



Proven Technologies to Reduce Flaring and Venting Emissions

15th February, 2022



Score **Group**

Some Perspective on
flaring reduction...

\$2.5m Capex Planned

62off Valves Targeted “JICM”

\$20k Monitoring Survey

615T Emissions / Annum

8off Leaking Valves Repaired

54off Valve Repairs Avoided

\$343k Annual Gas Recovery

\$3m Net Gain in Year 1

Fastest and most reliable pathway to “Net Zero”



Single source provider
(Breadth & Depth of Services)

Criticality Driven Focus, Risk
Management

Innovative Monitoring Solutions &
Engineering Support

Quantification (For top-down approach,
and repair prioritisation)

Permanent and temporary
maintenance capabilities

Close the loop :—
find it, fix it AND improve!



EMISSIONS ELIMINATION PROGRAM FROM SCORE GROUP

The single source solution, supporting your
journey towards zero leaks and emissions



Timeline to “Net Zero”



SHORT TERM (< 1YEAR)

Compliance & Beyond

- 4-step GHG Emissions Elimination Program (EEP)
- Prioritisation – Surveys – Analysis – Quantification – Rectification – Continuous improvement

MEDIUM TERM (Year 1-3)

Enhanced Emissions Elimination

- Improved accuracy and cost-effective methods
- Support services to generate and deliver Net Present Value (NPV) positive solutions to reduce (eliminate) flaring/venting/fugitive emissions
- Broader approach to reduce environmental losses

LONG-TERM (Year 3+)

Optimised Emissions Elimination

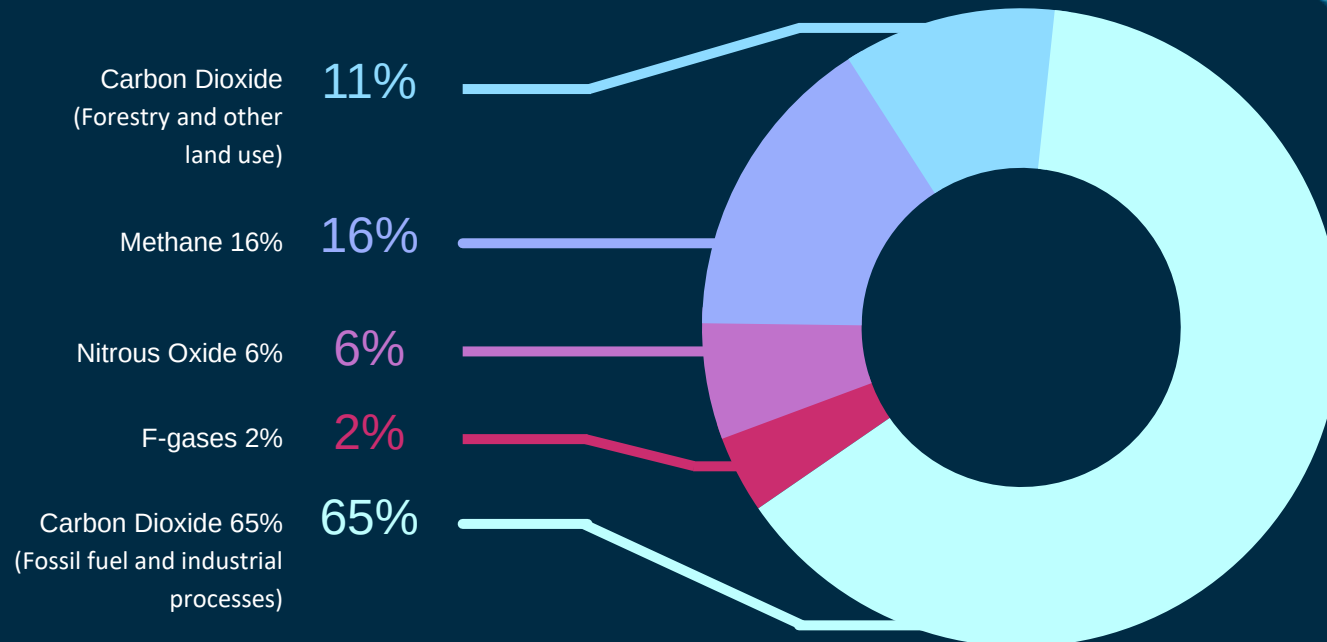
- Macro solutions for flaring and emissions
- Permanently installed sensors/systems enhancing remote monitoring capabilities, no survey requirement
- Continuous improvement of plant assets and systems, valve performance etc.
- Thinking beyond - supporting the transition journey to green energy
 - Valve recycling
 - Engineering support
 - Materials engineering – Hydrogen/CCUS

Target Leaks and Emissions Sources

- A holistic approach

Global Greenhouse Gas Emissions by Gas

Plus all other 'non-Greenhouse Gas' process leaks and emissions.



