



Department for
Science, Innovation
& Technology



NMS Flow Programme update

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Agenda

01 Flow Programme 26-27 overview

02 Knowledge Transfer & Traceability

03 Development projects

04 Research projects



National Engineering
Laboratory



Flow Programme

Core

R&D

Knowledge
Transfer

Traceability

Research



Development



Knowledge Transfer

- Focus on publications such as journal articles, best practice guides and case studies
- Online repository for FP research
- Webinars with engaging panel-led discussions
- Focus Groups across UK
- School outreach activities

Standards

- Develop new CEN CCUS metering standard
- Chair revision of OIML and ISO standards
- Representation at Energy Institute and InstMC committees
- Represent UK at EURAMET, BIMP WGFF and other international committees

Enhance National Measurement Capability

- NEL's Calibration Measurement Capability (CMC) spans diverse fluids, temperatures, pressures, and flow rates
- Strengthening UK measurement traceability by closing gaps and improving uncertainty

Achieve UKAS Accreditation

- Many facilities are accredited, but some gaps remain
- Addressing these gaps will boost confidence and competency across more areas of operation



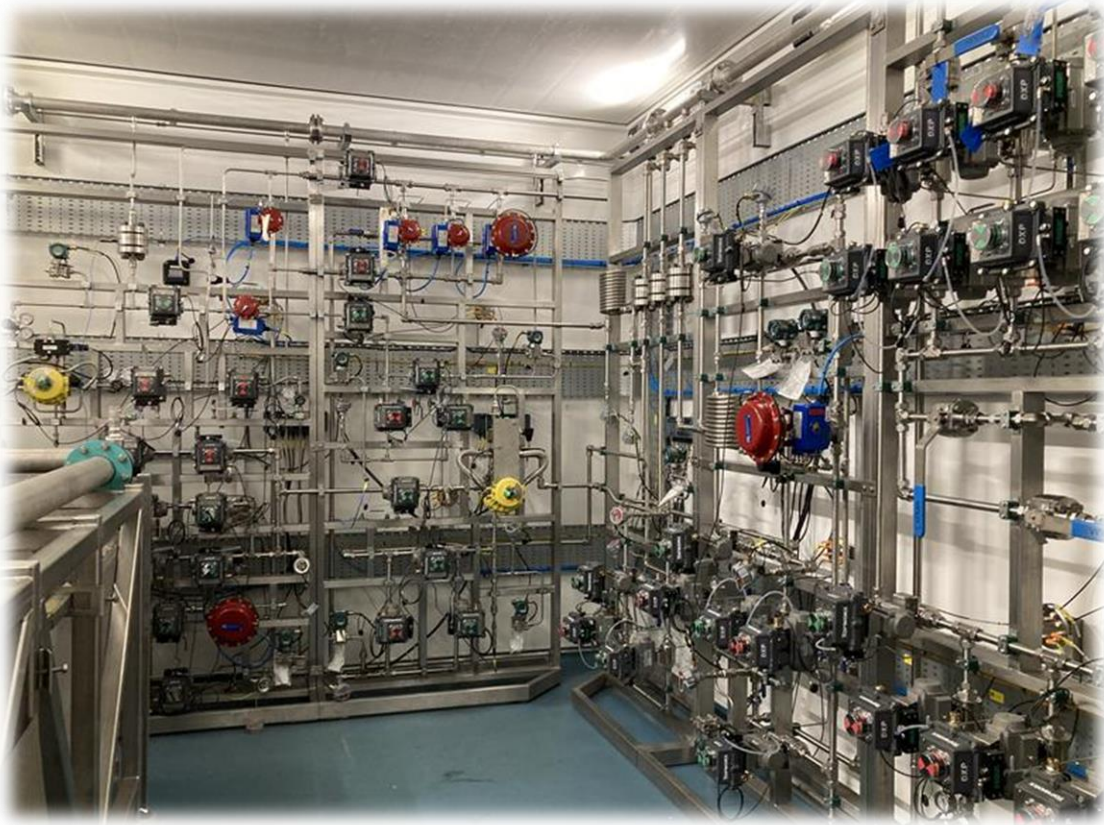


Modernize and Optimise CMC Values

- Many CMCs have remained static for years.
- Opportunity to reduce CMC values through data review, equipment upgrades and alternative calibration techniques.

