NetDRIVE Community Projects

2025-2026

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1. Introduction

The Net-Zero Digital Research Infrastructure Vision and Expertise (NetDRIVE) programme addresses the challenge of transitioning the UKRI Digital Research Infrastructure (DRI) towards a sustainable, net-zero future. The programme recognises that the environmental footprint of the DRI is complex and distributed, spanning high-performance computing facilities, data infrastructure, software systems, and the behaviour of the individuals who design, operate, and use them.

NetDRIVE is structured as an integrated programme combining a core team, champions, network, and a portfolio of **community projects** (**Figure 1**). Together, these components are designed to deliver authoritative and trusted advice across the full landscape of net zero DRI challenges. As articulated in the NetDRIVE workplan, the programme aims to *"deliver immediate and tangible progress, provide confidence in our pathway to sustainability, and demonstrate national and international thought leadership so that the DRI can continue to serve community needs well into the future"* (Juckes and Sparrow, 2025).

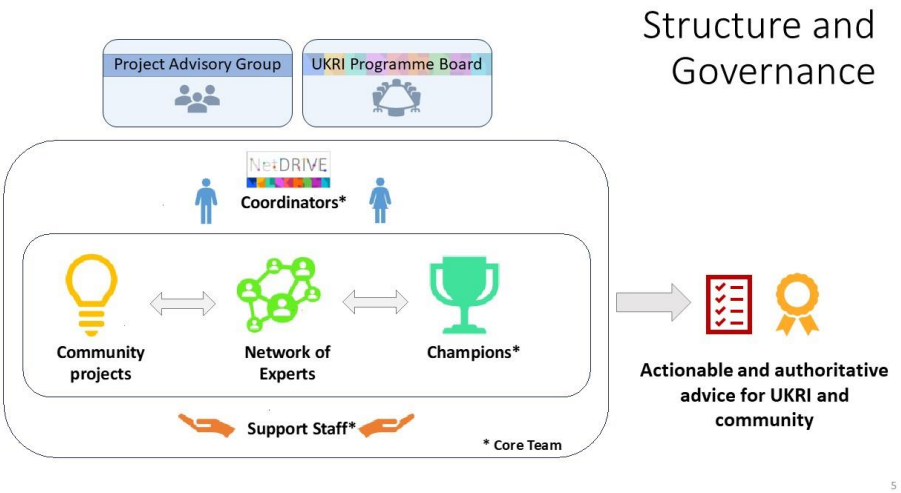

Figure 1. NetDrive programme organisation.

A central component of the programme is the **NetDRIVE DRI Roadmap**, which defines a set of priority actions required to achieve sustainable digital research infrastructure. These actions span areas such as carbon accounting, procurement policy, training, behaviour change, and governance. The roadmap provides a strategic framework linking technical developments with institutional and policy-level transformation.

Within this context, NetDRIVE funds a portfolio of **Community Projects**, designed to deliver targeted technical innovation, develop best practice, and test new approaches in real-world settings. These projects are complemented by Champions for Sustainable Research Computing, who provide leadership, synthesis, and translation of outputs into actionable advice for UKRI and the wider community. Champions play a critical role in connecting individual project outputs to the broader programme vision, ensuring coherence and alignment across activities.

This document presents a structured overview of the NetDRIVE Community Projects, capturing their aims, objectives, and intended impacts. It further introduces the Integration Cluster framework used to organise these activities and illustrates how individual projects align with the NetDRIVE DRI Roadmap.

2. List of Community Projects

A total of 13 community projects has been funded across Round 1 and Round 2 of the NetDRIVE programme. These projects represent a diverse portfolio of activities addressing both technical and behavioural aspects of the transition to net zero DRI. **Table 1** below summarises the community projects. The subsequent sections categorise these projects across the five integration clusters, illustrating the thematic distribution of activities and areas of strategic focus.