LEAKS TO ATMOSPHERE

From plant & equipment

LOSSES TO FLARE AND VENTING

ISOLATING VALVES POINTING TO FLARE

LOSSES TO VENTS/DRAINS

ISOLATING VALVES POINTING TO FLARE

SYSTEM INEFFICIENCIES

GENERATING CO2 AS A BI-PRODUCT

NON-FUGITIVE EMISSIONS

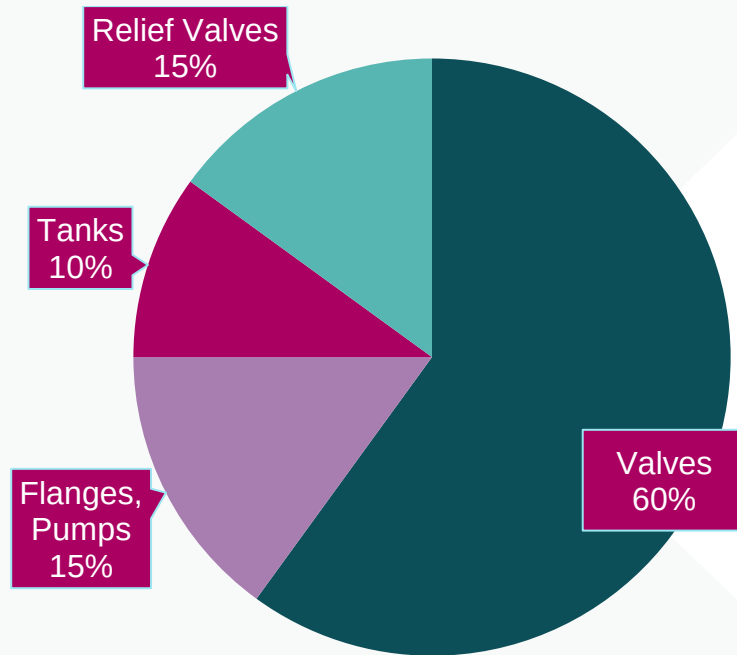
CORROSION CRACKS IN PIPEWORK ETC.



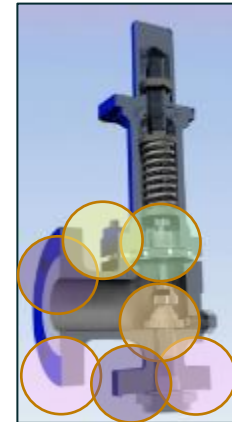
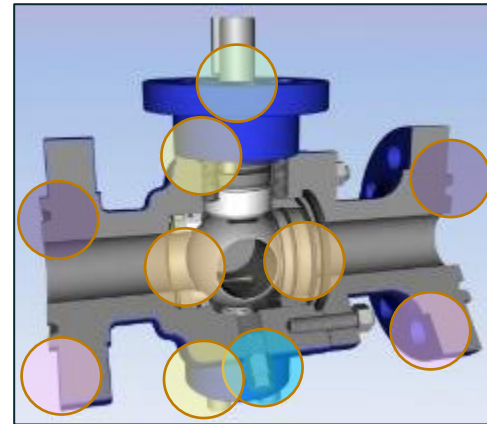
Why are valves a primary focus for “Net Zero” discussions?



