

Managing Methane Emissions

We will start at 13.02 to allow participants to finish previous meetings and join the call

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While you are waiting, please access Sli.do which we will be using for Q&A

Event Code:

#GTX6

Sli.do Instructions:

You can access Sli.do at www.sli.do or by downloading the Sli.do app.

Once you've logged on, enter the code above when prompted.

Welcome and Opening

Thank you for joining us today
Please get involved via SLIDO



Steven Vallender
Asset Director

Who will be speaking today?

Matthew Goldberg
Head of Environmental Strategy



Alexandra Kostereva
Gas Europe Research Group



Jemma Prydderch
Project Environmental Solutions



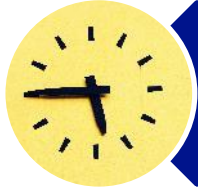
Matt Marshall
Cadent Gas



Jennifer Pemberton
Stakeholder Experience Manager



Logistics



Should last for approximately about 60 min



Questions and polling via slido.com #GTX6



All callers will be placed on mute



We will circulate the slides and a recording of this webinar

Agenda

1. Introduction – what an eventful 12 months

2. European Policy and Research

3. CH₄ Reduction from Gas Equipment Innovation

4. Digital Platform for Leakage Analytics

5. Questions

Gas
Transmission

Matthew Goldberg
National Grid

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Quick poll

Has your focus on methane changed?

Yes

No

If so, how?

Methane Emissions - What's changed?

A new precedent

1. At the Madrid Forum in late 2018, the UN asked the gas industry to produce a paper identifying the steps to further reduce methane emissions. Report accepted by the European Commission (EC) and UN in March'19
2. Oil and gas methane partnership 2.0 launched in summer'20
3. EC announce methane strategy Oct'20
4. EC start consultation on methane legislation for EU in Summer'21
5. IPCC and CCC reports in Jun'21 labeled methane as a focus to limit short-term warming
6. COP26 – UK, US and EU set out methane pledges, 80+ countries follow suit. US and EU setting legislation



GHG-SAT imagery of methane sources for 28-Oct-21

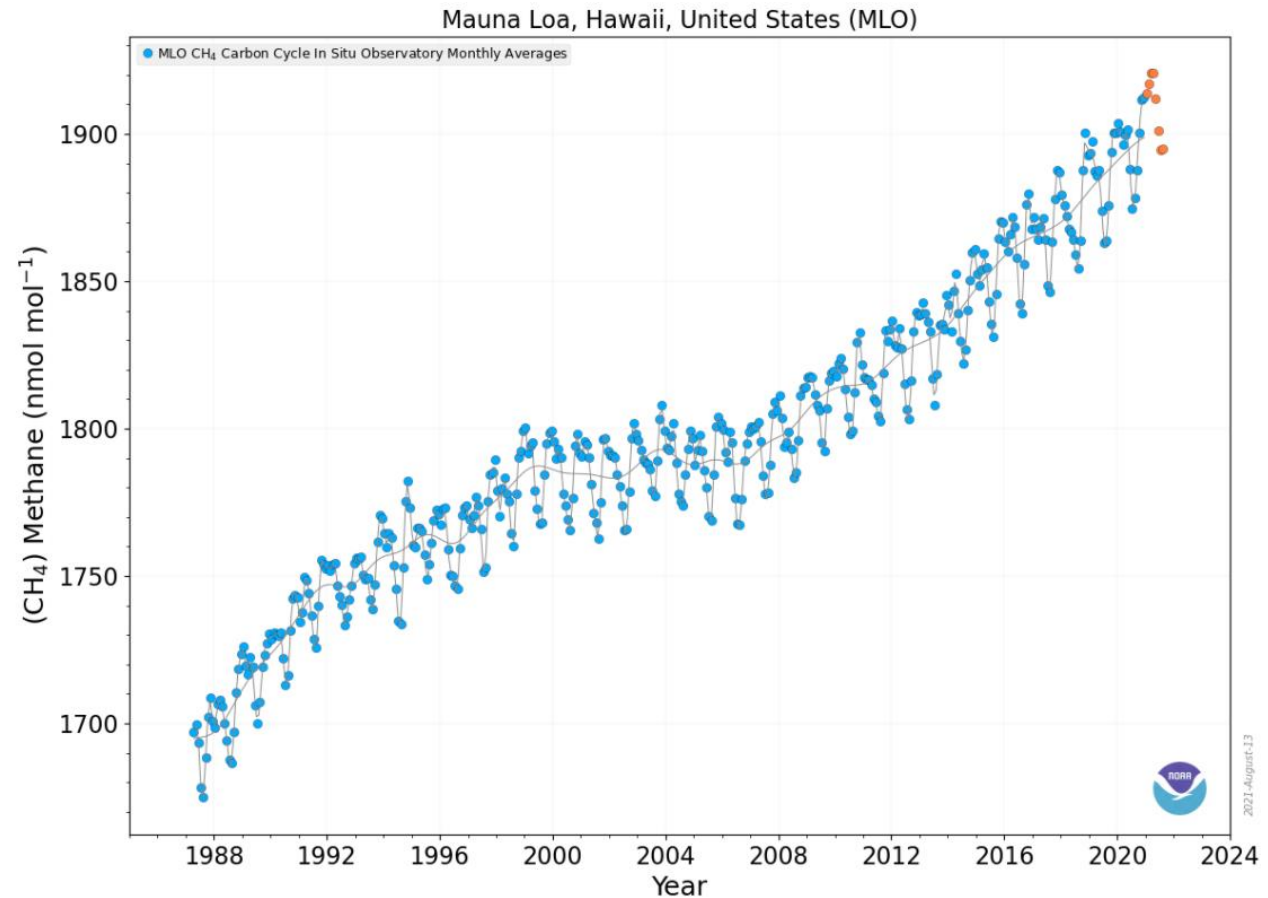
IPCC, CCC and COP

Apart from being some great acronyms for climate change, the reports and messages were clear:

“...reducing methane emissions will mitigate near-future warming.”

