Greening Research Webinars Series: Final Report

July 2024

Colophon

Contents

Introduction & Background

The contributions of science to identifying climate change and mobilising societies to address this defining challenge of our times is undeniable. The United Nations' Sustainable Development Goal 13 *"calls for urgent action to combat climate change and its impacts",* with the Paris Agreement adopted in 2015 saw 196 parties at the UN Climate Change Conference (COP21) agree to mobilise in tackling the climate crisis.

Science Europe engaged with this challenge, launching together with partners a Call to Action for the Net-Zero Transition of research organisations, in November 2021. The promoters of this initiative committed *"to supporting and enabling concrete actions which will help the research and education sector to address the many challenges of global sustainability"*. In 2023-2024, the Global Research Council addressed the challenge of "Making Research Itself Sustainable", providing a new opportunity to develop this topic at the international level. Both these initiatives form part of Science Europe's Strategy Plan for 2021-2026, under the priority of "strengthen the role and contribution of science in tackling societal challenges".

In 2024, Science Europe further launched a set of activities on "Greening Research", the objective being to work to reduce the ecological impacts of research activities and promoting climate sustainability for Science Europe Member Organisations. This objective is set to culminate in adoption of a soon-to-be published 'Framework for Greening Research', itself the outcome of a dialogue with Science Europe Member Organisations.

Building on the experiences of the Working Group for the Green & Digital Transition (2021-2023), the growing set of activities on artificial intelligence, and the mid-term review of Science Europe's strategy plan, this Greening Research Webinar Series has been the first of its kind for Science Europe. The webinar series had the following objectives:

- **Raise awareness**: Explore the environmental impact of research activities, helping you understand research organisations' footprint.

- **Discuss solutions**: Dive into principles, challenges, and methods for reducing the ecological footprint of research activities.

- **Empower action**: Provide concrete examples and good practices for "greening research," offering actionable steps.

This series is a collaborative effort by the Research Council of Finland (RCF/AKA), French National Research Agency (ANR), German Research Foundation (DFG), Italy's National Institute for Nuclear Physics (INFN), Portugal's Foundation for Science and Technology (FCT), Swedish Research Council for Sustainable Development (Formas), Dutch Research Council (NWO), Swiss National Science Foundation (SNSF), UK Research and Innovation (UKRI), and Science Europe.

This report aims to summarise the main lessons learned from the three webinars and propose key messages for the next steps in greening research. A summary of each webinar's contents is presented below; common lessons and key messages from the whole series are jointly discussed in the final section. The recording and presentations of the webinars are available on Science Europe website.

Webinar 1: Sustainability Strategies in Research Organisations

21 May 2024

Margarida Prado, Scientific Officer at Fundação para a Ciência e a Tecnologia (FCT, Portugal) and co-chair of the Science Europe Working Group for Greening Research, opened and facilitated the first webinar. The session focused on three main challenges: the carbon footprint evaluation of research organisations, the development of sustainability strategies to lessen or counteract their ecological impacts, and the exchange of best practices to pinpoint the most successful actions in promoting sustainability across the research system. These elements aimed to elaborate the roles and contributions of research organisations to sustainability by presenting concrete experiences.

From UK Research and Innovation (UKRI), **Jo Allatt**, Head of Sustainability, and **Martin Farley**, Associate Director, presented the key drivers and elements of the UKRI Environmental Sustainability Strategy adopted in 2020 and the recently announced cross-sector sustainability Concordat. UKRI committed to Net-Zero by 2040 with the objective of having a positive impact on the environment and setting standards for the British research system. A fundamental distinction between doing R&I to solve sustainability challenges and making these activities sustainable was proposed. UKRI aims to pursue both types of sustainability actions based on a systemic approach.

The "Concordat for the Environmental Sustainability of Research and Innovation Practice" aims to mobilise the whole UK research system around six areas: 1) Leadership and system change; 2) sustainable infrastructure; 3) Sustainable procurement; 4) Emissions from travel; 5) Collaborations and partnerships; and 6) Environmental impact and reporting. UKRI already engaged with sustainability challenges by reducing its carbon footprint, especially from travel. While the strategy is now adopted, several actions have already been taken to reduce waste and water consumption and increase self-generated "green" energy. The main open challenges refer to the Scope 3 emissions, which included funded research and suppliers. Finally, UKRI has engaged to support the support the research communities in their green transition.

