

**The nature-climate crisis is threefold:** we have to (1) transition to a net zero economy, (2) enhance the state of nature, and (3) adapt to changing climate – at the same time and on the same areas of land and sea.

**Cutting fossil fuel emissions is necessary but not enough.** We need to use the land to protect natural stocks and enhance natural sinks, and we also need to guard against the risks of focusing on carbon at the expense of nature.

**Conservation on its own is also insufficient.** Conservation is needed both in terms of protection and enhancement of nature, but we also need to address sustainable production and sustainable consumption – including in policy.

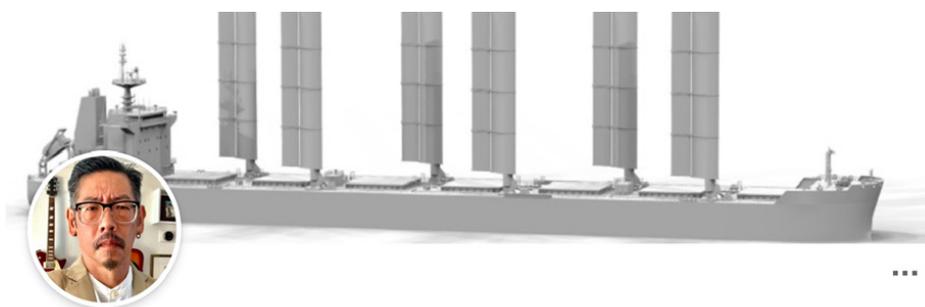
**Post-Brexit, many details relating to nature will be left to trade deals,** rather than the European Court of Justice, so scrutiny may be needed here.

**There are philosophical and ethical issues to consider,** including the ‘right state of nature’; distributive justice (how costs and benefits are distributed in a just transition) and procedural justice (who gets a say); the behaviour change of individuals vs institutions; and ‘how much is enough’.

Clive Mitchell offered the following ‘provocation’ from the Luc Hoffman Institute’s Biodiversity Revisited initiative (2020):

*"Biodiversity has not, broadly speaking, proven to be a compelling object for sufficient action to halt the degradation of the diversity of life on Earth. At the same time, the fragmentation of research and policy efforts into overlapping agendas around biodiversity, climate, oceans, land degradation, sustainable development, and so on has prevented the conservation community from developing a holistic approach to sustaining the diversity of life on Earth. Furthermore, the predominant focus of research on describing biophysical change does not provide the necessary insight into the social and policy dynamics that would facilitate effective action."*

## 2.4 A VIEW FROM INDUSTRY



**Jeff Zie**

Non Executive Director, Consultant & Advisor

 Smart Green Shipping

'Whole-system change' was again the theme in the final context-setting presentation, by **Jeff Zie of Smart Green Shipping**. He used shipping as a case study framework of how to go about changing the systems and the priorities that need to be considered there.

First, he offered some stats as a backdrop: about 90% of everything we use is transported by ship at some stage in its lifecycle, and international shipping is responsible for an estimated 3% of total GHG emissions – meaning it would likely be in the top five emitters if it were a country.

Smart Green Shipping is developing wind-powered solutions for shipping order to rapidly reduce fuel consumption and emissions from the sector, but as Jeff noted, using wind power in shipping is not the big idea here. The innovation, he said, is about:

- **creating a 'coalition of the willing'** (from engineers to insurers to energy companies to funders) who are open to disrupting the sector
- **wrapping the technology solution with incentives, risks and accountability** for all the parties in shipping (from ship owners to brokers to charters to investors) that will persuade them to adopt Smart Green Shipping's retrofitting solution.

*"When it comes to land use, we can't put a spade in the ground without doing something that's going to affect mitigation and adaptation and the state of nature all together at the same time."*

*"The Dasgupta Review is to biodiversity as Stern was to climate change 15 years ago ...and it boils down easily to a simple narrative – that our economies are embedded in a nature, whether we like it or not, and we need to move from a linear/extractive model to a more circular / regenerative one."*

*"I think one of the sheer strengths and opportunities that we have across Scotland in addressing climate change is the diversity across further and higher education institutions."*

*"It's not simply a case of having some nice designs ... We need to think through the entire system. We need to think through who the winners and losers are going to be, and we need to remove that fear of change."*

### 3. Insights for Societal Change and Sustainable Recovery: Discussion Session

Following the presentations and one-to-one networking, there was a round-table discussion with specialists on different geosciences: terrestrial, transitional and oceanic. A number of points made in the morning were reviewed and dissected, along with other key themes, issues and challenges. These are listed and summarised below.