Fugitive Emission Sources by Percentage



Source – Monitoring and containment of Fugitive Emissions from Valve Stems, University of British Columbia, Vancouver



Stem Seal Failure

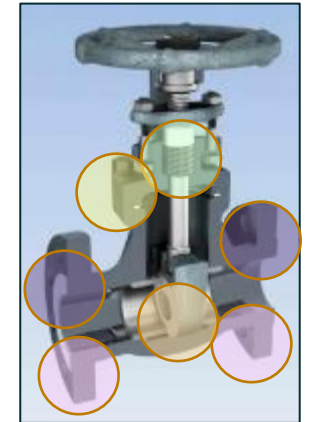
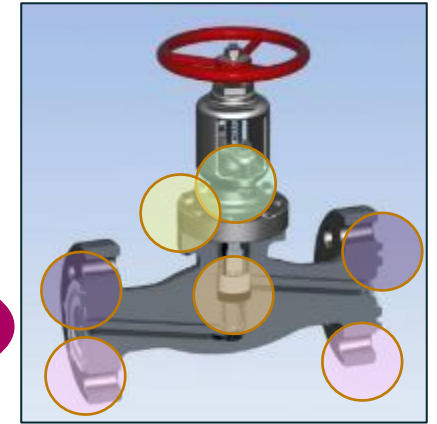
Flange Bolting

Through Seat

Flange Facings

Body to Bonnet and Trunnion Bolting

Plug and Vent Fittings



Leak Paths on Ball, Globe, Relief and Gate Valves

EMISSIONS ELIMINATION PROGRAM

PROVIDING CROSS INDUSTRY SUPPORT TO ACHIEVE ZERO EMISSIONS

A single source solution,
supporting your journey towards
zero leaks and emissions.

TOOLS AND TECHNIQUES



- MIDAS Meter®, MIDAS® Sensor, V-MAP®
- Optical gas imaging
- Thermal imaging
- VOC/FID Sniffers
- Ultrasound (airborne/structural)
- Non-Destructive Testing
- Complementary condition monitoring tooling
- Quantification tooling and software
- Software solutions (digital survey tablet)

SOURCES OF LEAKS & EMISSIONS



Leakages to
atmosphere



Losses to flare



Losses to
vents/drains



System
inefficiencies



Non-fugitive
emissions

SOURCES OF LEAKS AND EMISSIONS

EEP

- CO₂
- METHANE
- OTHER PROCESS FLUIDS



LEAKAGES TO ATMOSPHERE

- Loss of Tightness from equipment/other connection issues

- OPTICAL GAS IMAGING
- VOC/FID SNIFFER
- QUANTIFICATION TOOLING



LOSSES TO FLARE AND VENTING

- Internal through-valve leakage on isolating valve populations pointing to flare

- MIDAS METER®
- MIDAS SENSOR® ACOUSTIC EMISSIONS



LOSSES TO VENTS/DRAINS/STACK

- Internal through-valve leakage from isolating areas

- MIDAS METER®
- MIDAS SENSOR® ACOUSTIC EMISSIONS



SOURCES OF LEAKS AND EMISSIONS

EEP

- CO₂
- METHANE
- OTHER PROCESS FLUIDS



NON FUGITIVE EMISSIONS

- Loss or emission to atmosphere due to causes such as corrosion pinholes or cracks in process containment systems

- NDT – ULTRASONIC THICKNESS TESTING



SYSTEM INEFFICIENCIES

- Mitigating Generators of CO₂

- THERMAL IMAGING
- ULTRASOUND (AIRBORNE/STRUCTURAL)
- MIDAS METER® MIDAS® SENSOR
- ACOUSTIC EMISSIONS
- V-MAP®
- OTHER CONDITION MONITORING TOOLING

MIDAS® VALVE DIAGNOSTICS RANGE

KEY QUANTIFICATION TOOLS FOR ONLINE MONITORING AND EVALUATING

Score's proprietary suite of monitoring equipment and systems include:-

- **Permanently deployed MIDAS® Sensor / V-MAP®**

System for continuous, non-invasive valve condition and performance monitoring of critical valves and the process/systems in which they are operating. With almost 20 years of successful operation

- **Hand-held MIDAS Meter®**

Non-Invasive Through-Seat Leak Testing tool. Delivers a proven valve monitoring technology. With a track record of more than 10 years.