Table 1. Funded Community Projects (Rounds 1 & 2)

Project ID	Name	Project Title
Round 1		
CPX1_1	NetDrive Summer School	NetDRIVE Summer School
CPX1_2	ISPACE	Improving Sustainable Performance and Accelerated Computing Efficiency
CPX1_3	GEODE	Empowering Digital Researchers: A Series of Best Practice and Tools Guides (Guides to EmpOwering Digital rEsearchers)
Round 2		
CPX2_1	DEICAP	Digital Emissions Integration for Climate Action Planning (DEICAP) – Modelling the Unseen: Integrating Digital Carbon into Real-World University Decisions
CPX2_2	Dash4Action	Dash4Action: Facility Action Plans in Pursuit of a Sustainable UKRI DRI
CPX2_3	SMART-DRI	SMART-DRI: Scenario Modelling and Assessment for Research Transition in Digital Research Infrastructure
CPX2_4	Green Algorithms Dashboard	Unified Multi-Facility Resources Monitoring Dashboard for Sustainable UK Digital Research Infrastructure
CPX2_5	SOIL	Data sufficiency: A case study of soil data curation, storage, and usage at UKCEH
CPX2_6	SusTraIN	Sustainable Training Initiative for NetDRIVE (SusTraIN)
CPX2_7	E-Sched	A community hackathon to enable green scheduling
CPX2_8	REACT	REACT: Recommendations for Enhancing Adoption of Carbon-footprinting Tools
CPX2_9	DRI-EMIT	Measuring and Effectively Using Emissions Data Across DRI: A Dynamic Training Resource for Managers, Developers, Facilitators, Researchers and Users
CPX2_10	P4GS	Pathways to Effective Carbon Reductions by Use of Green Scheduling (pathways for green scheduling)

3. Integration Clusters

Given the diversity of projects and their contributions across multiple aims, themes, and roadmap elements, a structured approach to integration is required. To support this, the projects and champions have been organised into **five Integration Clusters**, each representing a key area of coordinated activity. These clusters provide an operational framework for collaboration, enabling alignment of outputs, avoidance of duplication, and clear mapping to the NetDRIVE DRI Roadmap.

The five clusters represent distinct layers of systemic change (**Figure 2**). **Cluster 1- Carbon Accounting & Metrics** establishes the foundational measurement infrastructure required for credible emissions tracking and environmental profiling. **Cluster 2- Green Scheduling** focuses on modelling and deploying scheduling-based carbon reductions. **Cluster 3- Optimisation & Efficiency** advances computational efficiency through technical optimisation and performance modelling. **Cluster 4- Training & Capability Building** embeds sustainable practice through education, guidance, and behaviour change. Finally, **Cluster 5- Institutional & Strategic Change** translates technical and behavioural outputs into governance, procurement, roadmap, and policy-level alignment.

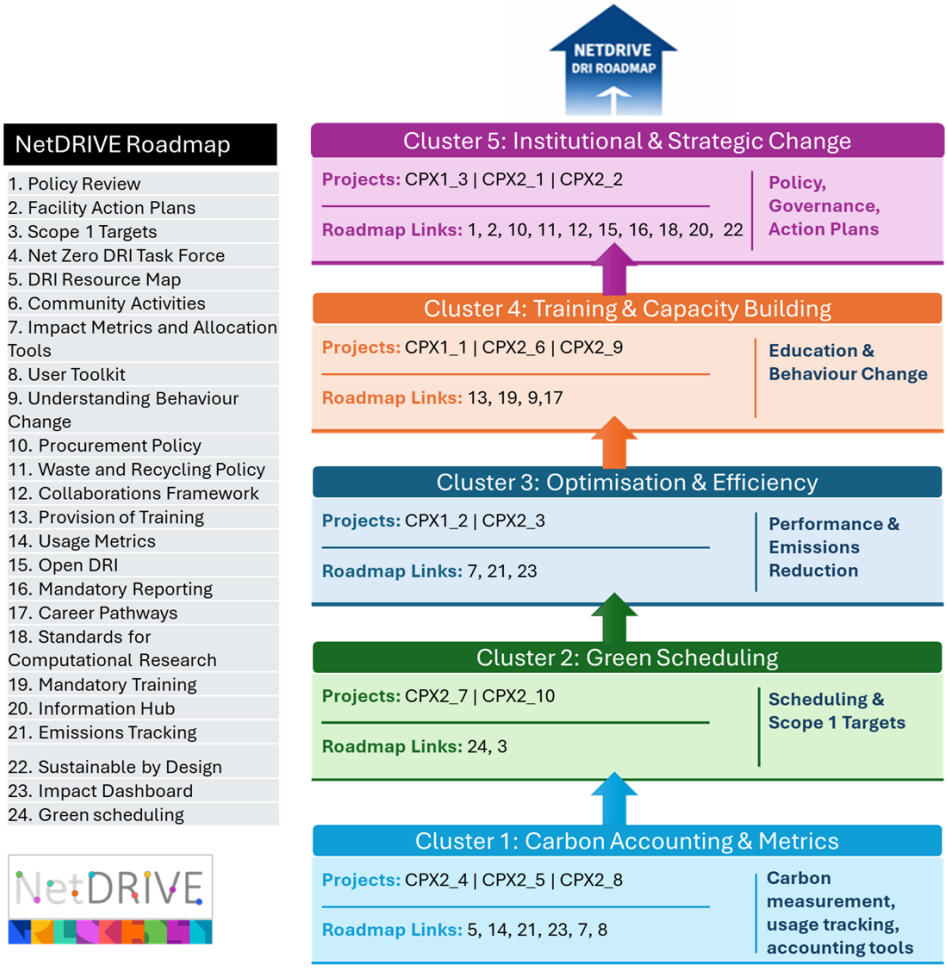

Figure 2. Community projects grouped into five Integration Clusters, illustrating their coordinated contribution to the NetDRIVE DRI Roadmap.

Each cluster maps directly onto specific elements of the NetDRIVE DRI Roadmap. In this way, community projects are not only coordinated horizontally across clusters but are also vertically aligned with roadmap commitments. This structure ensures that measurement enables optimisation, optimisation informs training, training supports institutional transformation, and governance is grounded in robust technical evidence. Detailed descriptions of each Integration Cluster, including the details of funded projects and their corresponding aims, objectives, and impacts, are presented in the following section.

4. Integration Clusters and Projects Details

This section provides a detailed overview of the five Integration Clusters, presenting the community projects grouped under each cluster. For each project, its aims, objectives, and key impacts are summarised, highlighting how activities are distributed across clusters and how they contribute to coordinated delivery of the NetDRIVE DRI Roadmap.

Cluster 1: Carbon Accounting & Metrics

Purpose

Align carbon measurement methodologies, modelling assumptions, reporting boundaries, and evaluation frameworks across NetDRIVE.

Community Projects

CPX2 4 – Green Algorithms Dashboard: Unified Multi-Facility Resources Monitoring Dashboard for Sustainable UK Digital Research Infrastructure

01/04/2026-30/09/2027 (18 months)

PI: Dr Loïc Lannelongue (University of Cambridge)

Summary: This project aims to create a unified dashboard to track and report the environmental impacts of individual computing projects and users. It builds on the Green Algorithms methodology and tools and existing monitoring software developed on ARCHER2. It will be modular to be compatible with the diversity of DRIs in the UK, open source for continuous improvement, and the result of collaborative co-design with the community. By the end of the project, the tool will have been deployed in a number of national DRIs and UK Universities to demonstrate feasibility.

Objectives:

1. Create a modular open-source dashboard for granular environmental monitoring of DRI infrastructures and computational projects
2. Develop and document a transparent underlying methodology for environmental monitoring of DRIs
3. Co-design key dashboard elements with the community using formal HCI frameworks
4. Deploy the dashboard in major national DRIs and UK research-performing organisations

5. Engage with the wider UK DRI community to enable systematic deployment and identify remaining barriers

CPX2_5 – SOIL: Data sufficiency: A case study of soil data curation, storage, and usage at UKCEH

1/04/2026 - 31/12/2026 (9 months)

PI: *Carolynne Lord (UKCEH)*

Summary: Data represents an aspect of research with large, and not particularly visible, carbon and environmental implications. However, it is not clear how much data is required, or how decisions are made around its (re)use, collection, and storage. In this case study, we use interviews and tours to understand how physical and digital soil data is created, stored and used at UKCEH, and how Findable, Accessible, interoperable and Reusable does data have to be for its reuse. These accounts will shape a co-design workshop that aims to generate data policies that encourage more 'sufficient' modes of data consumption and provision.

Objectives:

1. Understand how researchers decide how much data to collect or use for analysis
2. Understand how data curators decide what data to store, curate, or dispose of
3. Understand how data re-users decide which stored data to reuse
4. Identify opportunities for data sufficiency in DRI using soil data as a case study

CPX2_8 – REACT: Recommendations for Enhancing Adoption of Carbon-footprinting Tools

1/04/2026 - 31/03/2027 (12 months)

PI: *Liz Ing-Simmons (King's College London)*

Summary: Understanding the environmental impact of their DRI usage is crucial for researchers to make informed decisions. However, most DRI facilities do not routinely provide users with data on their estimated carbon emissions. This project seeks to understand factors that affect adoption of user carbon footprinting (UCF) tools by DRI facilities. We will survey DRI operators and users to identify what UCF tools they use, or have considered using, and key factors that influenced their decisions. We will technically assess the identified tools and produce a set of recommendations for future tool development, including the incorporation of Scope 3 emissions.

Objectives:

1. Create a catalogue of available tools for user carbon footprinting, with a focus on tools for HPC systems, and produce recommendations on the suitability of these tools for different DRI contexts
2. Understand the barriers and motivational factors that affect adoption of user carbon footprinting tools by DRI operators

3. Develop practical guidelines for the inclusion of Scope 3 emissions in user carbon footprinting tools
4. Provide recommendations for future tool development to better meet the needs of DRI operators, users, and other stakeholders

Cluster 2: Green Scheduling

Purpose

Align modelling, technical feasibility, and operational deployment of scheduling-based carbon reductions.

Community Projects

CPX2_7 – E-Sched: A community hackathon to enable green scheduling

1/05/2026 - 30/04/2027 (12 months)

PI: *Dr Andrew Walker (University of Oxford)*

Summary: CATS is a community developed application to allow users to schedule work on a local system at times of minimum grid carbon intensity ("green scheduling"). A key aim of CATS is its use as a tool for user education. In this project, we will seek to implement approaches to green scheduling that can be applied to multi-user systems by way of a community hackathon and follow up software integration work. This will allow DRIs to begin to experiment with green scheduling more easily and open a pathway to user education on these larger scale systems.

Objectives:

1. Support for dynamic rescheduling: this is essential in the move from a single user system to a large DRI where wait times can be long and the forecast grid carbon intensity can change between the submission time and scheduling time. This thus addresses a barrier to adoption within the DRI.
2. Use of different (and longer term) sources of grid carbon intensity forecast: this will overcome barriers to user adoption allowing longer term scheduling decisions and permitting users of different power grids or different power sources (e.g. on-site power storage) to make use of the approach.
3. Improved documentation, tutorials and examples. These can feed into the user training facing NetDRIVE projects and will overcome another barrier to user adoption of green scheduling.

CPX2_10 – P4GS: Pathways to Effective Carbon Reductions by Use of Green Scheduling (pathways for green scheduling)

1/05/2026 - 31/03/2027 (11 months)

PI: *Dr Michael K Bane (Manchester Metropolitan University)*

Summary: In order to reduce the operational carbon impact of computing requires both reduction of energy for a given task and reducing the carbon intensity (CI) of where & when the task is run. Empirically the largest savings are obtained in choosing where and when to run a task. In this project, we will examine current situation, opportunities and challenges of such "green scheduling" for different communities, including knowing the environmental impacts of available deployment facilities, the dynamic nature of the CI of the grid, the availability of sufficient resources, the collective impact of many tasks all scheduling for the same time/location and how to include a meaningful metric covering embodied impacts. We will deliver a report that discusses the state of the art, evaluates pathways for UKRI to prototype an effective green scheduler, and quantifies potential carbon (and cost) savings.

Objectives:

1. undertake literature survey to review current approaches to scheduling for reducing carbon
2. capture specific UKRI/DRI constraints
3. review lessons learned from specific examples of green scheduling in the particle physics community and users of CATS
4. preparation of a report bringing together what would be needed to implement an effective scheduler in the context of UKRI DRI
5. Publication and information dissemination
6. grant applications to implement & deploy appropriate green scheduling

Cluster 3: Optimisation & Efficiency

Purpose

Coordinate computational efficiency and emissions reduction through technical optimisation.

Community Projects

CPX1 2 – ISPACE: Improving Sustainable Performance and Accelerated Computing Efficiency

01/10/2025 - 31/09/2026 (12 months)

PI: *Adrian Jackson (EPCC)*

Summary: The ISPACE project is exploring the efficiency benefits that may be achievable is GPUs are run optimally for the workloads they are being used for. We have seen demonstrations of large-scale CPU-based systems reducing the energy they use by setting lower clock frequencies for their CPUs or by changing BIOS parameter settings, however, less work has been done on looking at the same approaches for GPUs. Whilst it is possible to simply reduce the power of a CPU or GPU by limiting the clock frequency, to ensure that less energy is used overall for a given program careful evaluation is required to understand the impact on the runtime of the program, and on the associated embodied carbon cost the hardware has. ISPACE will explore these aspects to provide guidance and best practice to groups running GPU-based systems, ensuring such hardware is run as sustainably as possible.

Objectives:

1. Systematically investigate potential approaches for optimising the use of accelerators in large-scale computing
2. Evaluate how tuning accelerator frequencies and parameters can reduce energy usage without compromising application performance
3. Explore optimisation approaches across a range of accelerators, workloads, and mixed CPU/accelerator workflows
4. Demonstrate to the UK DRI community what can be achieved and how to use accelerated computing infrastructure efficiently and effectively in the future

CPX2_3 – SMART-DRI: Scenario Modelling and Assessment for Research Transition in Digital Research Infrastructure

01/03/2026 -28/02/2027 (12 months)

PI: *Zeynep Duygu Tekler (University of Oxford)*

Summary: Digital Research Infrastructures (DRIs), including high-performance computing clusters and large-scale data platforms, are essential to modern scientific discovery but also contribute significantly to energy consumption and carbon emissions. SMART-DRI develops data-driven methods to support the transition towards sustainable digital research infrastructure. The project integrates heterogeneous operational and environmental datasets into a unified framework for evidence-based decision-making, develops and implements novel green scheduling methods, and evaluates the potential for DRIs to provide electricity system flexibility through workload shifting in response to grid conditions. SMART-DRI will deliver practical tools, open data, and case-study evidence to support sustainable and net-zero digital research infrastructure.

Objectives:

1. Integrate heterogeneous datasets on DRI operations into a unified analytical framework and release them as an open-access dataset
2. Develop and implement data-driven green scheduling methods to minimise emissions and operational costs by optimising computational workloads under varying environmental and economic conditions in real-world research computing environments.
3. Quantify the environmental and economic benefits of DRI participation in electricity flexibility services to inform policy and institutional strategies for sustainable digital research infrastructure.

Cluster 4: Training & Capability Building

Purpose

Ensure training outputs are coherent, non-duplicative, and embed technical project outputs.

Community Projects

CPX1_1 – NetDRIVE DRI User Summer School

01/09/2025 - 31/03/2026 (19 months)

PI: *Alastair Basden (Durham University)*

Summary : We are running a couple of summer schools for PhD students in Durham (June 2026) and Edinburgh (March or June 2027), focused on informing students about their DRI usage and the impacts that this has. Planning for the first one is well underway with 30 participants expected to attend the week-long programme.

Objectives:

1. Train early-career DRI users in sustainable computing without reducing scientific output
2. Provide hands-on experience in green software engineering and emissions monitoring
3. Increase awareness of full lifecycle emissions of DRI services
4. Build an empowered cohort able to drive climate action

CPX2_6 – SusTraIN: Sustainable Training Initiative for NetDRIVE (SusTraIN)

1/04/2026 - 31/03/2027 (12 months)

PI: *Caterina Doglioni (University of Manchester)*

Summary: The SusTraIN (Sustainable Training Initiative for NetDRIVE) project, led by the University of Manchester with partners at Sheffield and Liverpool, aims to address the growing environmental impact of Digital Research Infrastructures by developing accessible green computing training resources. Targeting researchers, technical professionals, infrastructure managers, and students, the project has three work packages: reviewing current training needs and gaps (WP1), creating Carpentries-style training modules, videos, and reproducible workflows (WP2), and building a FAIR-compliant training catalogue using the EVERSE TeSS platform that will be linked to UKRI and Europe-wide platforms through interoperable pipelines (WP3).

Objectives:

1. Review existing green computing training and identify gaps via user experiences
2. Develop modular training materials and reproducible workflows for sustainable computing
3. Provide a FAIR training catalogue to host and sustain training materials

CPX2_9 – DRI-EMIT: Measuring and Effectively Using Emissions Data Across DRI: A Dynamic Training Resource for Managers, Developers, Facilitators, Researchers and Users

1/05/2026 - 30/04/2027 (12 months)

PI: *Jessica Huntley (STFC)*

Summary: We aim to provide targeted, practical information to embed best practice for the measurement and effective use of carbon emissions data across scientific computing job roles. This will be achieved by consolidating existing resources and developing training modules to explain the current state of emissions monitoring for developers, managers, facilitators, and users. A dynamic

resource will also be provided that the community can continue to update. We will build on current work within STFC's Scientific Computing Department, where projects have focused on monitoring carbon emissions in different contexts, and engage with the wider community to gather additional information and feedback.

Objectives:

1. Develop a series of training videos and modules explaining the current state of emissions monitoring for developers, managers, facilitators, and users
2. Create a dynamic, trusted resource that can be updated by the community as best practice evolves
3. Provide clear guidance on how to obtain useful energy and emissions estimates across hardware, cloud, HPC, and software contexts
4. Explain best current approaches to embedding emissions monitoring in software and reporting emissions in research outputs
5. Build consensus and confidence through stakeholder engagement on how emissions should be estimated and reported across DRI services

Cluster 5: Institutional & Strategic Change

Purpose

Align recommendations, roadmaps, action plans, and institutional change outputs.

Community Projects

CPX1 3 – GEODE - **G**uides to **E**mp**O**wer **D**igital r**E**searchers

01/09/2025 - 31/08/2026 (12 months)

PI: *Lorna Smith (EPCC)*

Summary: We aim to develop a series of guides tailored for users and operators of DRI. Each guide will provide clear, practical advice, empowering individuals to effectively utilise and manage computing and digital resources in ways that promote sustainability and a reduction of environmental impacts from these DRI resources.

By compiling best practices and curating usage recommendations and guidance for existing tools for using and operating DRIs in the most sustainable manner, the series will assist researchers and infrastructure operators in enhancing capabilities and improving sustainable research outcomes. Emphasising effective knowledge engagement strategies, these guides aim to support a community of informed and proactive digital researchers, driving innovation and collaboration.