“Over a third of human-made warming experienced today, is a result of methane emissions in the atmosphere.”

Now is the time to act to significantly reduce the threat of warming... and a total of 103 countries agreed, representing 70% of the economic global GDP



Methane concentration at NOAA's Mauna Loa observatory thru July 2021: A record-high of 1912 ppb was reached in December 2020

Little bit on legislation

EU and US legislation announced in the Summer and at COP26 respectively and will seek to:

- Establish targets,
- Monitor,
- Quantify,
- Introduce reduction programmes,
- Leak detection and repair schemes.

(both due on the statute books in 2022)

Pledges are targeting **30% reduction** from a baseline year to 2030 across all emission sources; removing 41Mt of methane emissions in the US – equivalent to all car emissions in 2019



Quick poll - results

Has your focus on methane changed?

Yes

No

If so, how?

Methane is here to stay for a while yet

Hydrogen, the fuel of the future

- Investment and research started in earnest
- Will deliver the transition to green gas networks of the future... whilst we develop those...

Natural Gas (methane) will continue to be a cornerstone of the energy network

We need to continue to:

- ensure methane is used as efficiently as possible,
- whilst ensuring a clean transition to H2

Last time we spoke about these four challenges...



Quick poll

Do you face similar challenges?

Yes

Somewhat

No

Please explain your answer

Do you have any other challenges that we've not mentioned?

The challenges to reducing methane emissions



Challenge 1: Accurate detection and quantification



Challenge 2: Prioritisation – no standardised assessment process



Challenge 3: Innovation – understanding and having visibility of latest technology in this area

- CH4RGE
- MORFE



Challenge 4: Reporting – Uncertainty around what is needed to be reported

The challenge now

Challenges remain relatively unchanged, but the understanding has become broader and deeper

Academic analysis has identified several potential mechanisms for methane release in the National Gas Transmission System:

- Fugitive Emissions - Leakage through loss of tightness
- Gas actuation and process vents - GAV / Chromatographs
- Compressor venting (GHG Incentive, emergencies)
- Pipe / Asset venting during maintenance
- Incomplete combustion from gas turbines
- Incidents and 3rd party damage



Quick poll - results

Do you face similar challenges?

Yes

Somewhat

No

Please explain your answer

Do you have any other challenges that we've not mentioned?

**Gas
Transmission**

**Alexandra Kostereva
Gas Europe Research
Group (GERG)**

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METHANE EMISSIONS IN THE SPOTLIGHT

Rapidly reducing methane emissions is regarded as **single most effective strategy to reduce global warming in the near term.**

This year seen an important momentum on the methane emissions issue:

- European Commission's legislation to be launched this December to **measure, report and verify** methane emissions, put limits on **venting and flaring**, and impose requirements to **detect leaks and repair them.**
- The **Global Methane Pledge**: collective goal of reducing global methane emissions by at least 30 percent from 2020 levels by 2030
- Launch of the **International Methane Emissions Observatory (IMEO)** at the G20 Summit
- Strong focus on methane diplomacy at the **COP26** in Glasgow.

METHANE EMISSIONS

The **European Gas Research Group (GERG)** has long been involved in methane emissions reduction from the mid- and downstream gas sector, with a European perspective.

Over the past decades, the mid- and downstream gas industry has consistently worked on development & testing of **new technologies** and methodologies, first for leak detection and LDAR, then also explicitly for methane emissions reporting and reduction.

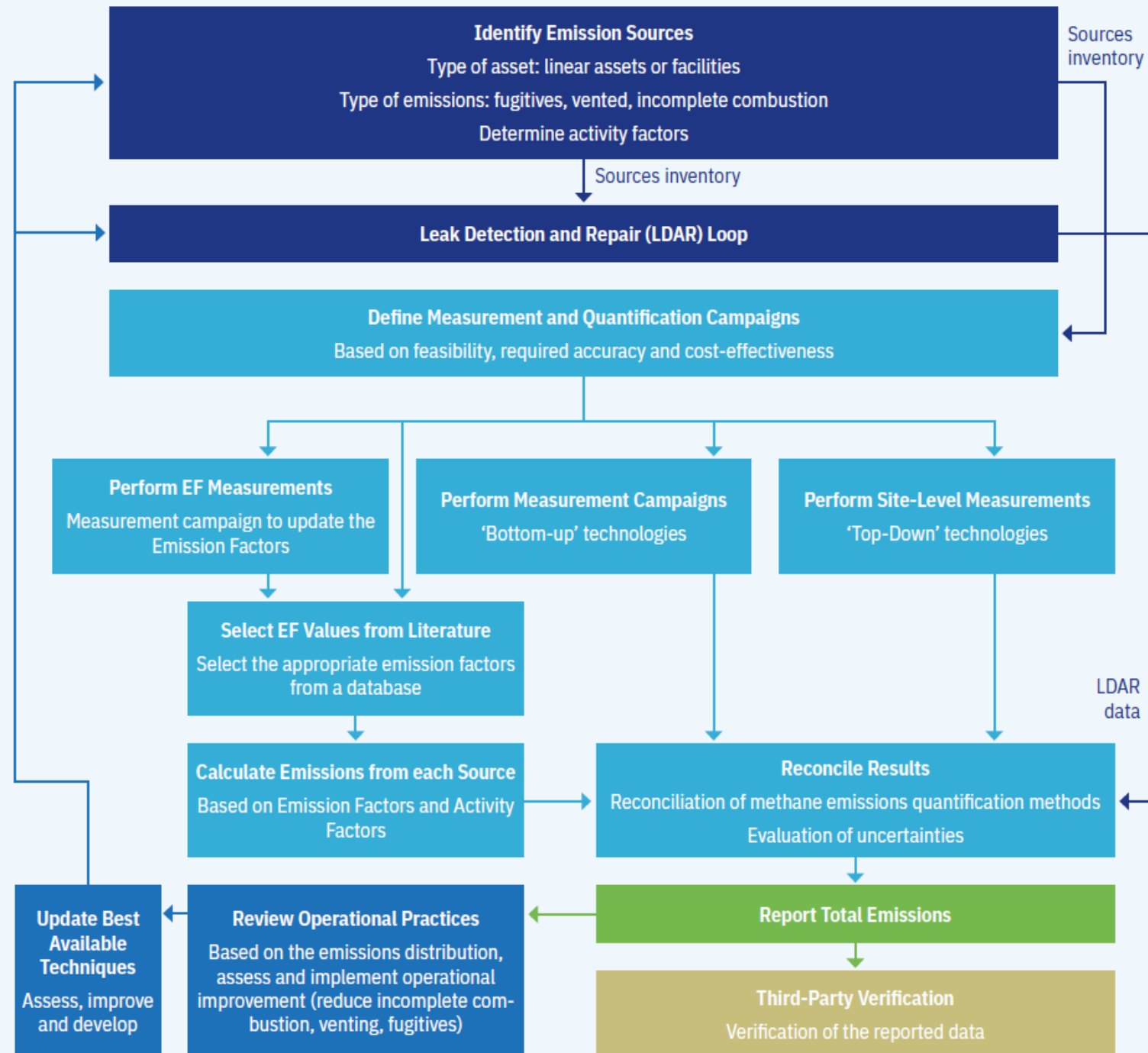
Continuous improvement of methane emissions management requires continued and collective R&D actions.

Innovation is central to successfully tackling these emissions.

HOW SHOULD METHANE EMISSIONS BE MANAGED

Methane emissions **management** and **mitigation** is a process where information circulates in a loop, in order to enable **continuous improvement**.

Each sector of the energy value chain faces specific technological and operational challenges.



THE GERG ROADMAP

A **collaborative effort** by industry experts to **define research and development gaps** and integrates the results of other ongoing initiatives in Europe and internationally.

It will be used as a tool to inform the larger R&D community, as well as policy makers, facilitating the creation of targeted research projects.

For each value chain segment and each methane emissions management topic, the roadmap defines precise **research actions** and prioritises them. Tentative **timelines** were created, representing the **criticality** of the different R&D topics.

GERG Methane Emissions Roadmap

Value Chain

Category

Distribution

Detection

Transmission

Quantification

Utilisation

Mitigation

Biomethane

KEY FINDINGS: RESEARCH ACTIONS

Transmission and distribution

- Compare **different detection and quantification techniques**: develop methods **reconciling data** from different sources and **validating** new technologies.
- Develop improved **correlation factors**: a priority to demonstrate how close estimated methane emissions are to the reality on the ground.
- Improve **emission factors**: develop a European database
- Gather better knowledge on **activity factors** – leak size distribution – to **target more efficiently the emission reduction measures**.
- Mitigation: define and implement **best-practices** (LDAR campaigns and other operational practices), and invest in creating **more efficient and cost-effective technologies**.

LNG

- Share best practices for **LDAR campaigns** and define accurate **emission factors** (including also the emerging small-scale LNG sites).
- **Mitigation actions**: include limitation of emissions from transfer and regasification, use of nitrogen to purge LNG pipes, optimised LNG truck loading, and flaring best practices.

KEY FINDINGS: RESEARCH ACTIONS

Utilisation

- Investigate the existing emissions: gather data from the field : emission factors, etc.
- Develop test protocols to assess emissions
- Mitigate incomplete combustion from engines

Overarching

- Finally, develop precise cost abatement curves per value chain segment to give visibility of the needed resources per achieved reductions.

Biomethane

- Assess the life cycle emissions from the biogas and biomethane sector - a high potential decarbonisation solution.
- Perform data collection exercises, define emission factors through measurement campaigns
- Provide plant operators survey kits
- Collect and share best practice methods

WP1: PREPARATION OF THE FIELD TESTS

Final decision on the most appropriate location

Final decision on technologies that are to be tested

Definition of the emission rates and the distribution within the site

Management of various authorization to perform the release

WP3: ANALYSIS OF RESULTS

Assessment of the tested quantification methodologies

Assessment of CH₄ emissions technologies and quantification methodologies

Comparison of the linear regression and the 95% confidence interval around the slope for the different technologies
Ideally, analysis to performed by independent researchers.

WP2: DEVELOPMENT OF THE FIELD TESTS

Blind study of controlled methane releases

7 / 8 technologies of different international providers

1-week tests: measurements for different emissions rates

Compressor Station in Vinaroz (Castellón) TBC

WP4: DEFINITION OF NEXT STEPS FOR PHASE II.B.

Based on the analysis of the results: 2 technologies will be selected for the measurements in sites (Phase II.B).

Initial definition of Phase II.B. to be performed.

Successful tests for Phase II.A

The tests successfully took place during the first week of October in Spain.

12 different technologies were tested:

- 9 Top-down / site-level technologies
- 3 bottom-up technologies

Project dissemination activities: **press release** has been sent with great success and repercussion in the media. **Abstract to WGC 2022** sent jointly with Phase I, initial feedback is positive, final answer expected in March.