Support Industry and Innovation

- Lower CMCs enable high-precision calibrations.
- Benefits include reduced uncertainty and position the UK as leaders in flow measurement



Primary Gas Facility Development (PVTt)

- Complete validation and commissioning of UK primary gas standard
- Establish in-house calibration capability across key gases
- Reduce reliance on overseas NMIs and support UK industry

Secondary Gas Facility Development

- Modernise facility for CO₂ and N₂ calibration capability
- Integrate new master meters and data systems

Secondary Density Facility Replacement (FEED)

- Complete FEED and detailed design for new density facility
- Support densitometers and Coriolis calibration capability

Water Facility Development

- Define concept and FEED for new primary water standard
- Provide robust design basis for future implementation

EPAT Facility – Coriolis Reference Upgrade

- Develop FEED for upgraded reference metering system
- Evaluate Coriolis meters as primary reference

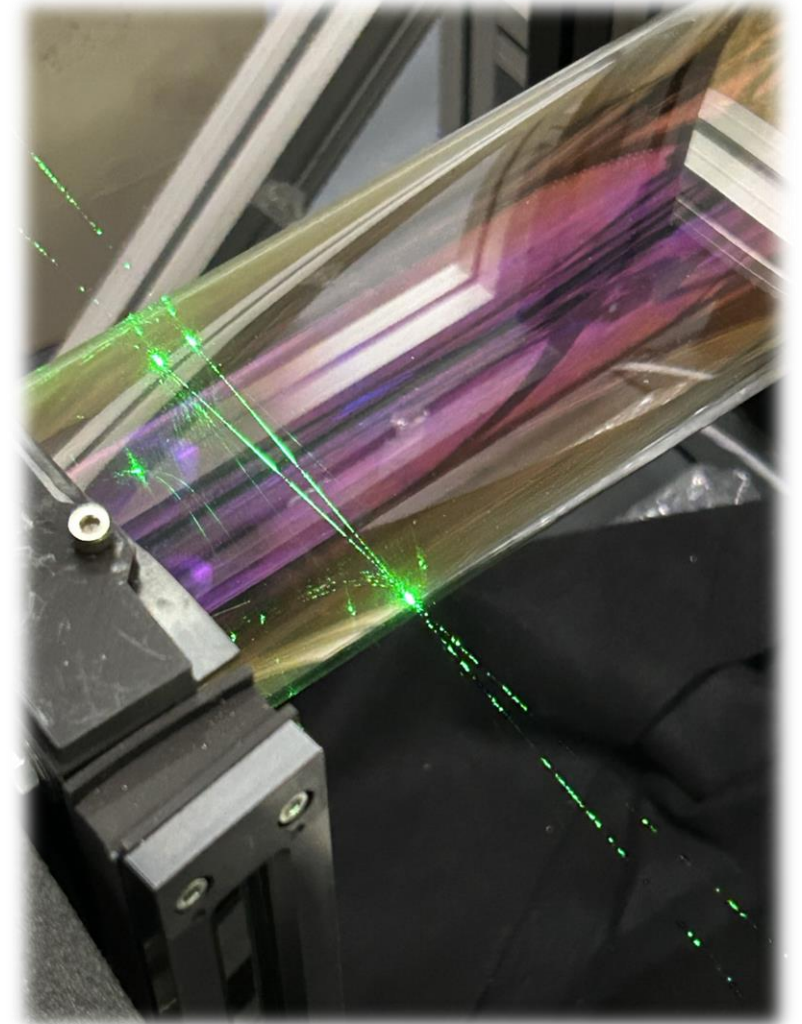


Establish UK High-Pressure Gas Primary Standard (LDV)

- Develop LDV primary standard for high-pressure gas flow
- Reduce reliance on overseas calibration facilities
- Target improved uncertainty and strengthened traceability chain

Remote Calibration & AI-Enhanced Measurement

- Transition to digital, remote calibration using cloud and ML
- Enable real-time data capture and predictive maintenance
- Reduce cost, human error, and need for on-site activity





Flare Combustion Efficiency Modelling

- Improve confidence in flare efficiency and emissions reporting
- Use CFD and experiments to replace fixed efficiency assumptions

Digital Flow Meter Calibration Standards

- Develop calibration methods for digital flowmeters
- Address analogue vs digital signal processing differences
- Ensure reliable calibration for next-generation systems

Flow Measurement for CCUS-2

- Advance flow measurement for CO₂-rich streams (target ~±1% uncertainty)
- Address impurities, compositional effects, and density measurement
- Guidance for meter selection and CCUS system design

Advanced Thermodynamics of CO₂-Rich Systems

- Generate experimental data on phase behaviour and fluid properties
- Utilise NEL thermodynamic test rig for CCUS conditions
- Improve models and measurement accuracy for CO₂ transport and storage







Thank you



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