Used globally by companies in the oil and gas, petrochemical, utility, energy and wider process industries

MIDAS® Sensor / V-MAP® - For continuous and automated leak detection, quantification and trending

BENEFITS

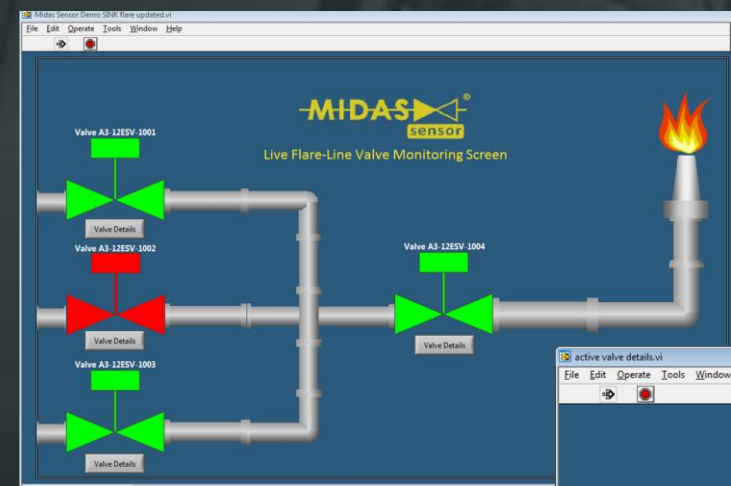
- Remote monitoring of all valve operations
- Margins monitoring supports predictive approach to maintenance
- Evidence to drive proactive and predictive maintenance activities
- Performance standards for all Safety Critical Elements
- Condition and performance reporting on every valve stroke
- Trending of valve, actuator and drive train over product life cycles
- Manages risk and reduces exposure to failures for personnel

FEATURES

- Issues warning of any performance deterioration
- Remote access to data and analysis functions
- Provides trending, benchmark comparison, reports and audit records
- All ESV operations are recorded
- Monitors the actuator supply pressure and strain between valve operations
- Seamlessly integrates with customers' Site Automation Systems (SAS)

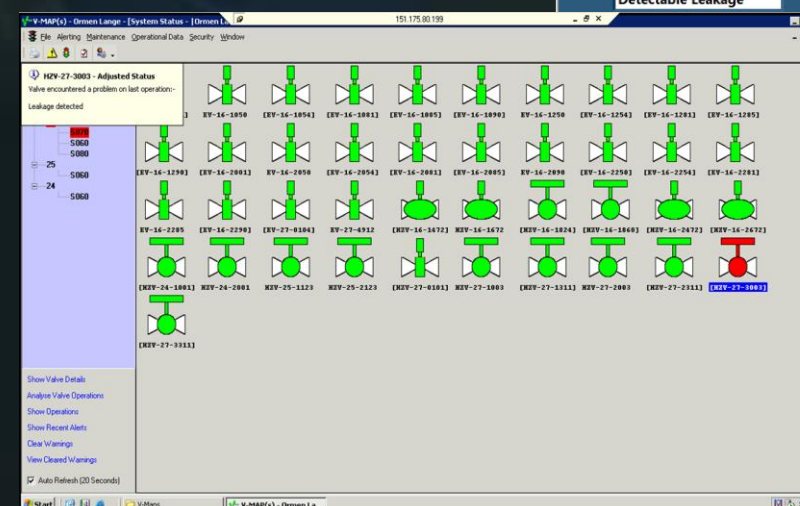
APPLICATIONS

- Asset Integrity Management (AIM)
- Risk Based Inspection (RBI) programmes
- Pre-shutdown planning activities to maximise ROI
- Trouble shooting to avoid shutdowns
- Reliability data for confirmation of Safety Integrity Levels (SILs)



Detect

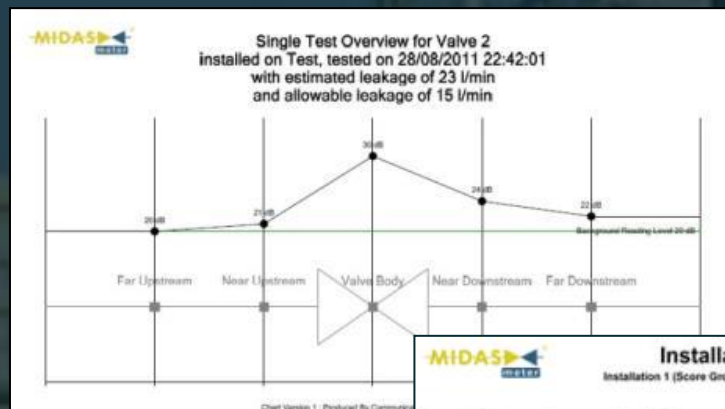
Quantify



Trend

MIDAS Meter® - For hand-held leak detection, quantification and trending

Detect





Installation Summary

Installation 1 (Score Group plc) from 01/07/2011 to 15/07/2011

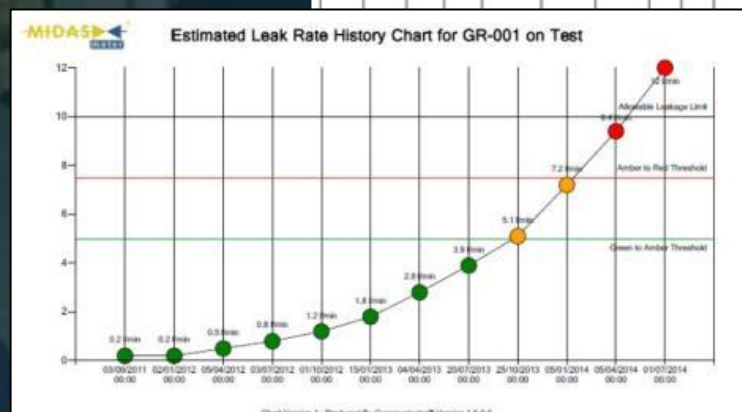
Identification		Operating Conditions				Readings				Leakage				
Test Date	Tag Number	Valve Type	Fluid	Fluid Density	System Pressure	Operating Pressure	Back pressure	Far Upstream	Near Upstream	Valve	Near Downstream	Far Downstream	Estimated Leakage	Allowable Leakage
04/07/2011 10	K00V000	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	20	22	21	21	20	20	0.00m³/min	100.00m³/min
04/07/2011 10	XV-001	Ball	Liquid	0.00g/cm³	40.00bar	40.00bar	21	28	28	28	28	20	0.00m³/min	10.00m³/min
04/07/2011 10	XV-002	Subsely	Gas	0.00g/cm³	40.00bar	40.00bar	20	22	21	21	20	20	0.00m³/min	10.00m³/min
04/07/2011 10	K00V000	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	21	24	23	23	23	21	0.00m³/min	100.00m³/min
04/07/2011 10	XV-004	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	20	23	23	23	20	24	0.00m³/min	10.00m³/min
04/07/2011 10	XV-004	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	20	22	22	22	22	22	0.00m³/min	10.00m³/min
04/07/2011 10	XV-000	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	21	24	23	23	23	24	0.00m³/min	10.00m³/min
04/07/2011 10	XV-002	Subsely	Gas	0.00g/cm³	40.00bar	40.00bar	20	21	21	21	20	21	0.00m³/min	10.00m³/min
04/07/2011 10	XV-000	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	21	21	20	20	20	21	0.00m³/min	10.00m³/min
04/07/2011 10	XV-004	Ball	Gas	0.00g/cm³	40.00bar	40.00bar	20	21	21	21	21	21	0.00m³/min	10.00m³/min
04/07/2011 10	XV-001	Ball	Liquid	0.00g/cm³	40.00bar	40.00bar	21	21	24	24	24	24	0.00m³/min	1.00m³/min
04/07/2011 10	XV-001	Ball	Liquid	0.00g/cm³	40.00bar	40.00bar	21	24	24	27	25	24	0.00m³/min	1.00m³/min

Rate History Chart for GR-001 on Test



Page 1 of 1

Quantify



Trend

BENEFITS

- Reduced operating costs
- Maximised profitability
- Minimised losses
- Optimised process efficiency
- Optimised reliability and uptime
- Minimised safety and environmental risks

FEATURES

- Completely portable and easy-to-use
- Non-intrusive and safe for use in hydrocarbon environments
- Integral display for use stand alone
- Rechargeable battery
- Bluetooth from sensor to PDA for data logging/quantification analysis
- Data download and export capabilities

APPLICATIONS

- Asset Integrity Management (AIM)
- Risk Based Inspection (RBI) programmes
- Pre-shutdown planning activities to maximise ROI
- Trouble shooting to avoid shutdowns

MAINTENANCE SOLUTIONS

NON-INTRUSIVE

- Valve Integrity clamps (stem, gland & plug) ✓
- Pipe & flange integrity clamps ✓
- Isolation barrier sealant injection ✓
- Leak sealing solutions ✓
- Gland packing adjustment ✓
- Controlled bolting ✓
- Composite techno-wrap ✓