*“The measure of ‘net zero’ is not understood by all in the same manner. If you ask this question of a scientist, an inventory calculator, a business or an individual, they all understand this differently.”*

#### 3.1 METRICS AND INDICATORS

Several participants raised questions about whether current sustainability metrics and indicators are focusing on the right areas. For example:

- Smart cities metrics tend to focus strongly on the delivery of services to people, with little about nature or biodiversity. Should they be turned around to be, eg, more species-centred, including non-endangered species? And are they driven too much by policy rather than science?
- Biodiversity measures tend to focus on increasing species numbers, but this may not lead to improved ecosystem function. Whilst we need to work with the measures we currently have, they may not be positive for certain systems.
- Indicator species are used to gauge ‘how nature is doing’, but would it be more useful to focus on healthy systems and processes? Prioritising natural processes can enhance biodiversity and make catchments and transitional areas etc more connected and resilient to change.

#### 3.2 WELLBEING INDICATORS

It was a natural step from sustainability metrics to wellbeing indicators, and the need to include wellbeing within discussions of natural capital. In discussion of the meaning of ‘living well’, the Andes concept of ‘Sumaq Kawsay’ came up, which considers living well as inseparable from the environment, and related strongly to justice, morality and the importance of cooperation to achieve a collective, efficient and sustainable system that benefits all.

#### 3.3 INDIVIDUAL ENGAGEMENT

This, in turn, led inevitably to discussion of individual responsibility and interest, how to engage individuals and communities, and which parts of society to target in communications about climate change. Some thought Covid had made people reassess their priorities / values and could be a disruptive moment in terms of environmental change; others seemed less optimistic.

Among the suggested areas for further discussion or action were:

- The development of individual carbon budgets

- The use of citizen science, which not only brings people into closer engagement with the issues but can help to bring together physical and social sciences
- How to build on existing social and creative enterprises and community interest. *“I see a momentum of personal choice,”* said one participant, and wanted further activity to harness this.

### 3.4 MONETARY VALUES

Some of the presenters had touched on this in the morning and the theme was continued in the afternoon session – with some differing views. In brief, it was put forward that:

- The morning’s presentations had underlined the importance and urgency of climate finance discussions (a focus of COP26).
- Monetaring natural processes would help to make the case for business and policy shifts, and existing work, such as the RSPB’s work to put monetary values on ecosystems and processes, showed that this was both possible and powerful.
- Placing monetary values on carbon savings can be counterproductive – as illustrated by the example of people putting their ‘savings’ on energy bills towards buying a second car.
- We should be “valuing the importance of the environment, not putting a price on it”, though this could perhaps be a starting point.
- We must not treat these issues too simplistically. For example, it was stated that the Dasgupta Review approach is not about putting a value on biodiversity or accounting practices, but about saying that the value in our current systems is dependent on biodiversity; if you don’t protect those habitats, your bottom line is going to be reduced. The view of the participant was that these conversations need to be taken beyond academia.

### 3.5 ACADEMIC / INDUSTRY PARTNERSHIPS

There was a sense from some participants that the interdisciplinary, multidisciplinary and multisectoral collaboration promoted by the Research Pools, Innovation Centres and Interface should extend wider and deeper, in order to help create new economic and financial models and the ‘civic legitimacy’ referred to by Andy Kerr. The following specific points came up:

- **Academics and businesses “don’t know who or what they don’t know”**, whether it’s people, businesses, sectors, technologies or solutions that could be relevant to them. The role of matchmakers and matchmaking forums is crucial.
- **The policy and funding landscape is fast-changing**. New climate policies and funding mechanisms appear at pace from the Scottish and UK governments, and funding windows can be tight. Information-sharing mechanisms and events are essential to keep industry, academics and others abreast of these developments, and to put the right information to the right people at the right time – including across sectors and disciplines.
- **Addressing shared challenges and spreading the net may require some ‘translation’**. Finding common causes, challenges or approaches often involves teasing out the differences in language or jargon used by different sectors, disciplines or nations, in order to find a common vocabulary; this can often be a starting point for collaboration. An example was given of a recent UK-Canadian workshop on erosion on the Atlantic coast.

Areas mentioned as worth further collaborative exploration and development included: how to promote more personal responsibility, eg through individual carbon budgets; discussion of specific

topics around coastal erosion, river catchments and carbon sequestration; monetarising nature: and the opportunity to look at carbon credits and restoration funds in blue carbon and rewilding.

