



# kellas

## MIDSTREAM

**NIIFTA... the story so far**

***Non-Intrusive Inspection Field Trial  
Accelerator***

**Stefan Kent CEng FInstMC**

## Recap - Corrosion Under Insulation - CUI

*CUI detection lacks innovative solutions and requires robust field verification to bring new techniques and equipment to market readiness*

### What is CUI?

- When plant and pipework are insulated, there is usually a space under the insulation where water, if it gets in, can collect and potentially cause corrosion.
- These areas, covered with insulation are hidden from view making corrosion difficult to spot.
- If left undetected, CUI can result in catastrophic and costly equipment failures and environmental concerns.

### How can NIIFTA help?

**Accelerate** piloting and testing of CUI detection technologies via collaboration of onshore terminal operators to trial more prospective technologies, more quickly, at lower cost and risk than offshore.

**Start** with CUI and progress to Vessel Inspection and other NII areas later.

### What are the hazards?

- Since 1984, out of the 137 major oil and gas accidents reported within the EU over 20% were associated with CUI [1].
- It is currently estimated that CUI incurs 40 – 60% of process plant maintenance costs within the UK Continental Shelf (UKCS).
- The value impact to the industry for more efficient inspection techniques would be in the region of £130M per annum to the UKCS.
- NIIFTA has the potential to help unlock these cost savings *and* provide faster, more effective detection of CUI.