Objectives:

1. Develop a series of best practice guides providing advice for sustainable use and operation of DRI

2. Identify and document existing best practices for utilising and managing digital research infrastructure efficiently and sustainably
3. Curate and present relevant tools and usage guidance to support sustainable DRI usage
4. Enhance community knowledge through clear explanations and case studies demonstrating implementation of best practices
5. Work with related initiatives to ensure guides complement other NetDRIVE activities and community efforts
6. Design guides to be applicable across diverse research fields and infrastructure contexts

CPX2_1 – DEICAP: Digital Emissions Integration for Climate Action Planning (DEICAP) - Modelling the Unseen: Integrating Digital Carbon into Real-World University Decisions

01/04/2026-30/09/2027 (18 months)

PI: *Polly Eccleston (University of Bristol)*

Summary: The DEICAP project addresses the lack of tools, standards, and data models for measuring digital-related emissions in UK universities, particularly Scope 3. Building on Claire Young's 2024 work at the University of Bristol—which found major emissions from end-user devices — the project will enhance and operationalise her digital GHG emissions model, including cloud infrastructure and HPC. It will pilot an expanded, standardisable methodology across multiple universities, improving transparency, PCF consistency, and Scope 3 reporting. The project will deliver dashboards, shared reporting templates, and a reusable toolkit to support sustainable digital decision-making, researcher engagement, and low-carbon procurement practices.

Objectives:

1. Improve transparency and reporting of digital emissions, including Scope 3
2. Collaborate on standardised digital GHG emissions reporting methodologies
3. Educate and empower researchers to understand and reduce digital emissions
4. Support sustainable digital procurement and decision-making

CPX2_2 – Dash4Action: Facility Action Plans in Pursuit of a Sustainable UKRI DRI

1/04/2026 - 31/03/2027 (12 months)

PI: *Alex Owen (QMUL)*

Summary: As climate action is widely accepted to be imperative the "Dash4Action" project will address the challenge of institutional inertia and lack of pertinent information which hinders action towards NetZero. Queen Mary University of London , Durham University and EPCC are working together to provide case studies in sustainable solutions and specimen facility NetZero action plans. These will be generalised into an action plan toolkit which will be launched with an action plan workshop encouraging interested parties can take the toolkit and start to apply it to their own DRI facilities.

Objectives:

1. Generate immediate NetZero Facility Action Plans for at least three representative UKRI DRI facilities
2. Generalise site-specific action plans into a reusable NetZero Facility Action Plan Toolkit
3. Seek and incorporate NetDRIVE community feedback into the Action Plan Toolkit
4. Launch the Action Plan Toolkit through a dedicated workshop for UKRI DRI providers.
5. Produce a final project report having incorporated workshop feedback into the toolkit.

5. Conclusion and Way Forward

This document has presented a structured and integrated view of the NetDRIVE Community funded Projects, demonstrating how a diverse portfolio of activities can be coordinated to deliver coherent progress towards a net zero Digital Research Infrastructure (DRI). Through the introduction of the Integration Cluster framework, projects are positioned within a clear operational structure that supports alignment, collaboration, and effective knowledge translation.

The next phase of the programme will focus on activating this structure. Integration Clusters will serve as the primary coordination mechanism, enabling projects to align assumptions, share methodologies, and build upon each other's outputs. As projects progress, the role of champions and the wider NetDRIVE network will become increasingly important in synthesising outputs, identifying gaps, and ensuring that recommendations are both actionable and aligned with UKRI priorities. Through this coordinated approach, the programme will move beyond individual project delivery to achieve systemic impact across the DRI landscape. Ultimately, this framework provides a foundation for sustained transformation, ensuring that technical innovation, behavioural change, and institutional reform are delivered in a coherent and mutually reinforcing manner.