PLANNED

- ✓ New valve & actuator supply
- ✓ Joint integrity management
- ✓ Valve & Actuator overhaul & repair
- ✓ PSV inline testing & recertification
- ✓ Lagging inspection & repair
- ✓ Instrumentation/control systems inspection, repair, assembly & supply
- ✓ Hose manufacture & supply
- ✓ On-site machining & fabrication



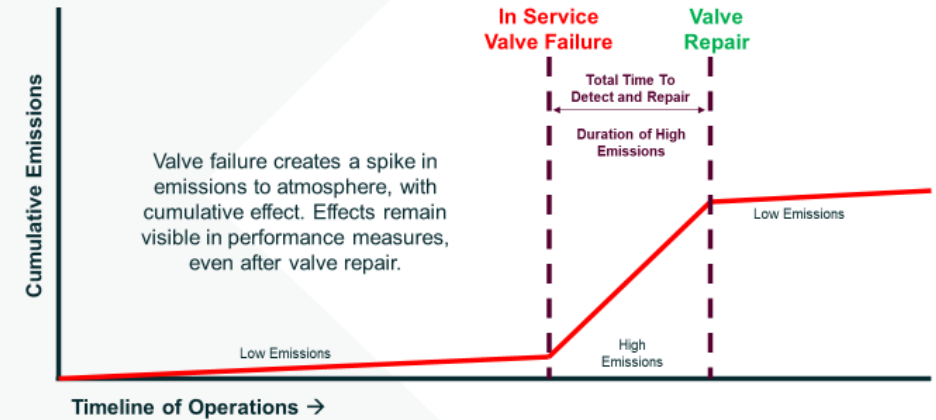


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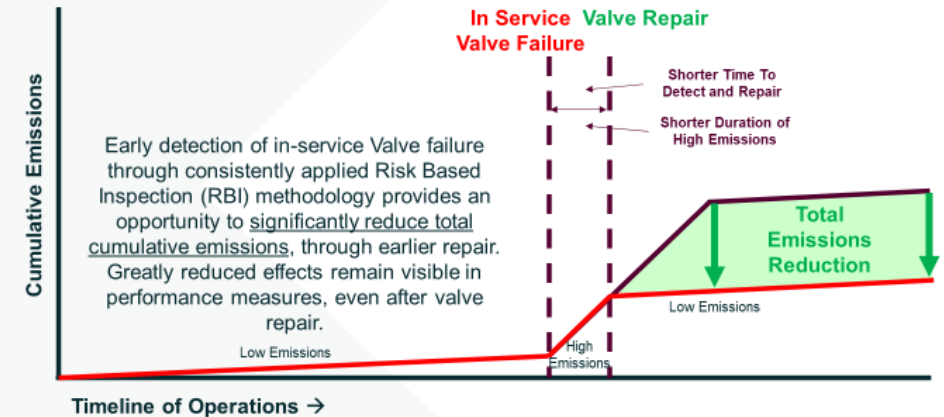
How to Reduce Process Emissions

With Valve Diagnostics Equipment / Systems and Targeted, Fast and Effective Repairs.

Environmental Performance Management (Expected Emissions, Without Condition Monitoring)



Environmental Performance Management (Emissions Reduction, Delivered Through Condition Monitoring)