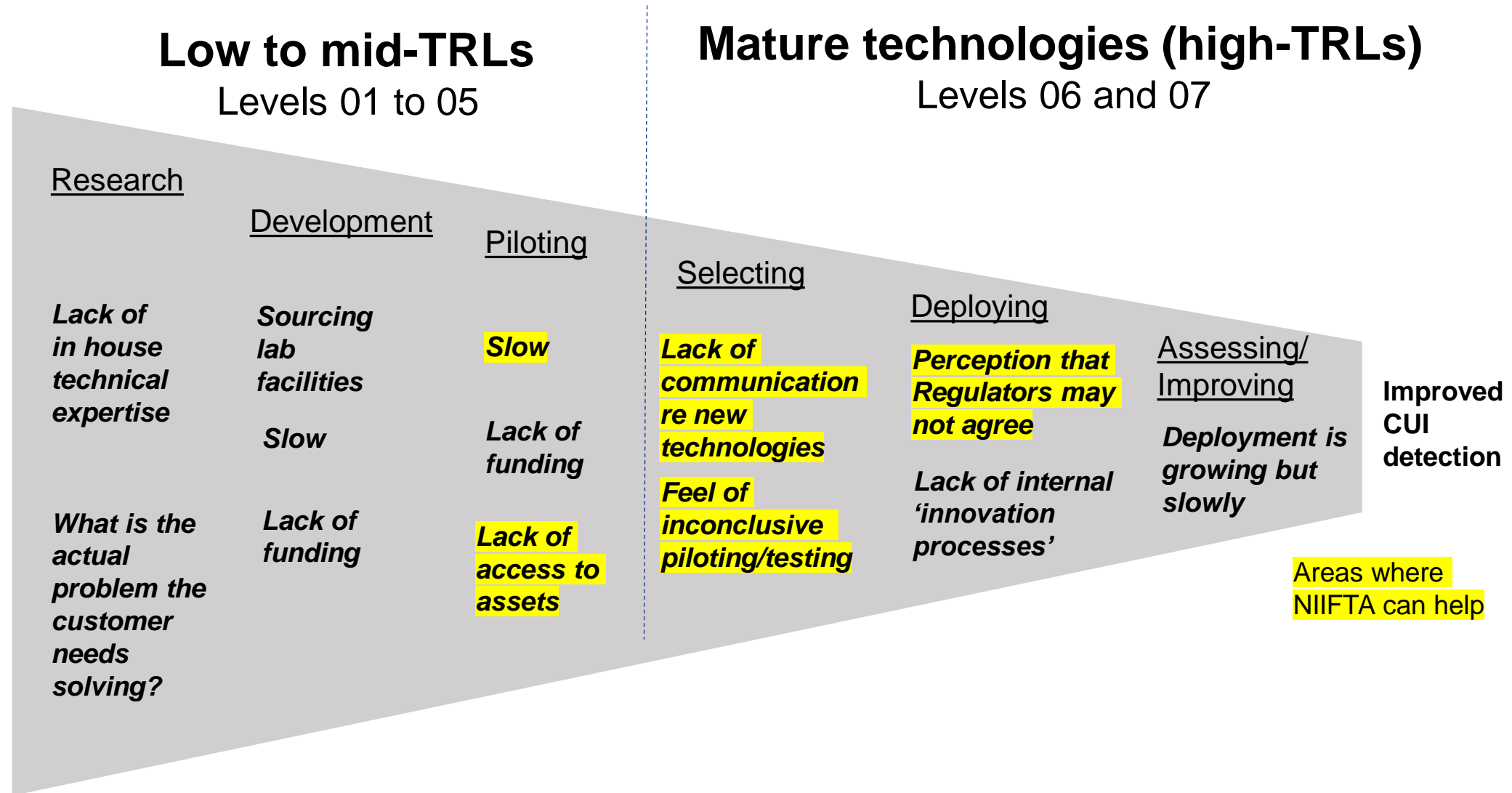
## CUI – what lies beneath

*There are currently no single solutions as alternatives to “strip & inspect” – what if we could monitor for CUI all the time?*



# CUI detection technologies – what are the challenges?

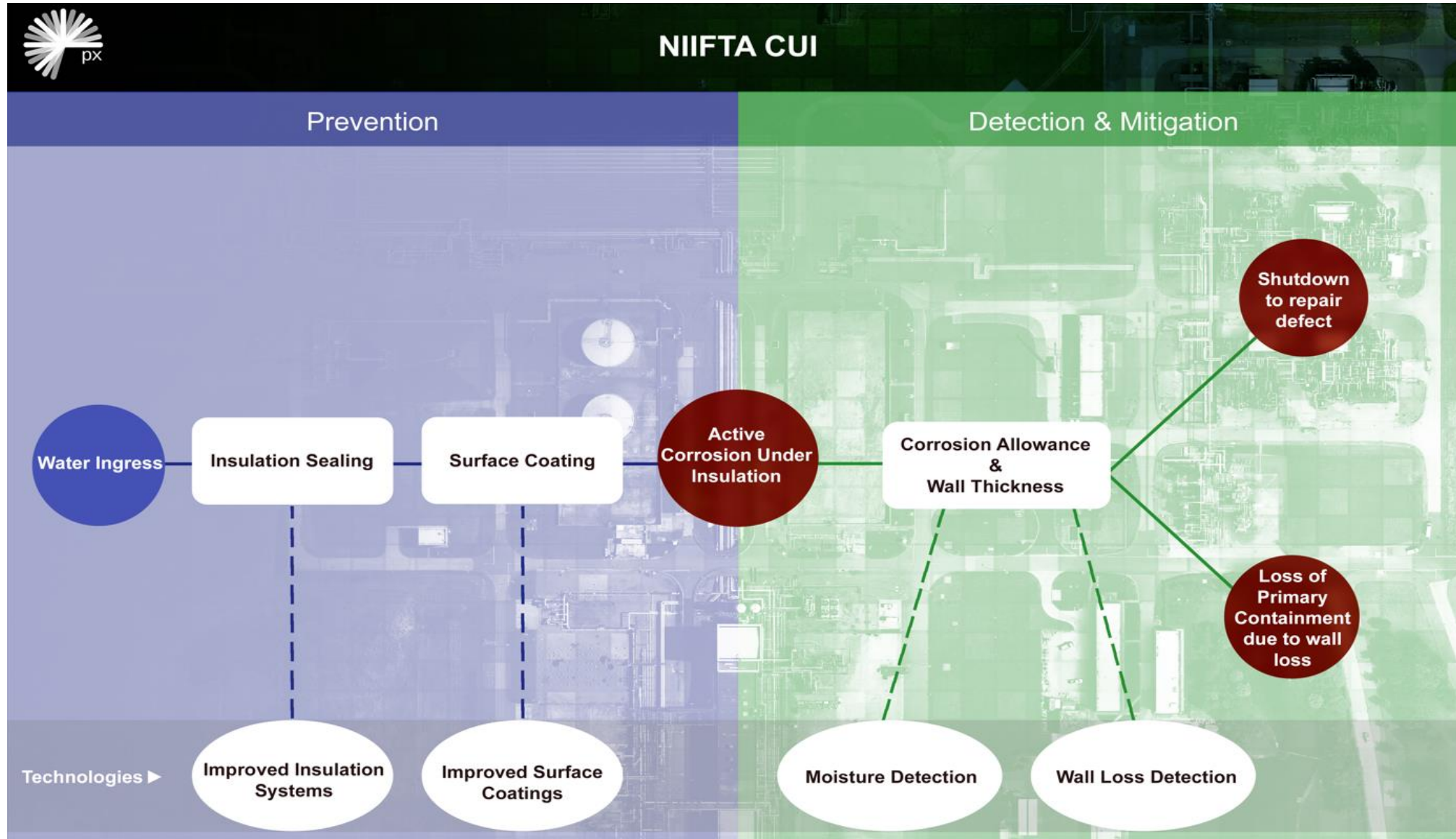
*Perceived barriers to entry for new technology*



