Scottish Enterprise

Digital Solutions for Energy Transition and Manufacturing

Phase 2 – Additional Information

Contents

Challenge 1 – Harris Tweed

Context

The Harris Tweed® supply chain is decentralised and heritage-based, involving:

- Commercially independent mills Harris Tweed Hebrides (HTH) and Kenneth Mackenzie Ltd (KMK), who serve as the primary economic operators for exports;
- ~150 self-employed, home-based weavers, who contribute core production inputs as commission weavers;
- The Harris Tweed Authority, a statutory body responsible for certifying finished cloth as genuine Harris Tweed®;
- Downstream customers. Lochcarron of Scotland is participating to demonstrate garment-level traceability using finished Harris Tweed® cloth.

Core Requirements

1. End-to-End Traceability
   Track and link product data from wool origin through yarn production, weaving, finishing, certification, and garment production.
2. Low-Burden Implementation
   Solution must be cost-effective, light-touch, and practical
3. Interoperability
   The solution must support both B2B data sharing with manufacturers and brands, and B2C readiness for issuing the Digital Product Passport.
4. Compliance-Ready Fields
   Capture expected data types:

- Composition and material origin
- Dyeing and finishing methods
- Energy, water and carbon impact
- Packaging and logistics
- End-of-life information

5. Scalability
   Solution should be scalable for broader use across the Scottish textile sector and adaptable to future legislative requirements.

Outcome

A working pilot that demonstrates DPP-compliant traceability from raw fibre to finished garment, enabling future compliance, strengthening supply chain transparency, and supporting the reputation of Scotland's textile sector.

Challenge 2 – Storm Energy

STORM

Challenge Overview

As the energy landscape evolves, decentralised systems are becoming the norm – with solar, battery, EV, and smart meter technologies deployed across homes and businesses. To enable trusted billing, carbon tracking, and energy trading at scale, we are seeking a solution that can:

- Capture performance data from multiple distributed sources
- Verify that data is accurate, tamper-proof, and traceable
- Share it securely with authorised parties in a standardised, transparent format.

This data layer is central to OpenGrid, a decentralised digital energy platform enabling households and businesses to trade energy and carbon credits securely and compliantly

Core Technical Requirements

- Interoperable Data Capture: Must integrate with multiple sources, including smart meters (SMETS2), solar inverters, batteries, sub-meters, and EV chargers.
- Trust Layer: Support cryptographic verification or blockchain anchoring to ensure traceability and prevent tampering.
- User Consent & Access: Must include GDPR-compliant user controls and standardised consent mechanisms (aligned with Ofgem's CC Solution guidance).
- APIs & Compatibility: Platform-agnostic design with open API access for downstream billing, trading, and analytics systems.
- Data Standardisation: Preference for compliance or alignment with PAS 2038, IEC 61850, OpenADR, or similar standards.

Advanced Trading-Ready Features (Desirable)

To support peer-to-peer trading and smart billing use cases, the following features are highly desirable:

- Smart Contract Compatibility: Ability to trigger programmable rules (e.g. price, timing, source) based on verified energy events.
- Marketplace Integration: Support for trading logic (price matching, order execution, or flexible auction-style matching).
- Carbon Credit Readiness: Translate energy use/generation into CO_2 equivalent and support tokenised tracking or credit issuance.
- User Identity Layer: Optional support for KYC or verified user credentials to protect transaction integrity.

- Regulatory Reporting Hooks: Ability to generate audit logs or summaries to comply with resale/licensing frameworks under Ofgem and other UK market rules.

Deployment and Pilot Considerations

- Initial Scope: Pilot will include mixed residential and business sites with a variety of metering setups and renewable assets.
- Integration Focus: Preference for modular “plug-in” design to overlay existing hardware/software without requiring wholesale replacement.
- Scalability: Solution should be scalable across thousands of endpoints with modular onboarding and low operational overhead.

Support & Documentation: UK-based or EU-aligned support preferred. Clear implementation documentation is essential.

