Fugitive methane emission

JOGMEC Initiatives and Technology for Methane Emission Management

Japan Organization for Metals and Energy Security

Makoto Shimouchi

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Who is JOGMEC?

Japan Organization for Metals and Energy Security

Mission As agency of Japanese government (METI)

Secure the stable supply of Natural Resources for Japan


Oil & Natural Gas


Metals

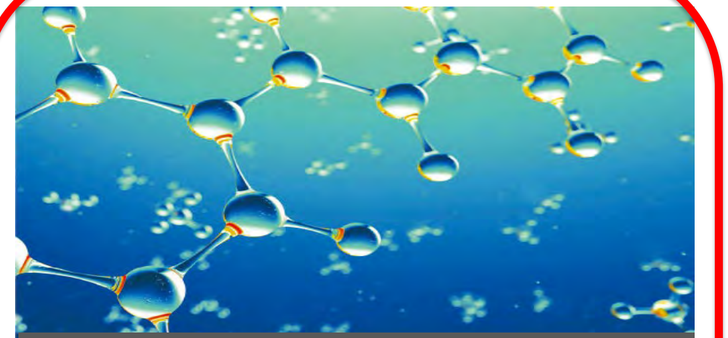

Coal

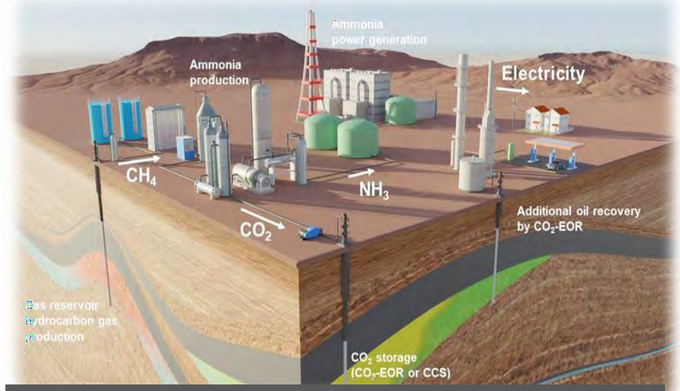

Geothermal


Stockpiling


Mine Pollution Control

New Area


Hydrogen/Ammonia



CCS

Global initiative : Methane Emission Management

Global Methane Pledge

Methane is a powerful but short-lived climate pollutant that accounts for about half of the net rise in global average temperature since the pre-industrial era.

Participants joining the Pledge agree to take voluntary actions to contribute to a collective effort to reduce global methane emissions at least 30 percent from 2020 levels by 2030, which could eliminate over 0.2˚C warming by 2050. This is a global, not a national reduction target.

With over 100 countries on board, representing nearly 50% of global anthropogenic methane emissions and over two thirds of global GDP, we are well on our way to achieving the Pledge goal and preventing more than 8 gigatons of carbon dioxide equivalent emissions from reaching the atmosphere annually by 2030.

Homepage | Global Methane Pledge

JOGMEC

The Oil & Gas Methane Partnership 2.0 (OGMP 2.0) is the United Nations Environment Programme's flagship oil and gas reporting and mitigation programme. OGMP 2.0 is the only comprehensive, measurement-based reporting framework for the oil and gas industry that improves the accuracy and transparency of methane emissions reporting.

The Oil & Gas Methane Partnership 2.0 (OGMP 2.0) | UNEP - UN Environment Programme

Figure 2. OGMP 2.0 member company timeline

eye_on_methane.pdf (unep.org)

JOGMEC CI guideline

Contents of CI guideline

Chapter 1:Scope of the guideline and handling of data

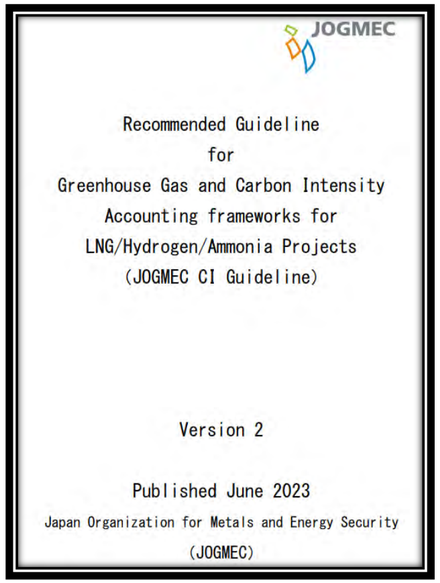
- GHG emissions in each process are calculated according to the “Well to Gate” boundary

Chapter 2: GHG emissions calculation methodology for eligible emission sources

- Recommend Primary data at major emission source for calculating GHG emissions – Data of quality
- Confirmed no unidentified methane leak.