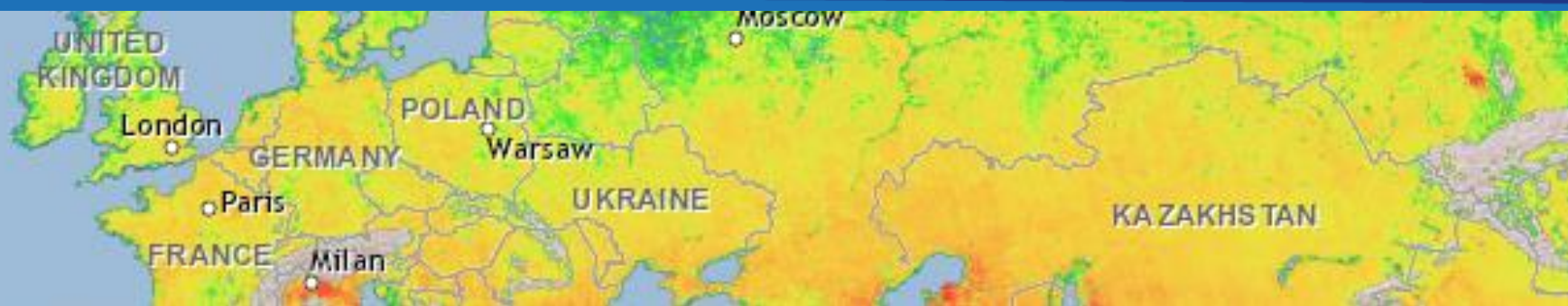
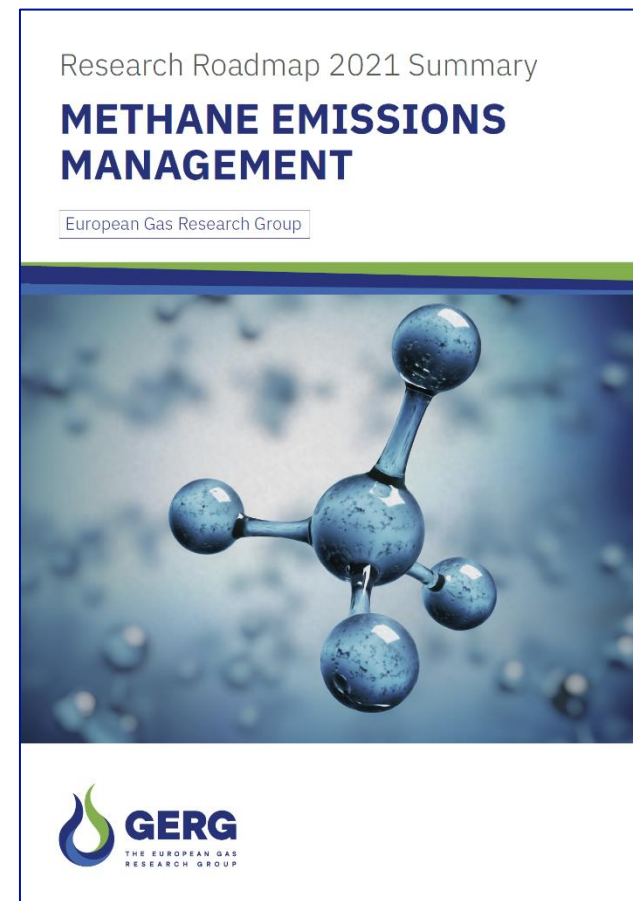
Results of the project:

- White paper/policy brief paper will be published/shared with main stakeholders (expected by end of November)
- Peer review article (more scientific approach) to be prepared early next year.



CONCLUSION

- The gas industry is building on long-standing efforts to limit and reduce methane emissions from the European gas sector.
- **Collaborative R&D** and knowledge sharing is key to manage the reduction of emissions.
- The GERG Research Roadmap is an example of such a collective initiative, and follow-up actions are already ongoing (Site-level quantification project).
- A Summary Brochure of the Roadmap is available on the GERG website.



**Gas
Transmission**

**Jemma Prydderch
Project Environmental
Solutions**

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CH₄Reduction from Gas Equipment Methane Reduction from Gas Equipment

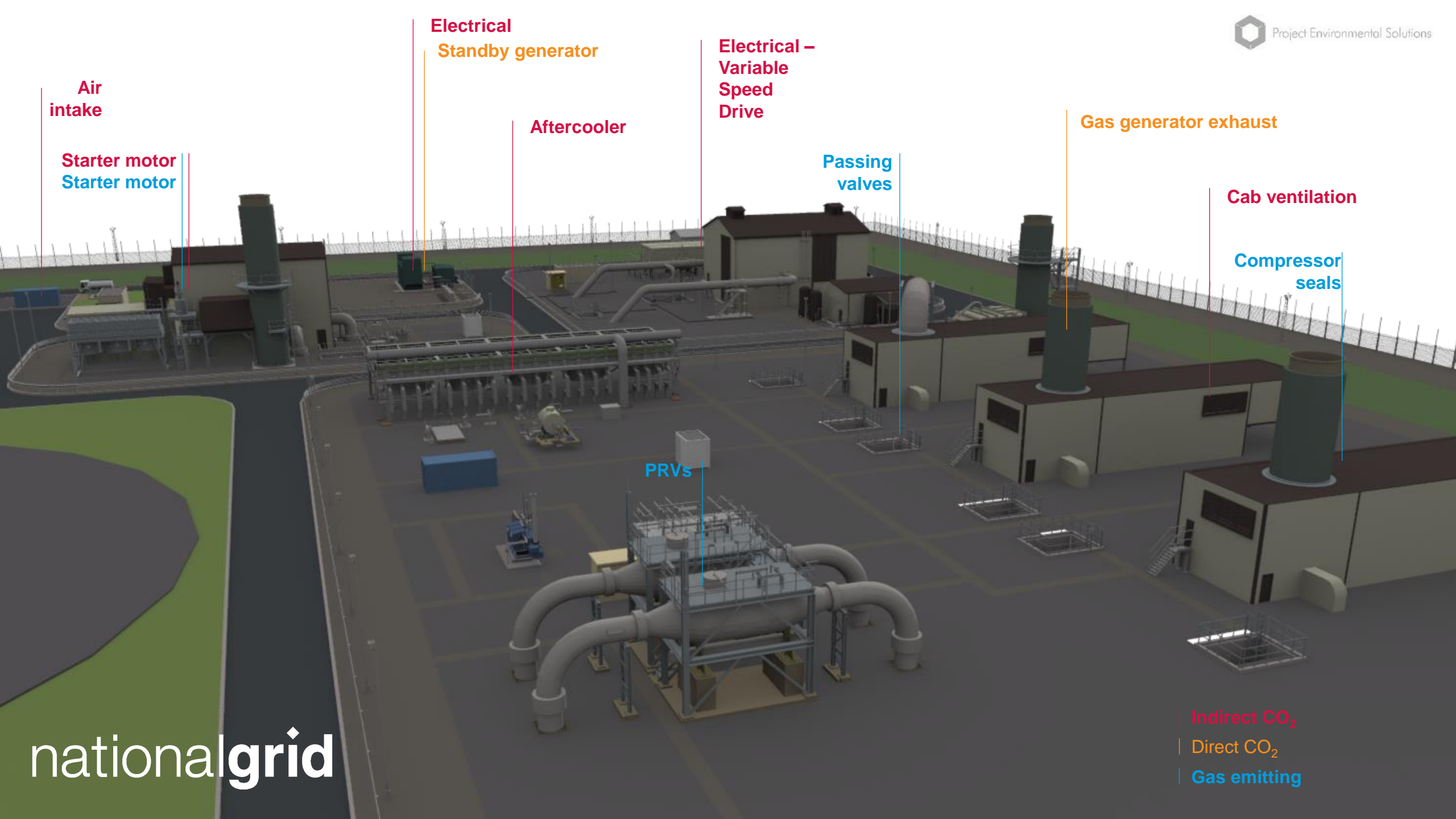


A National Grid Innovation Project

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Project Environmental Solutions