Challenge 3 - OEUK

Offshore Energies UK (OEUK) Overview

Offshore Energies UK are the leading trade association for the UK's offshore energy industry, giving a voice to over 400 organisations and businesses throughout the country. Our membership is open to all companies from the largest producers and developers, to contractors, consultancies and the smallest start-ups. The majority of these members are based in Scotland. OEUK primarily cover the offshore energy Industry and Supply chain across; Carbon Capture Utilisation and Storage (CCUS), Hydrogen, Offshore Floating Wind and Oil & Gas including decarbonisation and decommissioning.

Current Barriers

Within Offshore Energies UK (OEUK) a large number of data sources across the offshore energy mix (oil & gas, wind, carbon capture and storage (CCS) and hydrogen. These data sources provide a large number of insights already that drive forward a number of improvement activities particularly in the areas of safety (personal and process) and industry performance against key metrics and regulatory compliance.

- Data Standardisation: data sources and key metrics are often non-aligned across differing sectors; organisations remain a persistent challenge.
- Security & Governance: sharing or operational, safety & environmental data securely and in compliance with internal and external standards requires robust protocols.
- Change Management: cultural and procedural adjustments to drive adjustments and performance can slow down digital adoption unless benefits are clear and immediate.
- Collaboration & Alignment: Collaboration & innovation demands a strong common data evidence base and early stakeholder engagement to gain an alignment.
- Isolation: A large number of cases the data sources are accessed in a standalone manner.

Potential Next Steps

With such a broad and increasingly diverse energy mix this has driven a reliance on innovative and collaborative solutions. Digitisation and block chain technology is the key aspect that will combine and unlock innovation and collaboration. Through a studies & workshops completed by Net Zero Technology Centre, North Sea Transition Forum and OEUK a digital collaboration tool that will encompass benchmarking, performance basis that help foster sharing of good practices & lesson learned. The obvious solution is a controlled access Data Trust.

Challenge 4 - Soltropy

Introduction

In the renewable energy sector, homes and businesses increasingly use a mix of technologies—solar PV, solar thermal, heat pumps, and traditional heating systems. A critical challenge is that each technology operates in isolation, monitored by its own proprietary system. This leaves the end-user with fragmented data and with difficulty in assessing and improving performance.

Ideal Partner Profile

We are seeking a long-term strategic partner with expertise in delivering robust, end-to-end IoT solutions.

Core Technical and Delivery Requirements

Partner must provide demonstrable, in-house experience across the following areas:

1. Unified Full-Stack IoT Platform Development:

- Multi-System Integration: Architecture must harmonise data from various third-party sources (e.g., solar PV inverters, heat pumps etc) alongside our solar thermal technology which incorporates 1-Wire bus technology to minimise cabling complexity.
- Bespoke Sensor Hardware: Proven capability in the electronic and mechanical design of robust, low-cost, and weatherproof (IP67+) sensor.
- Intelligent Cloud Analytics: Scalable cloud infrastructure with analytics for:
  - Automated fault detection and diagnostics across all connected systems.
  - Performance optimisation algorithms.
  - Generation of verifiable data suitable for ESG and carbon emissions reporting.
- Intuitive User Interfaces: Expertise in creating clear and intuitive front-end apps:
  - A customer-facing mobile/web app unify system data into one dashboard.
  - A comprehensive backend portal for technicians, featuring advanced diagnostics, fault reporting, and maintenance alerts.
- Blockchain for Data Integrity: Experience in leveraging blockchain.

2. Prototyping, Manufacturing & Deployment:

- In-house Prototyping: On-site facilities for rapid prototyping of hardware components.
- Small-Scale Manufacturing: Small-scale sensor hardware production runs.
- Field Trial Management: Track record of in-situ field trials of new IoT technologies.

3. Regulatory, Quality & Project Experience:

- Quality Management: Must have ISO 9001 Quality Management System.
- Regulatory Compliance: Design experience for UK/EU standards.

Sector Knowledge: Previous project experience in solar thermal, building management systems (BMS), or a closely related renewable energy sector is highly desirable.