Chapter 3: Carbon Intensity(CI) calculation for target product

- CI Calculation method with reduction items



Measurement project using CI guideline

- To Avoid Not identified or Uncalculated Methane emission in the project
- To consider the appropriate combination of measurement techniques for each facility while balancing the need for adequate coverage and cost-effectiveness

- ✓ **Country**: Indonesia
- ✓ **Plant Type**: Ammonia Production Plant
- ✓ **Approach**: Calculation and Direct Measurement

<Project members>

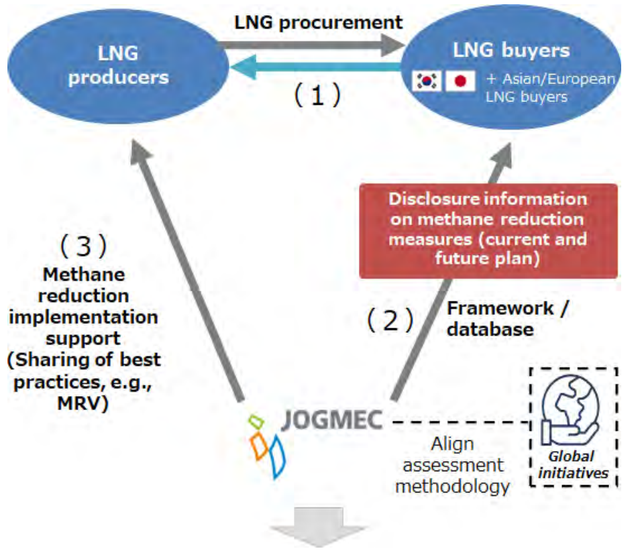
essa PT Panca Amara Utama
Mitsubishi Corporation
JOGMEC
Intero THE SNIFFERS
JGC
Aeromon

JOGMEC Projects related methane emission management

Coalition for LNG Emission Abatement toward Net-zero - Sharing LNG project-level methane reduction measures -

CLEAN project is a public and private program. First, large LNG buyers, JERA of Japan and KOGAS of Korea will send a questionnaire to the LNG producers asking the status of methane emission management and emission reduction efforts for each LNG project. JOGMEC will support the program as a coordinator, by providing information platform to enhance visibility on LNG-related methane emissions and to disseminate best practices based on the collected questionnaire.

United States of America, the Republic of Korea, Australia, the European Commission, and Japan signed a joint statement for supporting global methane abatement activities and GHG reduction throughout the LNG value chain at the LNG Producer-Consumer Conference 2023



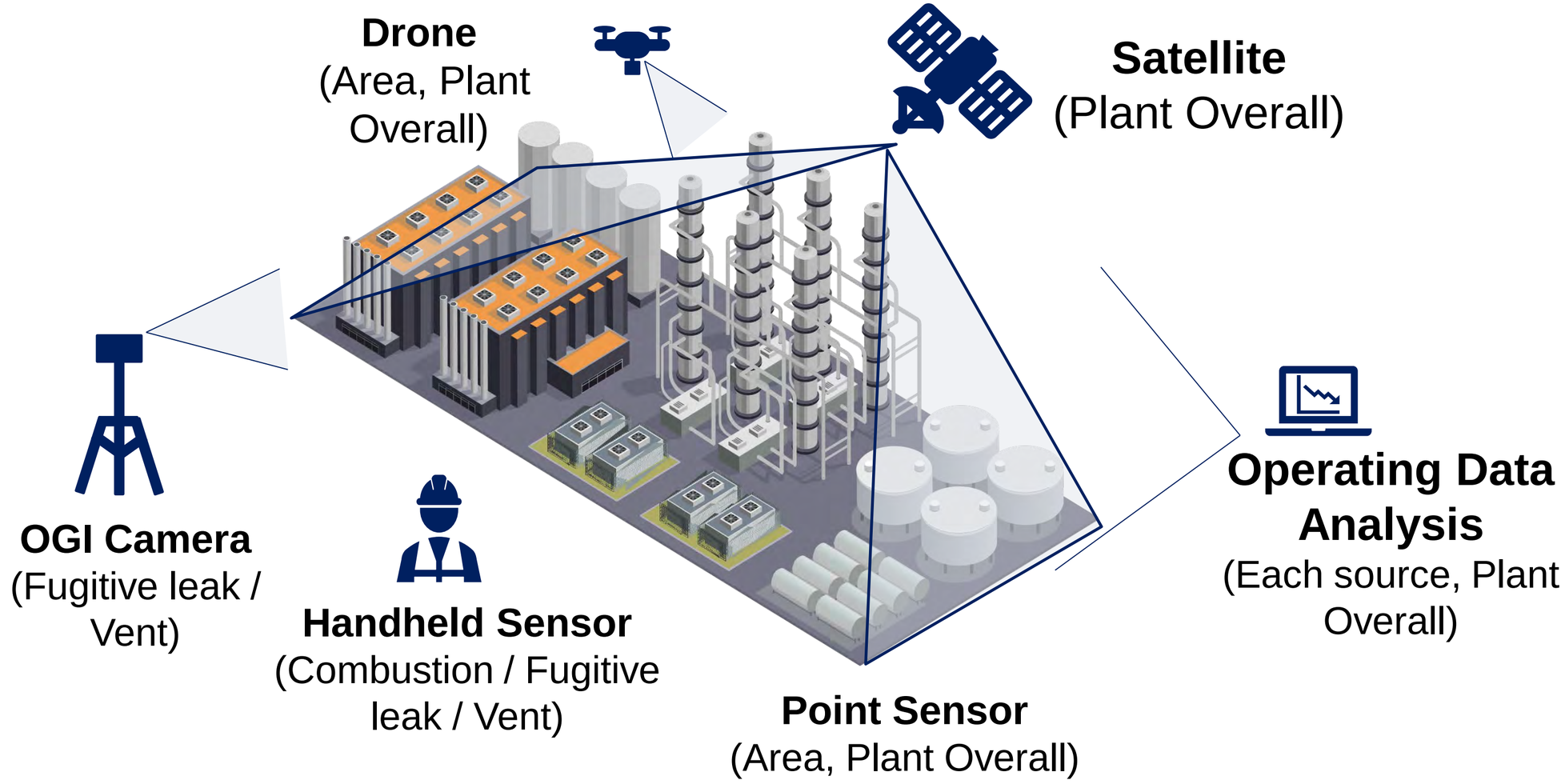
https://www.jogmec.go.jp/english/news/release/news_10_00041.htmlleases | Japan Organization for Metals and Energy Security (JOGMEC)

JOGMEC and PETRONAS signed Memorandum of Cooperation to promote Carbon Neutrality

Japan Organization for Metals and Energy Security (JOGMEC) and Petroliam Nasional Berhad (PETRONAS) signed a Memorandum of Cooperation (MOC) to cooperate to create projects carbon-neutral fields in Malaysia and other related area. Based on this MOC, both parties will commence discussion and joint study to formulate and promote projects related to hydrogen/fuel ammonia, CCS, and GHG emissions management, including Japanese companies

https://www.jogmec.go.jp/english/news/release/news_10_00027.html

Methane Measurement : Top-down/Bottom-up



Top-down: Satellite

GOSAT-GW : Global Observing SATellite for Greenhouse gases and Water cycle

- GOSAT-GW is new Earth observation satellite responsible for greenhouse gas observation missions and water cycle change observation missions.
- GOSAT-GW is scheduled to launch on Q3 in 2024
- CO_2,CH_4, NO_2 are target gases and possible to observe in a wide area. It can be acquired more observation data than GOSAT-2, previous satellite. For Greenhouse gas observation sensor is called TANSO-3
- Two observation modes
  - ① Wide-mode – 10x10 km : Area observation (900 km)
  - ② Focus-mode - 3x3 km : Detail observation (90 km)

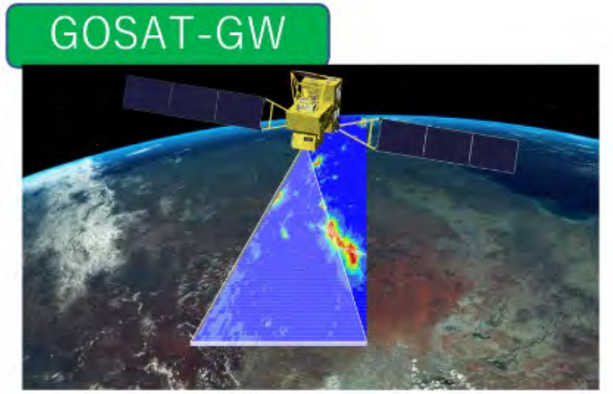


Image of Area observation

Two types of satellite observations :

Wide area - 900 km swath or more: Sentinel-5p/Tropomi (7x5.5 km pixel), planned: GOSAT-GW (10x10 km pixel)

- (1) quantifying large emission sources such as oil/gas/coal basin, accidental release events
- (2) detecting large point emitters (eg compressor station) - for subsequent monitoring with focus mode/narrow swath satellite

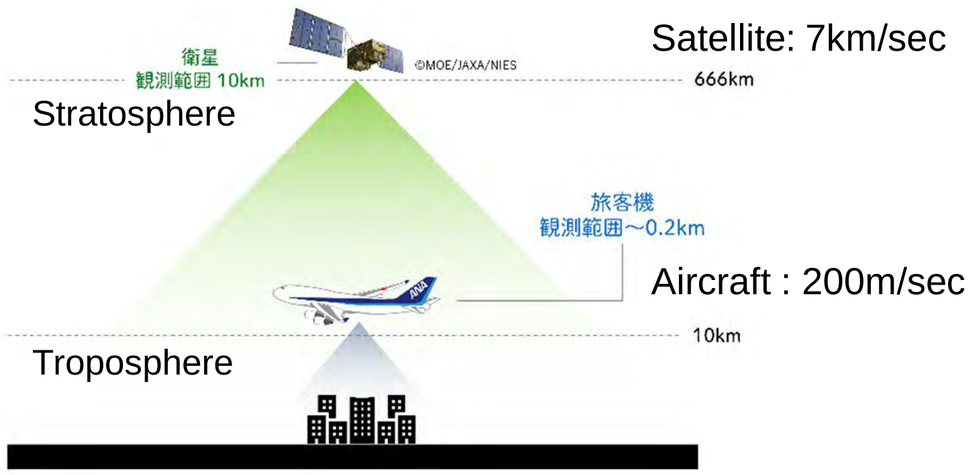
Narrow area - such as GHGSat (30 km wide), EMIT (72 km), PRISMA (30 km), planned: MethaneSat (200 km), GOSAT-GW focus mode (90 km)

- quantification of CH4 leaks on city to facility scales

Top-down: Aircraft

Aircraft –GHG Monitoring projects

- JOGMEC, ANA and JAXA conduct Methane measurement project from regular flight at JAPAN
- JAXA has knowledge of GHG emission observation project from Satellite and ANA and JAXA has “The Greenhouse gas Observation of Biospheric and Local Emission from the Upper sky (GOBLEU) project to monitor GHG emission(mainly N2O and CO2) from regular flight.
- Analyzing data acquired from 2022/2023 and considering methods for regular observation Data acquisition



Data Acquisition image from GOBLEU PJ

Bottom-up: OGCI Camera

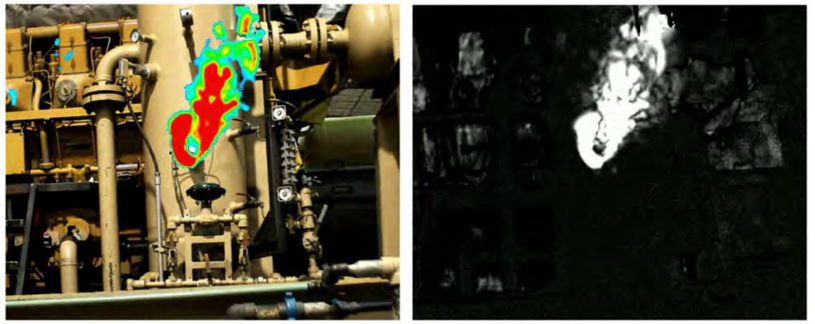
Konica Minolta

- Konica Minolta, Inc. (TSE: 4902), headquartered in Tokyo, is a global leading manufacturer and solution provider with its advanced technologies in imaging, materials, optics and nano-fabrication and has been developing businesses based on the imaging IoT expertise.
- Konica Minolta started the business of Gas Monitoring Solution from 2019 and launched new portable gas monitoring camera “GMP02” in 2022.

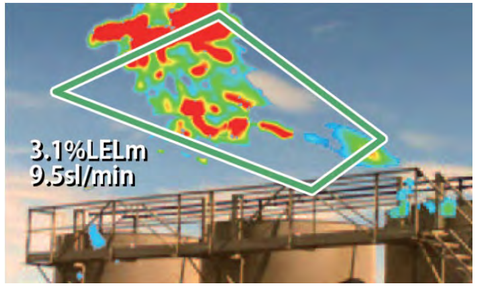
[GMP02]

OGCI camera

- KONICA MINOLTA arrange Portable Gas Detection Camera(GMP02) in Market
- Optimized for field Use – Light, small, and easy to use
- Certified as Approved Instrument Monitoring Method(AIMM) by Colorado State Government
- The camera can record multiple images simultaneously without switching image modes
- Visualizing the gas, quantifying the amount of leakage allows for more appropriate action to be taken



Gas Overlay Mode　　Gas Enhanced Mode

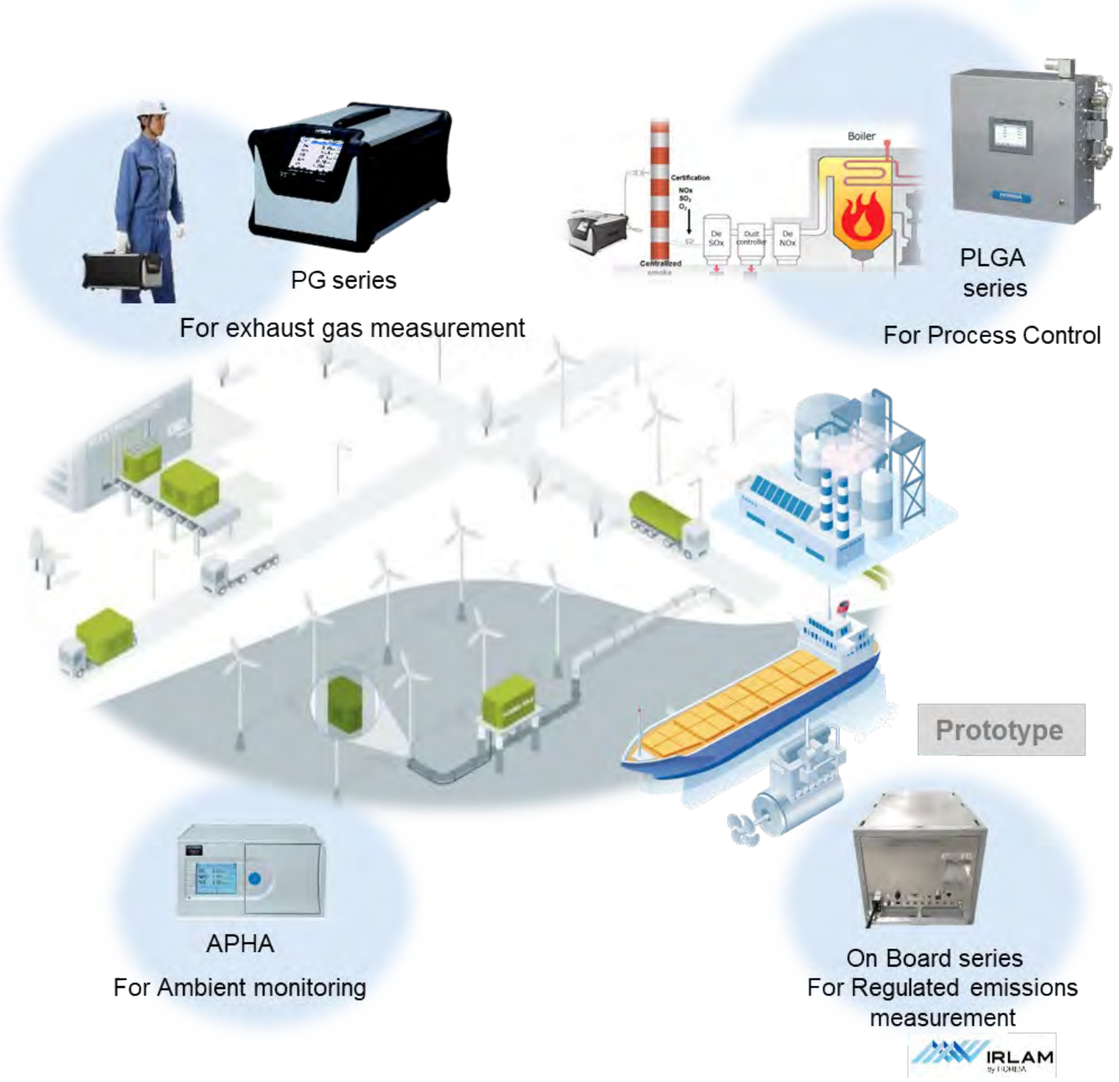


Quantification

Bottom-up: Gas Analyzer

HORIBA

- HORIBA Group is a **leading global provider of analytical equipment and systems** with approximately 50 group companies worldwide.
- HORIBA's analytical equipment and systems are utilized across various industries and fields, playing a significant role in environmental conservation, optimization of manufacturing processes and facilitating research and development.
- HORIBA’s analyzers are widely used in diverse sectors including ship engine, power generation, petrochemicals, iron and steel production, sulfuric acid production, rubber and glass production, medical care, and semiconductor fabrication.



Bottom-up: Gas Analyzer

HORIBA

PG series

For exhaust gas measurement in environment assessment etc.

New technology; Compact and lightweight, proven technology in both field and Lab.

CH4 Ranges (GHGs model)
0-200/500/1000/2000 ppm
or
0-500/1000/2000/5000 ppm

Measurement components*(GHGs model)
CH4, CO2, N2O,O2
*Other combination available

Dimension(With side guards)
300(W) x 520(D) x 260(H) mm

JOGMEC

PLGA series

For Process control

OBS series

For Regulated emission measurement

New technology; High sensitivity & Low interference

CH4 Ranges*
CH4 : 0 - 2000 ppm or 0 - 5 vol%

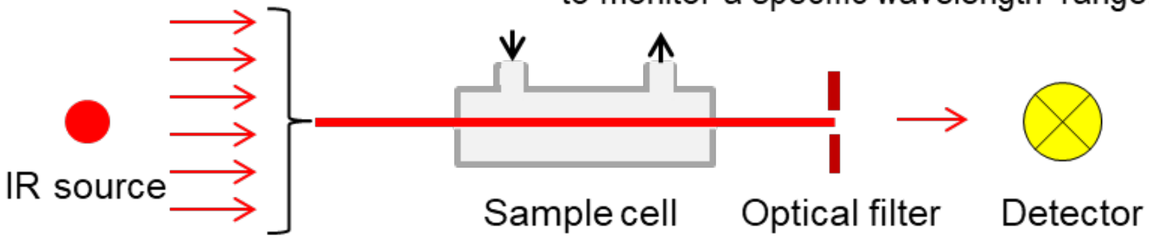
Measurement components*
CH4, C2H6, C2H2, CO2
*Other combination available

CH4 Ranges*
TBD

Measurement components*
CH4, CO2, CO, N2O, NO, NO2, NH3, HCHO

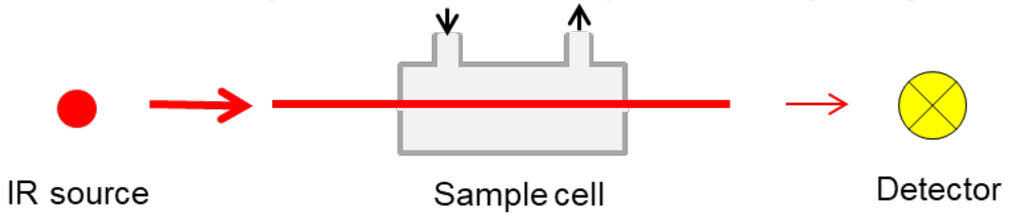
Non-Dispersive IR (NDIR)

Broad-wavelength light is filtered by an optical filter to monitor a specific wavelength range.



Quantum Cascade Laser IR (QCL-IR)

Narrow band laser light is used to monitor a specific wavelength range.



HORIBA Ltd. developed unique QCL-IR technology , called Infrared Lase Absorption Modulation (**IRLAM™**). **IRLAM uses patented calculation algorism** and it enable **high robustness measurement** and **compact analyzer unit.**

Measurement Tech Evaluation facility

- **Experimental Items**
  - Accuracy of quantification (in NL/min) with control release
  - Methane detection performance
- **Imitated leaks**
  - Fugitive leak
  - Combustion emissions

Testing Facility in JGC R&D Center

Key point

- Test facilities are necessary in the development of each existing and new technology for measurement technology
- Understand that measurement technology has certain uncertainty.
- Selecting a technology for purpose and characteristics of emissions (concentration, frequency,)