# Bowtie diagram – CUI prevention, detection and mitigation concepts



Prepared for NIIFTA by Px



## Two main CUI detection technologies are evolving

*Each requires a different field trial protocol*

### 1. Indirect methods – find moisture in insulation which may be associated with CUI

- Visual examination
- Water collectors
- Moisture detectors
- Infra-red thermography
- Neutron backscatter

### 2. Direct methods – identify CUI through the insulation and cladding

- Guided wave testing (inspection and monitoring)
- Radiography (incl. real-time imaging)
- Advanced electromagnetic sensors
- Monitoring using permanently installed sensors

## Developing a robust test protocol

*Field trials must be credible to provide confidence to operators, regulators and for developers to continue to invest*

### Factors include:

- Pipe diameter and wall thickness
- Geometry changes (e.g. elbows)
- Insulation type and thickness
- Cladding type (ferromagnetic/stainless steel, aluminium, non-magnetic)
- Corrosion morphology (localised pitting/extended corrosion, circumferential/axial extent)
- Maximum wall loss and cross-sectional profile

**Valid to draw comparisons between results from trials on these same components - but cannot generalise to areas of wall loss with different factors**



## NIIFTA summary workflow

*Accelerate onshore testing of prospective NII technologies, more quickly, at lower cost and risk than offshore.*

Trial candidates to include NZTC current/past projects (NZTC-graduates), HOIS-graduates and others



- Discussions held with 7 terminal operators representing 12 onshore facilities.
- Meetings held at Kellas office and SAGE gas terminal.

- Dialogue with HOIS/ESR Technology re field trial design, results verification and independent reporting.
- Funding proposal with NIIFTA members.

- Positive engagement with HSE, supportive of NIIFTA concept.
- Alignment with terminals planned maintenance outages.

- Non-disclosure agreements (NDAs) being developed for NIIFTA members & technology providers review and comment.



## NIIFTA – Forward Plan

*NIIFTA evolved from the Technology Leadership Board's Industry Sponsor Programme – NII for CUI Project, Led by Kellas Midstream*

- Develop NIIFTA CUI field trial roadmap and optimised plan;  
**identify** → **select** → **agree** → **trial** → **record** → **assess** → **share outcomes**
- Seek out trial candidates through NZTC call, supplemented via TLB's Technology Managers' Network and Topsides UK presentations.
- Produce question set for developer selection, e.g. required test duration, ATEX, live vs mothballed systems, temperatures, timelines, confirmation of field trial readiness, agreement on trial design and results sharing etc.
- Capture HOIS/ESR knowledge in field trial design; secure independent party for trial oversight and reporting.
- Keep HSE informed and engaged.
- Build cooperation across NIIFTA group, led by Kellas Midstream, securing access for trials, dovetailing with already planned maintenance programmes where appropriate.
- Demonstrate multiple viable alternatives to existing inspection practice, securing industry confidence and regulator acceptance.



## NIIFTA – Latest News

*Outcome of NIIFTA meeting held on Friday 3<sup>rd</sup> November 2023*

- NIIFTA are delighted to announce that the first two technologies have been chosen for field trials
- One **Indirect** (moisture detection) technology and one **Direct** CUI detection technology.
- The successful candidates are:



FLUVES

- Subject to satisfactory progress etc., the first trails will start early in 2024, followed by a second, larger batch later in the year.



## **NIIFTA – Non-Intrusive Inspection Field Trial Accelerator**

*Start with CUI with potential progression to Vessel Inspection and other NII areas once process established*

**Any Questions?**