Challenge 5 – TUAL

Essential Criteria

Operational Experience and Fit

- Embedded Systems Expertise
  - Partner must have direct experience working with embedded development teams and understand the constraints of edge-integrated hardware systems.
- EV Charging Domain Expertise
  - Hands-on delivery experience withing the EV charging environment—including protocols, safety standards, and charger behaviour—is essential for effective integration. Specific applied knowledge with OCPI/OCPP from both device and cloud sides.
- Expert Knowledge in Cloud and Infrastructure Engineering
  - Ability to plan, design, and implement cloud solutions on AWS (AWS certifications and partner status preferred)
- Collaborative Working Style
  - Willingness to work closely with in-house and agency embed and systems teams, including in-person engineering sessions in Glasgow as required.
  - Comfortable engaging in fast-moving, field-driven deployment cycles.

Team and Platform Capabilities

- Developed & Deployable Platform
  - The orchestration platform must already exist, with demonstrated deployment in real-world settings (e.g. industrial IoT, energy, or mobility).
  - The core functions—asset provisioning, OTA updates, and audit logging—must be field-proven, not conceptual.
  - User interfaces to control OTA update assets must be both field-proven and intuitive
- Tamper-Proof Logging Mechanism
  - Partner must offer an immutable audit mechanism (e.g. cryptographic ledger or blockchain) capable of logging update attempts, delivery state, and success/failure events—even under delayed sync conditions.
  - Comprehensive & field-proven firmware version management.
- Multi-Vendor Interoperability
  - Solution must support integration with varied charging hardware and telemetry stacks without requiring bespoke builds for each.

- Resilience to Connectivity Constraints
  - System architecture must operate effectively in low-bandwidth or intermittent environments, maintaining safe local operation without constant cloud access.
- Live Asset State Visibility
  - Must support real-time or near-real-time visibility of fleet-wide asset status and software version control for operational and compliance needs.

Desirable Criteria

Operational Experience and Fit

- Delivery Experience with Charging OEMs or Energy Platforms
  - Prior collaboration with charger manufacturers, grid integrators, or energy management platforms that operate in field-deployed infrastructure contexts.
- Track Record in Safety-Critical or Regulated Deployments
  - Background delivering systems in environments where auditability, operational assurance, and compliance pressures shape delivery practices (e.g. transport, healthcare, utilities).
- Cross-Disciplinary Integration Mindset
  - Demonstrated ability to work across software, hardware, and operations teams with sensitivity to end-user workflows and on-the-ground constraints.

Team and Platform Capabilities

- Native Blockchain-Based Audit Layer
  - Use of blockchain or similar technologies to reinforce tamper-proof auditability is strongly preferred
- Flexible Infrastructure Support
  - Ability to assist with cloud infrastructure (e.g. AWS setup or deployment acceleration) is beneficial.
- Track Record in Regulated Infrastructure

Prior deployments in regulated fleet, energy, or public infrastructure sectors will be viewed favourably.

Challenge 6 – Stewart Technology

Solution Requirements Overview

The required solution must deliver comprehensive component traceability and authentication throughout the electronics manufacturing ecosystem, achieving full compliance with IPC-1782 external traceability standards while seamlessly integrating with existing manufacturing execution systems. The solution should establish provenance from component origin through final assembly, enabling secure data sharing among our supply chain partners and providing verification of component authenticity to eliminate counterfeit ingress.

Beyond external supply chain traceability, the solution must integrate factory-wide statistical process control capabilities through IPC-CFX standard implementation, to create a unified view of both external component provenance and internal manufacturing processes.

Critical Technical Requirements

Standards Compliance (Essential)

- IPC-1782 Traceability Standard Compliance: Solution must fully implement all four Critical Tracking Events (CTEs) as defined in IPC-1782 for external traceability:
  - Material Packing
  - Material Logistics
  - Material Processing
  - Material Consumption
- IPC-CFX Compatibility: Integration capability with IPC Connected Factory Exchange protocols for machine-to-machine communication

Software & System Requirements

- MRP System Integration: Integration with our existing MRP system – Cim50, through APIs
- Blockchain Architecture: permissioned blockchain platform with data/IP privacy protection capability (as recommended by IPC-1782)

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Atrium Court 50, Waterloo Street, Glasgow, G2 6HQ

www.scottish-enterprise.com