The second speaker was **Christiane Joerk**, Programme Director at the German Research Foundation (DFG). In the field of sustainability, DFG focuses on three main axes: 1) funding research for sustainable development, 2) establishing a sustainability office for greening its own activities, and 3) promoting the inclusion of sustainability principles in all aspects of the research system. A specific commission, chaired by the DFG President, has been in place since 2022, mobilising experts from different disciplines. In March 2023, DFG adopted a recommendation paper to foster a culture of resource-saving and climate-neutral research without compromising research quality.

The DFG sustainability strategy now includes a broad set of instruments and actions. As of September 2024, all project proposals must include a section on ecological sustainability. This initiative is supported by guidelines and a catalogue of questions designed to help researchers consider the environmental impacts of their projects. The questions cover various topics, including travel, experimental design, material usage, equipment procurement, and computing considerations, aiming to reduce emissions and resource consumption. The DFG plans to continue supporting the research community in adopting sustainable practices through workshops, best practice models, and dedicated funding calls. Collaboration with the German Rectors' Conference

will further discuss the role of universities and research institutions in this effort for a systemic change of the national research and education system.

Paula Leskinen, Science Adviser at the Research Council of Finland (RCF), outlined the [RCF's commitment to integrating sustainability](#) into its funding processes and operations. The RCF's performance agreement with the Finnish Ministry includes targets related to resource management, such as producing annual sustainability reports and monitoring the linkage of funded research to the UN Sustainable Development Goals (SDGs).

Accountability is a core value for the RCF. The funding applications and review processes now include sustainability criteria. The RCF emphasises carbon neutrality and biodiversity protection for research infrastructure funding, requiring detailed plans for assessing and reducing carbon footprints. Research infrastructures are now required to engage with actions like remote usage of infrastructures, energy efficiency, use of renewable energy, and recycling. Internally, the RCF is reducing its carbon footprint by using online evaluation panels, reducing travel, and adopting hybrid working models. Furthermore, they opted to offer vegetarian options during in person events. Overall, the RCF is actively developing its reporting systems to incorporate the environmental impact of project activities better and strives to lead by example in promoting sustainability within the research community.

Webinar 2: Greening Digitalisation

28 May 2024

The second webinar was introduced by **Yamine Aït Ameur**, Head of the Digital Sciences and Mathematics Department at the French National Research Agency (ANR) and co-chair of the Science Europe working group on greening research. The growing need for extensive computing resources and data processing is causing concerns because of their environmental impacts. The production and disposal of digital devices, extensively needed for research purposes, is a significant concern when balancing research performance and its environmental impacts. These challenges, summarised under the title 'Greening Digitalisation', were the topics addressed by two experts.

Adel Noureddine, Associate Professor at the University of Pau and Pays de l'Adour, presented on the environmental impacts of Information and Communication Technology (ICT). Energy consumption related to ICT is projected to rise from 7% of global emissions in 2020 to 13% by 2030. Similar trends are reported for greenhouse gas emissions caused by both production and disposal of ICT devices. Furthermore, the exponential growth of connected devices, including smartphones, servers, and data centres, and their usage are further exacerbating the situation, with the short average lifecycle for these devices serving as the main cause of these environmental impacts.

Data centres form an environmentally problematic part of the ICT infrastructure, although being fundamental for research activities. Despite efforts to enhance energy efficiency, gains in reducing their carbon footprint are becoming marginal, indicating a need for new, more radical approaches to manage this challenge. Furthermore, equipment like freezers, IT infrastructure, and ventilation systems used in research facilities consume more energy than other, ordinary buildings.

He suggested raising awareness on the environmental challenges posed by digitalisation. Possible actions are automating equipment shutdowns, optimising the use of digital devices, and adopting renewable energy sources. A more crucial action to develop is the extension of ICT device lifecycles to reduce the high emissions from the production. Enhancing the energy efficiency of data centres and other ICT infrastructure is also a much-needed action for research activities, although this requires more structural investments. These actions for greening digitalisation should be integrated into the sustainability strategies of research organisations.

The second speaker was **Ruggero Ricci**, Head of the Electrical Installation group of the Frascati National Laboratories of Italy's National Institute for Nuclear Physics (INFN). He shared his experiences in reducing energy consumption and improving the ecological footprint of the INFN accelerator and data centres. Significant upgrades have been made to the INFN collider to improve energy efficiency by reducing power demand while combining the need to enhance its luminosity. These measures improved the quality of the infrastructure, leading to notable power savings. Furthermore, INFN implemented a heat recovery system to repurpose the wasted heat from its data centre and provide chilled heating to its buildings. These examples demonstrated the effectiveness of tailored solutions for the energy transition, leading to improved quality of the research infrastructure, reduced environmental impacts and economic savings without expensive investments.

The success of these initiatives depends on the collaboration of skilled technical staff and support from various INFN departments, including electrical installation, cooling, and automation. INFN emphasises continuous improvement and adaptation to new technologies while managing these operations internally. These tailored solutions are needed because these research infrastructures are often unique. While sustainability principles are common to all research organisations, their implementation requires an advanced understanding of how these highly sophisticated infrastructures work.

Webinar 3: Promoting Ecological Sustainability in Research Systems

4 June 2024

Sarah Achermann, Head of Sustainability at the Swiss National Science Foundation (SNSF) and member of the Science Europe working group on greening research, chaired the concluding webinar. This final session aimed to discuss actions that could enhance the ecological sustainability of the broader research systems. The goal was to identify concrete measures integrating sustainability principles into the strategies and operations of research funding and performing organisations. A call for a cooperative approach was launched during this last webinar.

The first speaker was **Philipp Weber,** Sustainability Project Officer at EMBO. He started by explaining the urgency of the climate crisis and discussing the need to organise research activities respecting planetary boundaries. From the research lab perspective, researchers have to balance the running of research activities with energy, water, and material consumption. These challenges call for a systemic approach combining the roles of researchers with research funders, policymakers, suppliers, research managers, industries, and other stakeholders. EMBO promoted

this systemic approach through several initiatives, especially a multi-stakeholder policy workshop on 14 and 15 May 2024 on "Funders' role in promoting environmentally sustainable research".

From this workshop, he presented three experiences of how research funding organisations integrated sustainability principles. Since 2024, DFG requires reflecting on the sustainability dimensions in all its funding applications (see here). This requirement aims to foster dialogue and learning among stakeholders, ensuring sustainability considerations are integrated effectively. Wellcome Trust introduced an 'Environmental Sustainability' policy in April 2024, requiring lab-based researchers to achieve minimum accreditation from schemes like LEAF and My Green Lab. Researchers can include related costs in their funding applications, and institutions in high-income countries must adhere to the UK Concordat for Environmental Sustainability (see also the presentation by Jo Allatt and Martin Farley at the first webinar). Similar measures have been adopted by Cancer Research UK as of 2026. These new sustainability measures by research funding aim to promote self-reflection among researchers, though this might add workload. Nonetheless, these new processes are and will provide learning experiences to improve the sustainability of research systems. He concluded, emphasising the need for multi-stakeholder collaboration.

Sule Karamik, analyst at the Swedish Research Council for Sustainable Development (Formas), started presenting a vision where knowledge drives sustainable development. Formas contributes to this vision by funding research and innovation, synthesising environmental research reviews and engaging in societal dialogues. Formas aligns its entire operations with the UN's Sustainable Development Goals (SDGs), specifically by requiring applicants to classify their research's contributions to the SDGs and thematic calls for each of the SDGs. Furthermore, Formas maintains and develops an active dialogue with national research coordinators and the research community.

Since 2009, Sweden's regulations have required government agencies, including Formas, to implement environmental management systems, specify sustainability targets, and report yearly to the Swedish Environmental Protection Agency. Thanks to this system, Formas can provide evidence that its emissions from business travel dropped from 125 tons of CO_2 in 2019 (i.e., before the COVID-19 pandemic) to only 22 in 2023. In this frame, Formas also monitors the magnitude of its office energy usage, public procurements, and digital meeting statistics to identify if additional actions are needed in these areas. Furthermore, Formas funds and participates in the Higher Education Climate Network with 37 universities aiming to support the engagement with the Paris Agreement, foster collaboration and knowledge-sharing in the climate field, and communicate climate efforts to inspire broader societal actions.

The last presenters were **Anne Marie De Beaufort**, sustainability officer, and **Josef Stuefer**, senior policy advisor and program manager from the Dutch research council (NWO). The objective of integrating sustainability into research should combine bottom-up and top-down approaches. Examples in this direction are the Dutch Green Labs network, the Dutch Climate Research Initiative (KIN), the NWO strategy plan and its constant dialogue with the Dutch government. These actions aim to promote behavioural change by also revising the research impact definition, calling researchers to reflect on potential undesired impacts alongside desired outcomes.

Their presentation ended with **a call to create a European network on greening research**. This network of relevant research actors across Europe should aim to facilitate and accelerate the transition towards green, sustainable research practices. This initiative should mobilise funding bodies, such as NWO, as well as researchers, research performing organisations, policymakers,

existing networks and umbrella organisations, such as Science Europe. The overarching objective is to promote sustainability as a fundamental value for scientific research, complementing and reinforcing efforts from the whole research systems.

Key Messages & Call for Next Steps on Greening Research

The webinar series ended with a call to act together for greening research, relaunching the commitment from the [Call to Action for the Net Zero Transition](#) launched by, among others, Science Europe at COP26 (Glasgow, UK, 2021). The speakers addressed the challenges and good practices from research funding and performing organisations engaged in promoting sustainable practices from different angles, national experiences and parts of the research systems.

From the webinar series, the following key messages were derived.

1. **We need to work together to promote the sustainability of research activities.** The whole research systems should be mobilised, from research funding and performing organisations to policymakers, researchers, and umbrella organisations.

2. **Funding bodies should include sustainability as a fundamental research principle.** The complexity of this challenge requires research funding organisations to promote networks to learn from each other about practical needs and support a collective effort, together with the research communities, to make research activities ecologically sustainable.

3. **The greening of research physical and digital infrastructures has environmental and economic benefits.** Research facilities are often unique and energy-demanding, but greening these infrastructures provides substantial benefits increasing research qualities, reducing environmental impacts and leading to economic savings.

4. **Sustainability strategies, data gathering, and concrete actions are needed, even if comprehensive perspectives are still unavailable.** The difficulties in providing evidence of the ecological footprint of research activities should not prevent from taking concrete actions, such as reducing research-related travelling, introducing protocols for greening labs, and requiring research applicants to reflect on the environmental implications of their activities. The scientific evidence of climate change is clear, and urgent actions are needed. Research systems should lead by example.

From this perspective, Science Europe will continue its engagement for the greening of research. The thematic working group will be the reference to promote a network of research organisations engaged with the sustainability of research organisations. Other research organisations and stakeholders are invited to join these efforts for the ecological sustainability of research systems. The ultimate objective is to make ecological sustainability a fundamental value of research.

Webinar Series Programme

Date	Title	Speakers & Moderators
Tuesday 21 May, 2 - 3 pm (CEST)	**Sustainability Strategies in Research Organisations** The first webinar explored how research organisations are working towards sustainability. Specifically, the speakers delved into how research funding and performing organisations are assessing their environmental impacts and taking steps to reduce it. ▪ **Measuring Environmental Impact**: How do research organisations appraise their carbon footprint and ecological effects? What approaches do they use? ▪ **Sustainability Strategies**: What strategies and tools are research organisations currently using, or developing, to reduce or mitigate their ecological impacts? ▪ **Sharing Best Practices**: What are some effective actions and practices that research organisations can share with each other to promote the sustainability of the whole research system?	**Speakers** Martin Farley & Jo Allatt (**UKRI**) Christiane Joerk (**DFG**) Paula Leskinen (**AKA**) **Moderator** Margarida Prado (**FCT**)
Tuesday 28 May, 2 - 3 pm (CEST)	**Greening Digitalisation** The second webinar focused on the environmental challenges posed by digitalisation in research activities, and how to make digital processes more sustainable. ▪ **Reducing Environmental Impact**: How can we minimise the environmental footprint of digital research activities, which often require extensive computing resources and data processing? ▪ **Sustainable IT Equipment**: What strategies can be adopted to ensure that IT equipment used in research has sustainable life cycles, from design to disposal? ▪ **Balancing Performance and Environmental Impact**: How can researchers balance the need for computing power with the goal of reducing environmental impact? What criteria should be considered beyond just performance?	**Speakers** Adel Nourredine (**University of Pau, France**) Ruggero Ricci (**INFN**) **Moderator** Yamine Aït-Ameur (**ANR**)

Date	Title	Speakers & Moderators
Tuesday 4 June, 2 - 3 pm (CEST)	**Promoting Ecological Sustainability in Research Systems** This last webinar aimed to address the actions needed to promote the ecological sustainability of research activities and the whole R&I systems. Acknowledging national differences, the speakers addressed the following questions. ▪ **Promoting Sustainability in Research Organisations**: What steps can be taken to encourage and develop sustainability practices within research organisations? ▪ **Integrating Sustainability into Research Funding Processes**: How can sustainability considerations be integrated into the processes for funding research projects? ▪ **Challenges for Large Research Organisations:** What are the specific challenges faced by large research facilities and infrastructure in achieving ecological sustainability? ▪ **Collaborative Actions:** What collaborative efforts are needed to mobilise stakeholders and scale up existing sustainability initiatives in research?	**Speakers** Philipp Weber (**EMBO**) Sule Karamik (**Formas**) Anne Marie De Beaufort & Josef Stuefer (**NWO**) **Moderator** Sarah Achermann (**SNSF**)

List of Speakers

Martin Farley

UK Research and Innovation, UKRI

Martin started a career in research, however his interests in sustainability led him to take an alternate career path focused on making science more sustainable. Currently, Martin is the UKRI Associate Director of Environmental Sustainability. Prior to joining, he founded the consultancy Green Lab Associates, which helps researchers to reduce the energy and resources they use in their workspace. Martin also created the LEAF programme at UCL - the leading global standard in sustainable lab operations, as well as co-founded GreenED, a programme which improves the sustainability of NHS emergency rooms.

Jo Allatt

UK Research and Innovation, UKRI

Jo Allatt is a Chartered Environmentalist and UKRI Head of Sustainability (Policy and Engagement). Jo has played a key role in bringing stakeholders together across the research and innovation sector to explore opportunities to address the environmental sustainability of research practice, including collaborative development of a new sector-wide concordat. Jo also works closely with the UKRI Commercial team developing UKRI's responsible procurement work.

Jo joined the UKRI sustainability team in September 2020, moving across from the Knowledge Exchange (KE) team in Research England. Previously, Jo worked in Local Government, specialising in Environment, Energy, Fuel Poverty and Community Development roles**.** Jo also volunteers with local environmental action and conservation groups, is a trustee of a local preschool and doing crafts, tending her allotment and spending time with her family.

Christiane Joerk

German Research Foundation, DFG

Christiane Joerk works as a Programme Director at the German Research Foundation DFG. She is experienced in the area of economics/business administration as well as social and behavioural sciences in a broader sense. Particularly, she also covers the interdisciplinary topic of sustainability and global change research. With regard to evaluation procedures, she provides expertise on a broad range of different national and international funding programmes, and moreover on the structures of the German science and research system.

Paula Leskinen

Research Council of Finland, RCF (former AKA)

Paula Leskinen works as a Science Adviser at the Research Council of Finland (AKA). Her current tasks are related to the development of scientific reporting and providing advice on project management. Prior to this position, she was a member of the research infrastructure team at the Research Council, mainly working on managing funding calls. Her background lies in molecular ecology with a strong interest in accountability (including sustainability) of research and research funding. She is a member of Science Europe's working group 'Greening Research since its initiation in 2021.

Margarida Prado

Portugal's Foundation for Science and Technology, FCT

Margarida Prado is a Scientific Officer at Fundação para a Ciência e a Tecnologia (FCT) with experience in the monitorisation and developing evaluation processes of diverse funding instruments supporting research organisations and scientific employment. Her science background is in Cell Biology (PhD), with post-doctoral experience at the Fraunhofer Institute (Germany) for Interfacial Engineering & Biotechnology, and a post-graduation in Climate Change and Sustainable Development Policies.

