

Safe H₂ Pipeline Infrastructure for Europe

Two complementary project ideas for
metallic and **polymeric H₂ pipelines**



SCIOFLEX
HYDROGEN

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SCIOFLEX Hydrogen GmbH | Short pitch deck

Why SCIOFLEX is relevant



Mattersburg (Burgenland), Austria

Core capability

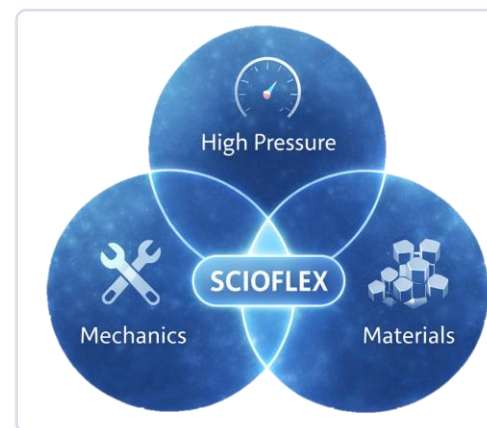
In-situ material characterisation in pure H₂ up to 400 bar

Application focus

Qualification support for metallic and polymeric materials

Why this matters for the pitch

Rare competence at the interface of hydrogen, materials, fracture mechanics and qualification.



What we bring to the table

- Testing and qualification for both metals and polymers
- Standardised methods for metals; tailored method development for polymers
- Focus on fracture mechanics, crack propagation, lifetime and safety-critical components

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Why hydrogen pipeline integrity matters now



European Hydrogen Backbone
50,000 km pipeline network by 2040

Need

Europe needs safe, durable and low-leakage H₂ pipelines to scale cross-border hydrogen transport.

Gap

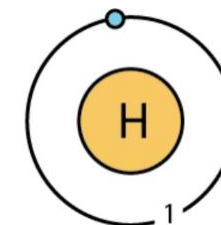
Critical gaps remain in weld integrity, material qualification data and lifetime prediction.

Response

Two complementary CET-ready concepts: H₂WELD-INTEGRITY (metal pipelines) and H2SAFE-PIPE (polymer pipelines).

Cross-border relevance

Particularly relevant for Central Europe: repurposed gas grids, import corridors and industrial demand centres all need safe and reliable H₂ transport infrastructure.



Target funding route: CETPartnership Joint Call 2026 | Call module: Hydrogen and renewable fuel

Project 1 | H₂WELD-INTEGRITY

Metal pipelines



Objective

Safe and efficient transport of renewable H₂ and H₂-NG blends through improved welded-joint integrity.

Core development

- Assessment on weld degradation and H₂ embrittlement
- Advanced UT + CT-supported defect detection
- In-situ H₂ compatibility testing
- AI inspection and lifetime prediction

Outputs

- Validated inspection protocols
- Datasets for weld integrity assessment
- Evidence base for operators and standardisation bodies

TRL 3 → 5

Validation on representative pipeline welds

Existing consortium

- VZÚ Plzeň (CZ) – coordinator
- SCIOFLEX Hydrogen (AT)
- INTOM GmbH (DE)
- Hochschule Karlsruhe (DE)



Consortium workflow and validation logic

Seeking partner

End-user partner: pipeline operator, infrastructure owner or pilot site

Project 2 | H2SAFE-PIPE

Polymer pipelines



Objective

Development and validation of recyclable polymeric materials for high-pressure H₂ transport in pipelines.

Core development



Outputs

- Validated H₂-compatible materials
- Qualification test methods
- Datasets for pipe lifetime prediction

TRL 3 → 5

Demonstration on representative pipe section

Current consortium

- SCIOFLEX Hydrogen (AT) - coordinator; H₂ testing & qualification
- Montanuniversität Leoben (AT) - testing & lifetime assessment
- IPPE / JKU Linz (AT) - MD modelling, sustainability & LCA

Seeking partners

- Polymeric material provider
- Pipeline operator / end user
- Pipe manufacturer / system integrator
- Certification / standardisation body

Why it complements Project 1

Together the two projects cover both repurposed metallic assets and next-generation dedicated H₂ pipeline systems.