Case Study

Campaign undertaken at Processing Plant



01

Site Survey

Identified losses of 540 tonnes per annum

02

Data Analysis

Maintenance strategy developed

03

Mitigation

Mobilised to undertake non-intrusive maintenance

04

Improvement

Mobilised to undertake intrusive maintenance



60% reduction achieved

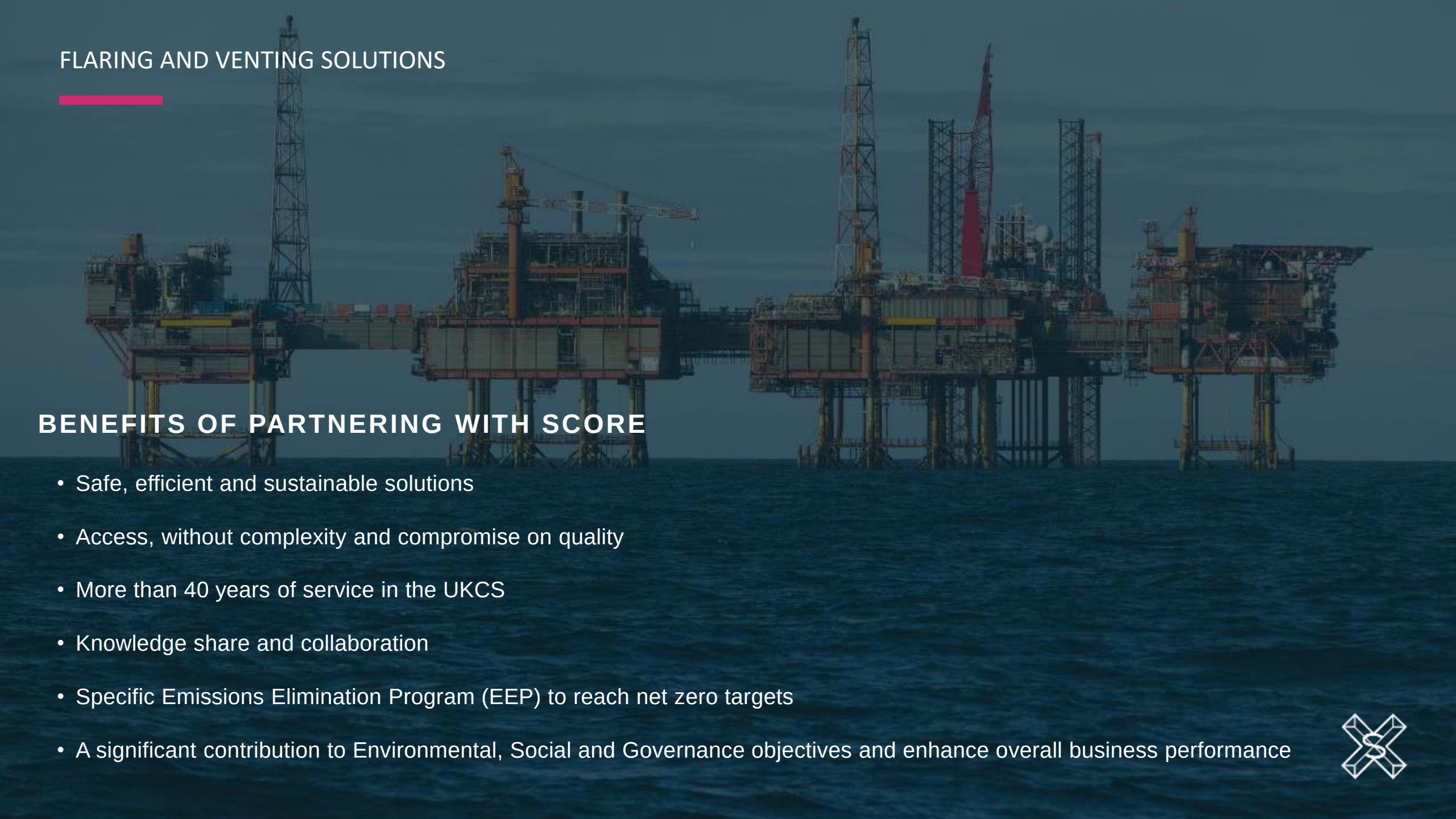
84% reduction achieved on total emissions



Identified & Repaired

- ✓ 178 On-line leaks repaired – valve glands, screwed fittings, instrument tubing and bolted joints
- ✓ 8 Isolation valves identified with through bore leakage – injected with isolation barrier solutions
- ✓ 700+ Valves overhauled
- ✓ 1086 Flanged joints assembled
- ✓ 221+ Flange faces re-machined to spec
- ✓ 142 New valves supplied

FLARING AND VENTING SOLUTIONS

A large offshore oil platform is visible in the background, situated in the middle of the ocean. The platform consists of several interconnected steel structures with various cranes and equipment. The sky is a clear, pale blue, and the water is a deep blue. A solid pink horizontal bar is positioned below the title.

BENEFITS OF PARTNERING WITH SCORE

- Safe, efficient and sustainable solutions
- Access, without complexity and compromise on quality
- More than 40 years of service in the UKCS
- Knowledge share and collaboration
- Specific Emissions Elimination Program (EEP) to reach net zero targets
- A significant contribution to Environmental, Social and Governance objectives and enhance overall business performance





Score **Group**



Working together and implementing our innovative technologies and proven program will help you eliminate emissions.

For consultation or further details, email: EEP@score-group.com

**Thank
You**