Adel Nourredine

University of Pau, France

Dr Adel Noureddine is an Associate Professor in computer science at the University of Pau and Pays de l'Adour, France. He holds a PhD in computer science from the University of Lille and INRIA in 2014 and has worked in computer science in France and the UK, and in the private and public sector.

His main research areas are around green IT and green software engineering, behavioural computer science, empirical software engineering, and autonomic computing. In particular, he is interested in the role of software and its generated data in energy-efficient, green, autonomous and smart adaptations in cyber-physical systems.

Ruggero Ricci

Italy's National Institute for Nuclear Physics, INFN

Ruggero Ricci is the Head of Electrical Installation group of the Frascati National Laboratories of INFN (Italy). He holds a MEng in Electrical Engineering interventions. He has extensive experiences in the fields of high and medium voltage electrical installations and operation and maintenance, power plants for particle accelerators, energy efficiency, and Data Centre infrastructure. For more than 10 years he has been the Energy Manager of the Laboratories, where he performs energy analysis of infrastructures and has proposed and implemented various energy efficiency interventions. He also held technical courses on Data Centre electrical installation and their maintenance, Particle accelerator technological plants, and Electrical systems in particle accelerators for hadron therapy.

Yamine Aït Ameur

French National Research Agency, ANR

Yamine AÏT Ameur is Full Professor since 2000. Since September 2011, he has been at Toulouse's National Polytechnique Institute (INP) in France and a member of the Toulouse Research Institute in Computing (IRIT-CNRS). Two main essential aspects characterise his research activities: the development and use of state-based formal modelling techniques based on refinement and proofs and the operational applications, allowing the validation of the proposed approaches. Embedded systems in avionics, engineering, interactive systems, and CO2 capture are some of the application domains targeted by his work. Since September 2021, he is the head of the digital sciences and mathematics department at the French National Research Agency (ANR).

Philipp Weber

EMBO

Philipp Weber is the Sustainability Project Officer at EMBO, an organisation that promotes excellence in the life sciences in Europe and beyond, and co-founder of Green Labs Austria. He received a PhD in cell biology from the University of Vienna and is active in several areas relevant to the sustainable development of life science research. One of his goals is to promote exchange between different stakeholders, such as funding organisations, research institutions and bottom-up initiatives.

Sule Karamik

Swedish Research Council for Sustainable Development, FORMAS

Sule Karamik has a background in Economics and works as an analyst at Formas, the Swedish research council for sustainable development. Her primary responsibilities include monitoring the calls within the National Research Programme on Climate, a 10-year research program initiated by the Swedish government and contributing to Formas' strategic agenda. She also holds the role of sustainability coordinator, where she oversees, implements, and fosters the enhancement of various sustainability initiatives within the organisation.

Anne Marie De Beaufort

Dutch Research Council, NWO

Anne Marie de Beaufort is sustainability officer at NWO. She is responsible for the development and implementation of NWO's policy on sustainability, its implementation and coordination. She has a background in development economics with experience in sustainability projects within the NGO sector. She is president of a local association focussing on the acceleration of the transition towards circular entrepreneurship amongst SMEs.

Josef Stuefer

Dutch Research Council, NWO

Josef Stuefer works as a Senior Policy Advisor and Program Manager at the Dutch Research Council NWO. His current focus is on the development of policies and research programs in the field of climate-related transitions towards sustainability. During his career at NWO, Josef Stuefer has worked on various policies and funding initiatives, with a focus on broad interdisciplinary themes and international collaboration. He developed and coordinated a strategic research program for the six Caribbean islands of the Kingdom of the Netherlands. Josef Stuefer was trained as a research scientist in plant ecology and has worked at different universities in the Netherlands and abroad before joining NWO.

Sarah Achermann

Swiss National Science Foundation, SNSF

Since 2021, Sarah Achermann is Head of Sustainability at the SNSF, tasked with the implementation of the organisations' strategy on sustainable development. After completing her Geography degree in 2011, she worked as a research associate at the Centre for Development and Environment of the University of Bern. Before joining the SNSF in 2019, she worked as a consultant in international development projects focused on sustainable water management, climate change adaptation and sustainable regional development.

Science Europe is the association representing major public organisations that fund or perform excellent, ground-breaking research in Europe.

More information is available at www.scienceeurope.org