Air intake

Starter motor
Starter motor

Electrical
Standby generator

Aftercooler

Electrical –
Variable
Speed
Drive

Passing
valves

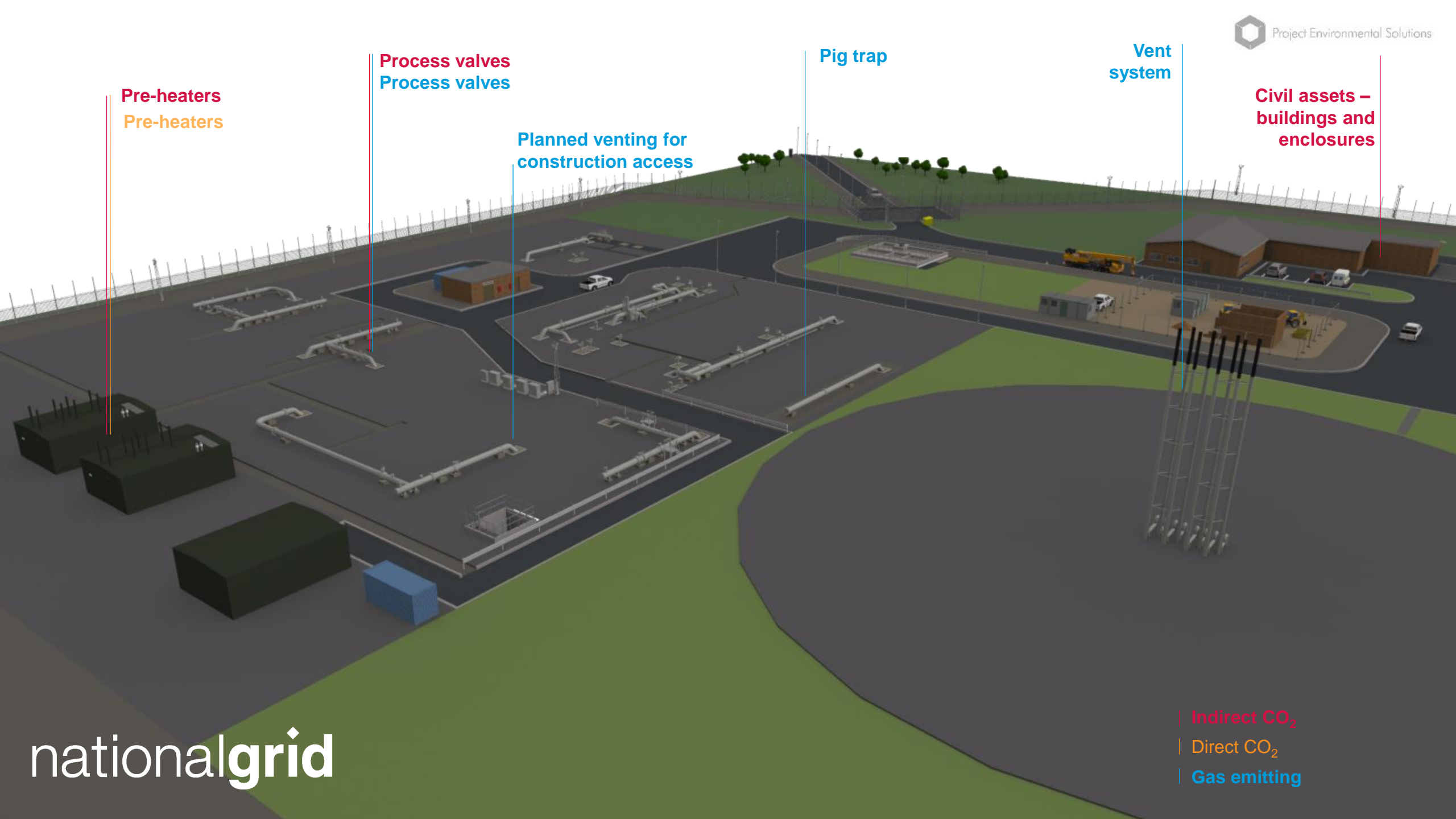
Gas generator exhaust

Cab ventilation

Compressor
seals

PRVs

- | Indirect CO₂
- | Direct CO₂
- | Gas emitting



Pre-heaters
Pre-heaters

Process valves
Process valves

Planned venting for
construction access

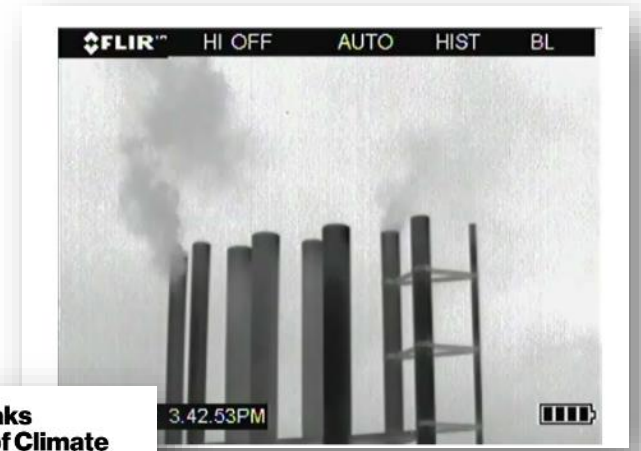
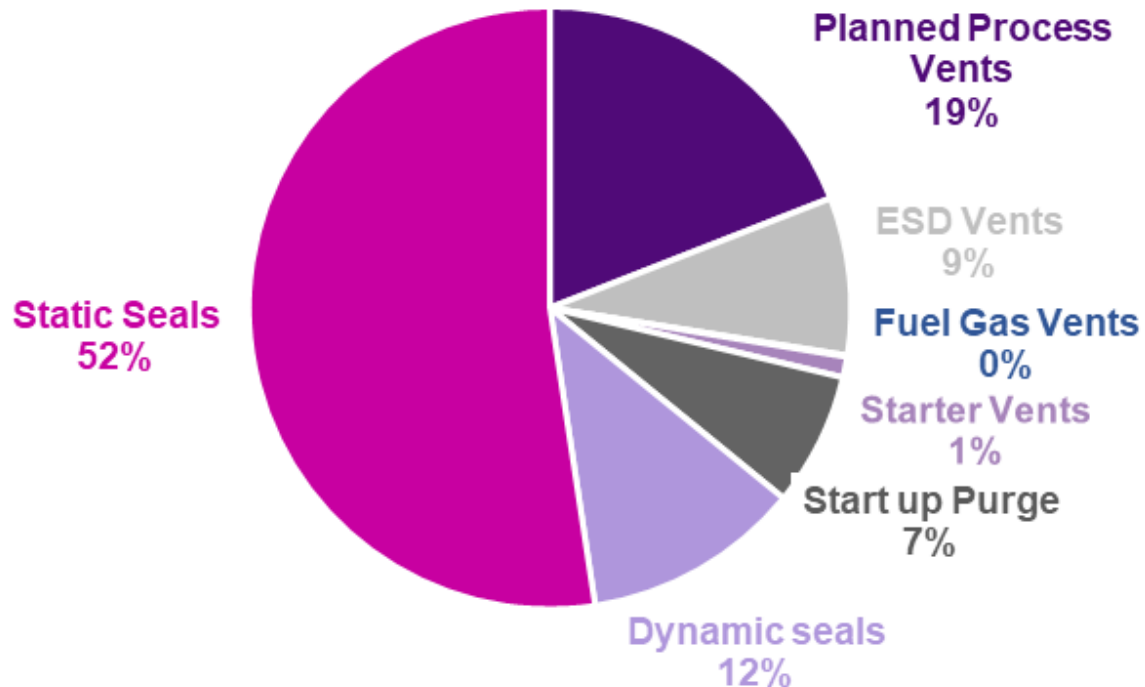
Pig trap

Vent
system

Civil assets –
buildings and
enclosures

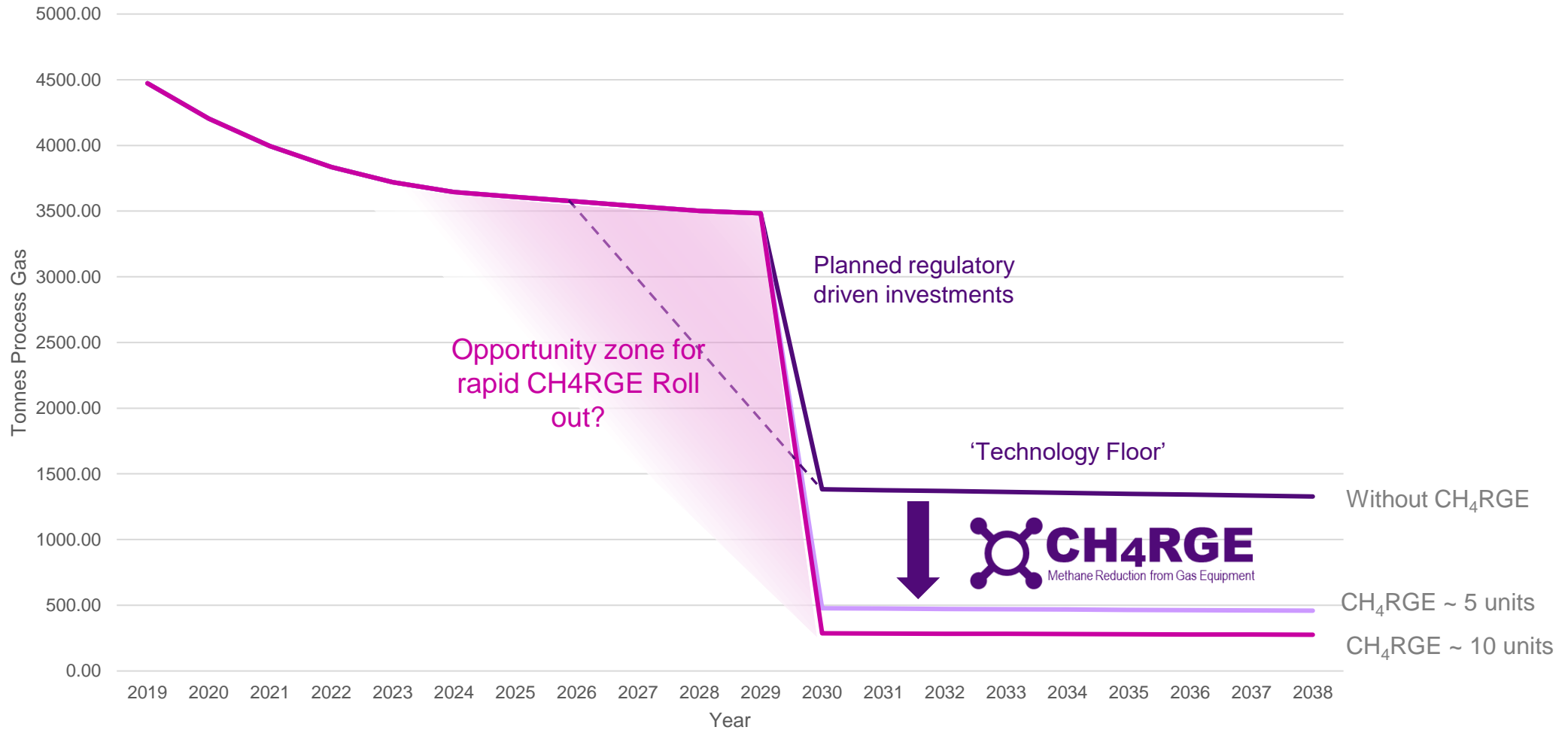
Evaluation of in scope emissions

>93,000 tCO₂e known emissions
potentially in scope (current levels)



Unintended emissions are increasingly in focus

CH₄RGE has a critical role to play in Net Zero transition





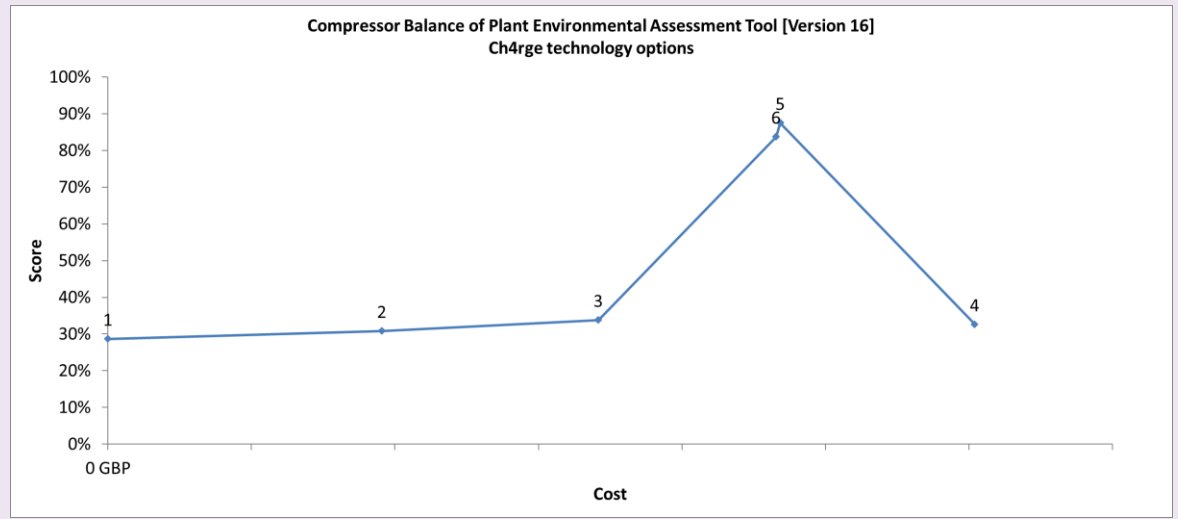
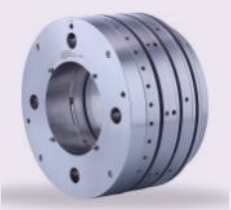
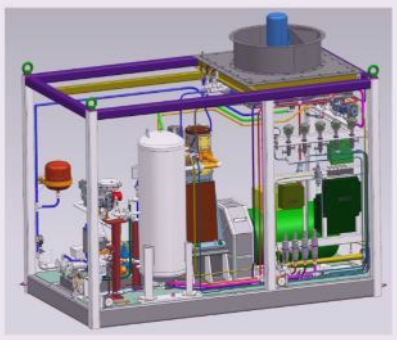
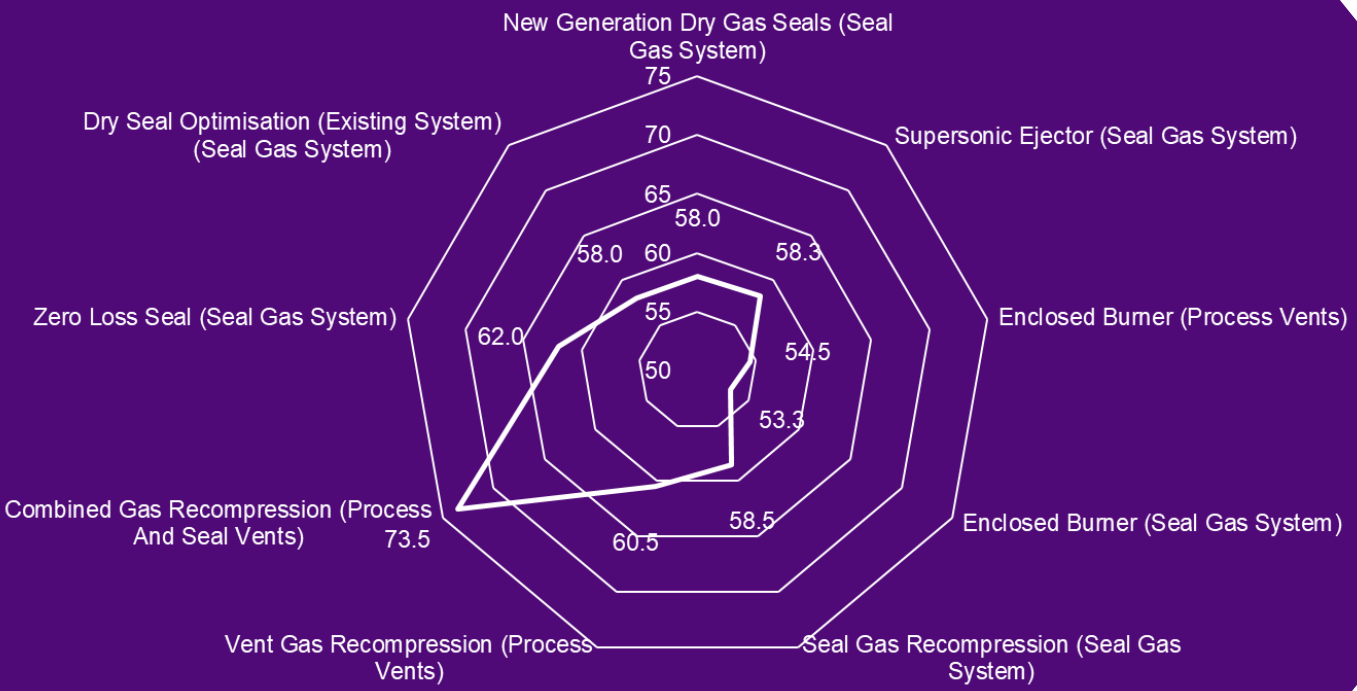
Solar Turbines

A Caterpillar Company

EagleBurgmann

SIEMENS

Baker Hughes

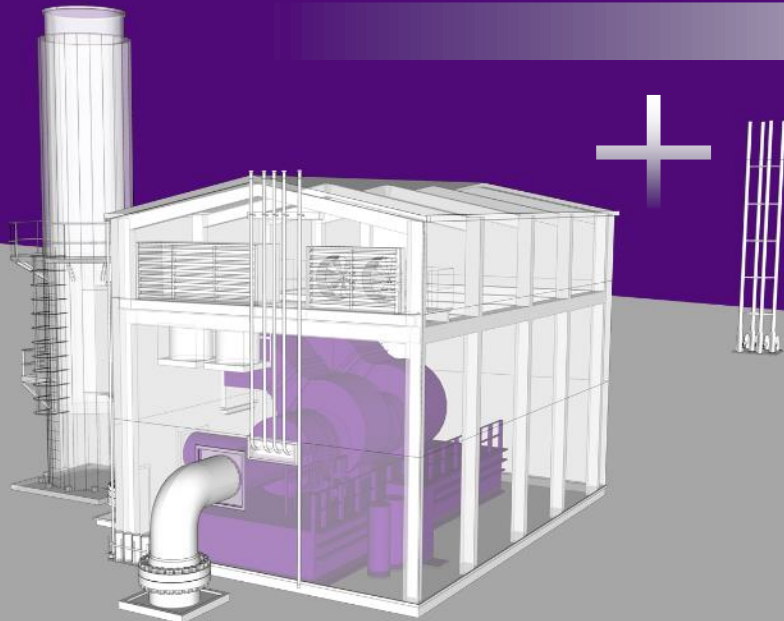




A CH₄RGE SIF pilot will deliver methane emissions reduction and progress to Net Zero ahead of transition to a hydrogen-based system.

Visibility of up to 10 CH₄RGE installations

Ultimately the CH₄RGE programme could reduce tCO₂ emissions by up to 750,000 tCO₂e by 2050



Need case confirmed

FEED consultant selected and OEM RFI completed

OEM RFP at pre-launch

Technology and sites selected for pilot



Compressor shaft seal vent releases

Planned compressor vent releases

A SIF Discovery funding application was made in November 2021

Feasibility and conceptual design work will deliver a clear understanding of the challenges, opportunities and costs associated with roll-out as a business-as-usual solution.

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Specialist contractors



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Transmission**

**Matt Marshall
Net Zero Planner
Cadent Gas**

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Digital Platform for Leakage Analytics

(SIF Application)

Matt Marshall
02 December 2021

Cadent
Your Gas Network

Digital Platform for Leakage Analytics

Strategic Innovation Fund

The SIF aims to find and fund ambitious innovation projects with the potential to accelerate the transition to net zero.

These projects should shape the future of the gas and electricity markets.

Cadent have submitted, with partners, a request for funding for a discovery phase that could revolutionise emissions detection.



Digital Platform for Leakage Analytics

Current Process

Distribution Networks use a complex modelling tool to estimate Leakage emissions.

Asset data is partnered with leakage rates to determine emissions.

Current approach has always been considered *world class* but this project opens up opportunity for even greater understanding.



Digital Platform for Leakage Analytics

The Opportunity

Improve granularity and understanding of emission volumes and locations by investigating:

- Existing data records, for example historic leak or asset information
- Operational monitoring data, for example sensor data or external data feeds
- Real time handheld and drone mounted methane detection
- Lidar technology
- Satellite imagery



Digital Platform for Leakage Analytics

Unlocking Potential

A successful discovery phase could lead to:

- A whole network view of GHG emissions
- Development of a digital platform for leakage analytics
- Insight leading to proactive investment and improvement in leakage reduction processes
- Reduced customer bills



Q&A



Thank you for joining us today

Keynote speech	Complete	Watch again
Future of Gas	Complete	Watch again
Innovation – broadening the horizon	Complete	Watch again
Gas Market Plan	Complete	Watch again
Transitioning to a hydrogen backbone	Thu 02 nd Dec 10.00 – 11.00	Watch again
Managing methane emissions	Thu 02 nd Dec 13.00 – 14.00	Watch again
Supporting regional hydrogen transitions	Fri 02 nd Dec 09.00 – 10.00	Register here
Understanding the skills needed for a net zero world	Mon 06 th Dec 13.00 – 14.00	Register here
Digital Strategy and Information Provision	Tue 07 th Dec 13.30 – 14.30	Register here
Operating the network	Wed 08 th Dec 09.00 – 10.00	Register here
FutureGrid 2021 Progress report	Tue 14 th Dec 10.00 – 11.00	Register here
Annual Network Capability Assessment Report	Wed 15 nd Dec 10.00 – 11.00	Register here

What next?



You will receive the recording and material from today's session



If you have any further questions or would like to discuss anything specific please get in touch with Jennifer.Pemberton@nationalgrid.com



Feedback is important to us, therefore if you have not already taken part, we would like to put you forward for a survey

Thank you for joining us



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