**Poll: Within your geoscape and in the context of industry / academic collaboration, what is your top priority in finding steps to address NetZero?**

Cost:	17%
Practicality:	0%
Efficacy (% reduction as a function of cost and practicality):	66%
Other:	17 %

## 4. Final Points and Next Steps

*“One of the things we want to know is how we make further progress from this workshop – there may be other people that should and could be involved, and we welcome further feedback on that.”*

### 4.1 THE FUNDING LANDSCAPE

Wrapping up after the discussions was Chris Bagley, Head of Infrastructure at KTN, who listed the funding and other support available in this arena, whilst admitting that many Net Zero mechanisms were focused on other areas of Net Zero innovation. Those mentioned included:

[BEIS Net Zero Innovation Portfolio](#) (NZIP), with £1bn of funding for low-carbon technologies and systems, focused on 10 areas such as future offshore wind, energy storage and flexibility, bioenergy, the Industrial Energy Efficiency Accelerator, and disruptive technologies.

[Industrial Energy Transformation Fund](#) (IETF) supporting the development and deployment of technologies to enable businesses to transition from high energy use to a lower carbon future

[Ofgem Strategic Innovation Fund](#) (SIF), launched in August 2021. he pointed out that while this was aimed at large network operators in electricity and gas, they would be looking for partners to provide specific technologies in there.

[KTN Innovation Exchange](#), designed to promote innovation transfer, and help large organisations search for solutions to specific challenges, often tapping into knowledge or solutions from other sectors. Sectors include urban systems, transport, and infrastructure, among others.

[KTN Innovation Networks](#) (previously Special Interest Groups), bringing together expertise into communities to come up with creative ideas on specific issues, Current networks of interest include:

[Decarbonising Ports and Harbours](#), [Geospatial Insights](#), [Nature Inspired Solutions](#), and – in future Net Zero Place Innovation. Details of events and experts on these groups are available online.

[National Underground Asset Register](#), a digital map of the UK's underground pipes and cables being built by the Geospatial Commission and the UK government

[Infrastructure Industry Innovation Partnership](#) (i3P) an independent 'client-led' community of supply chain organisations, supported by KTN and committed to delivering collaborative projects. The model was previously for major project owners and Tier One supply chain companies, but the model has been changed to allow SMEs and researchers to get involved. One of its strategic themes is 'Zero Carbon World'.

## 4.2 NEXT STEPS

Two ideas permeated the themes discussed in the afternoon, and will underpin next steps for the research and innovation community:

**Firstly, the climate and environment challenge goes further than harnessing technology to reach net zero carbon emissions. It's about recognising that our economy is embedded in nature and climate and creating the infrastructural, societal and behavioural change to protect it.**

**Secondly, cross-disciplinary interaction between academia, industry, government and citizens is needed not just to offer solutions but to examine the challenges and issues.**

Building from these two points, a number of suggestions emerged from the morning and afternoon sessions for further discussion and collaboration:

- Governments and private sector need more clarity on a number of areas in order to invest; these include conservation priorities; environmental change and diversity; connectivity; predator-prey relationships; and demonstrating impact.
- Promotion of personal responsibility and engagement through, eg, individual carbon budgets (see 'Individual engagement' theme)
- Equal effort does not necessarily equate to equal consequence in term of the journey to net zero. Should actions should be prioritised based on evaluated "effort to impact ratios": how are such evaluations quantified?
- Exploration of new biodiversity metrics incorporating ecosystem functionality and conservation status (see 'Metrics and indicators' theme)
- Issues around monetarisation of nature (see 'Monetary values' theme)

The Scottish Research Pools, with their multi-disciplinary expertise and connections, have a clear role here, as do their partners in Research Innovation Scotland: The Innovation Centres and Interface. Together and working closely with other key players in this sphere, they will now take forward the ideas from this workshop and design future activity around climate and environment.

## Be Part of Scottish Research Innovation Futures

Scottish Research Innovation Futures is a series of workshops and other activities, organised by Research Innovation Scotland (RIS) with KTN, exploring how collaborative research and innovation can tackle grand challenges and help Scotland build back better from Covid-19. The series themes included Health & Wellbeing, Economic Development and Enterprise: The Future of Work in Scotland ('Manufacturing and Green Economic Recovery' and 'Digital Infrastructure'), Just Transition to a Net Zero Carbon Society, and Climate and Environment.

For more information, please visit:

[www.research-innovation-scotland.co.uk/ris-ktn-workshops](http://www.research-innovation-scotland.co.uk/ris-ktn-workshops)

Thank you to contributing Research Pools, Innovation Centres and Interface:

