Hydrogen Capabilities

Supporting the development and deployment of novel hydrogen technologies and systems

UNIVERSITY of STRATHCLYDE
PNDC

Hydrogen Capabilities

Whole energy systems R&D facility

Opened in 2013, PNDC is an established whole energy systems research, test and demonstration environment across multiple locations and one of the multi-award-winning University of Strathclyde's industry-facing innovation centres.

PNDC focuses on accelerating the development and deployment of novel energy and transport technologies through multiple collaboration models and open access facility provision for engagement with the innovation ecosystem.

With established partnerships within energy companies and technology developers, PNDC provides an ideal platform to support technological advances within integrated energy systems.

Engage with us:

- pndc@strath.ac.uk
- pndc.co.uk
- @PNDC_UK
- /company/pndc/

UNIVERSITY of STRATHCLYDE
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In collaboration with:

SP ENERGY NETWORKS
Scottish & Southern Electricity Networks
UK Power Networks
HALO URBAN REGENERATION
orion Clean Energy Project

Accelerating Innovation

Novel hydrogen technologies & systems

With significant capability enhancement and facilities expansion, PNDC is supporting the development and deployment of novel hydrogen technologies and systems.

Our hydrogen capabilities include:

- **Whole energy system analysis and testing**
  Assessment of how novel hydrogen technologies and systems interact and integrate with other systems, including the ability to explore whole system performance boundaries and assess external threats (e.g. cyber security).

- **Future-proofing**
  Using scenario-based analysis and real-world validation to de-risk and future-proof the performance and commercialisation pathways of novel hydrogen technologies and systems.

- **Hydrogen technology and systems engineering**
  Appraising the technical viability, innovation requirements, and scale-up & commercialisation challenges associated with novel hydrogen-based technologies and systems.

- **System modelling, real-time simulation, and network emulation**
  De-risking of hydrogen-based generation, storage and transport systems prior to validation testing, including capability in fluid mechanics, heat transfer, and electrical system modelling and simulation.

- **Real-world testing and demonstration**
  Enabling the study and de-risking of the performance and interactions of hydrogen-based generation, storage and transport systems in real network conditions.

University of Strathclyde Glasgow

Access to the renowned University of Strathclyde academic expertise

The University of Strathclyde has a strong track record in renewable energy and energy storage systems. As a leading international university and a place of useful learning, Strathclyde includes the Institute for Energy & Environment, one of Europe's foremost and largest power systems and energy technology university research groups.

The collective expertise at PNDC and across the University facilitates multi-vector innovation challenges and opportunities, including:

- Integrated solutions and new control and operating methodologies for validating and accelerating energy systems innovation.
- Enhanced system flexibility provision, including the role and performance evaluation of advanced energy storage systems.
- World-leading research with knowledge exchange to Tier 1 companies and their innovation-led supply-chain partners and other SMEs.

In 2019, Strathclyde was awarded a Queen's Anniversary Prize for its excellence in energy innovation.

The Queen's Anniversary Prizes

Meeting Future Needs
Towards commercial realisation

PNDC, in collaboration with industrial and academic partners, can support innovators and energy companies to de-risk new hydrogen technologies and systems and accelerate them towards commercial realisation.

From modular production and scaling up to the integrated design of electrolyser and power electronics, PNDC provides an innovation environment with continual capability enhancement in hydrogen storage, capacity, supply pressure and flow measurement systems - enabling the design, testing and validation of technologies at scale.

Our expert team can assess and validate operating methodologies for enhanced system flexibility provision across energy storage systems and multiple business models and technology combinations.

Get in touch to discuss collaborative opportunities and PNDC membership.

pndc@strath.ac.uk www.pndc.co.uk

Case Study
Hydrogen Accelerator

H2A Hydrogen Accelerator

European Union
European Regional Development Fund

PNDC is a partner in the Hydrogen Accelerator, a collaboration between the University of St Andrews and the University of Strathclyde.

The Hydrogen Accelerator supports the co-ordination of Scotland's key hydrogen initiatives and delivers vital project management and technical guidance and support, particularly in the area of fuel cell technology, with the purpose of enabling capabilities in Scotland to create new opportunities driven by the growth of the hydrogen economy.

Stimulating innovation in hydrogen technologies | MAKE - MOVE - USE
PNDC engages with industry to provide research support and conduct analysis of the challenges and opportunities for technology de-risking to accelerate the evolution of hydrogen-related technologies.

University of St Andrews | Scottish Government Riaghaltas na h-Alba gov.scot | TRANSPORT SCOTLAND CÒMHDHAIL ALBA | UNIVERSITY of STRATHCLYDE PNDC

Innovation Value Chain
Integrated energy systems expertise

PNDC supports technology developers, system integrators and end-users from definition to delivery, through towards full commercial deployment and impact assessment.

Shaping Innovation Requirements

- Specification of project requirements based upon industry needs.
- PNDC expertise within the development of innovative testing process and methodologies.

Device Testing

- Provision of unique, fully controllable, and flexible network for de-risking of technologies for operational and customer benefits.
- Accelerated development of new hardware/software through rapid testing at scale through PNDC physical and simulation environment.

Systems Validation

- Systems-level validation utilising PNDC assets and capabilities addressing network integration challenges.
- Ability to demonstrate end-to-end capability of technologies within realistic power systems, communications, and cyber security testbed.

BAU Deployment & Real World Demonstration

- Replicating real world scenarios, proving performance in cost-effective and reduced risk environment, leading to live network deployment.
- Ability to attract further leverage to engage the wider supply chain in live network trials and commercial deployment with follow up impact assessment.

INVESTMENT

PNDC's expansion of its unique innovation environment is supported by investment from the Scottish Government's Green Jobs Fund, UKRI and Transport Scotland.

TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

Scottish Government
Riaghaltas na h-Alba
gov.scot

UK Research and Innovation

Through investment in its capabilities, PNDC is helping to advance vital research and accelerate the development of sustainable energy systems for a just transition to net zero.

GET IN TOUCH

Find out more about our work or talk to us about opportunities for collaboration, including PNDC membership.

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