



Operational Excellence Services

Decarbonization HiHGuard® (GHG Quantification Service)



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GHG Quantification Service

Do you have any of these issues?

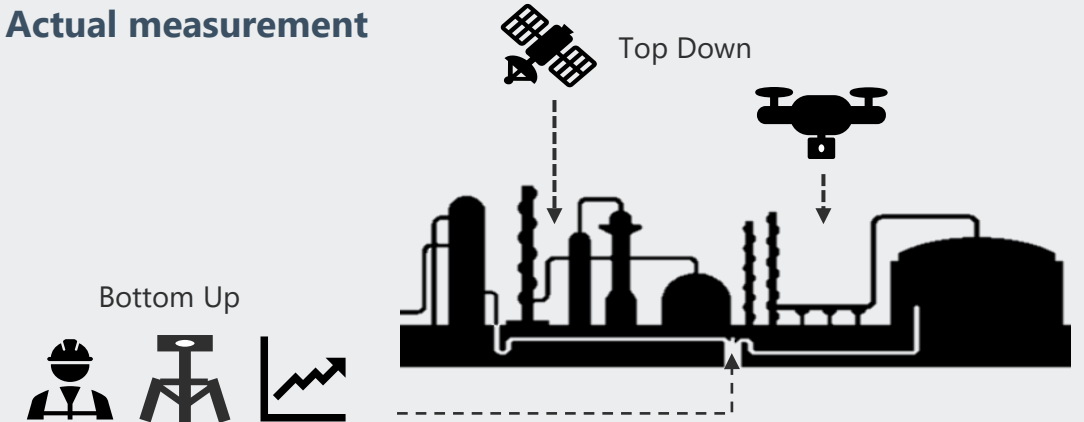
- ☹️ **Difficulty in quantifying GHG (including CH₄)**
- ☹️ **Need to quantify emissions in actual operation**
- ☹️ **Identifying baseline for decarbonization project**

GHG Quantification

- Quantify GHG (CO₂, CH₄, N₂O) by actual measurement and engineering calculation.
- Conduct actual measurement with drone, satellite, handheld sensor, IR camera
- Provide optimized MRV(*) methodology
- Reporting the GHG emission to the authorities.

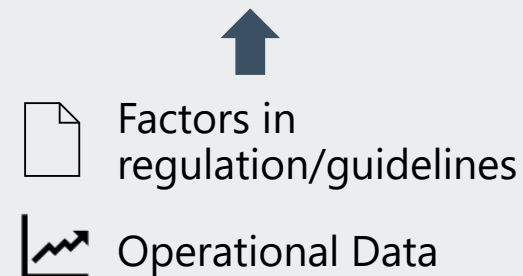
(*) Measurement, Reporting and Verification

Actual measurement

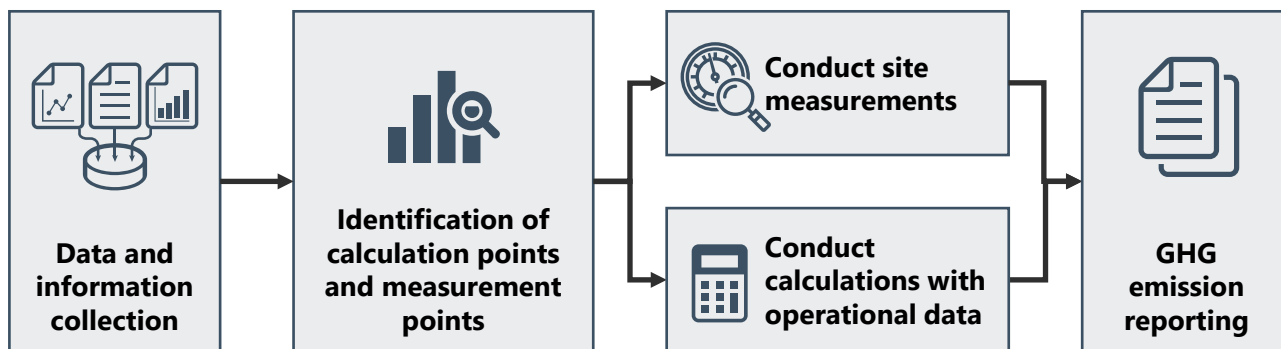


Emission Calculation

$$\text{GHG emissions} = \text{Emission Factor} * \text{Activity Factor}$$



Workflow & Results



Steps

- Identify measuring points and calculation points from design documents.
- Conduct engineering calculations / Actual measurements
- Report to client or government agency with preset format

JGC is

- able to select the most appropriate MRV methodology from those proposed by international organizations and standards/guidelines
- familiar with a variety of plants and can provide the best combination of drones, satellites, and handheld sensors

Our Strengths

- Professional HSE, Process, Mechanical Engineer Teams
- Dispatched technical experts to participate in various international discussions on GHG Measurement, Reporting and Verification (MRV).
- Experience in EPC and O&M of many types of facilities in many locations around the world.
- Collaboration between overseas group companies and local companies.

Our Background

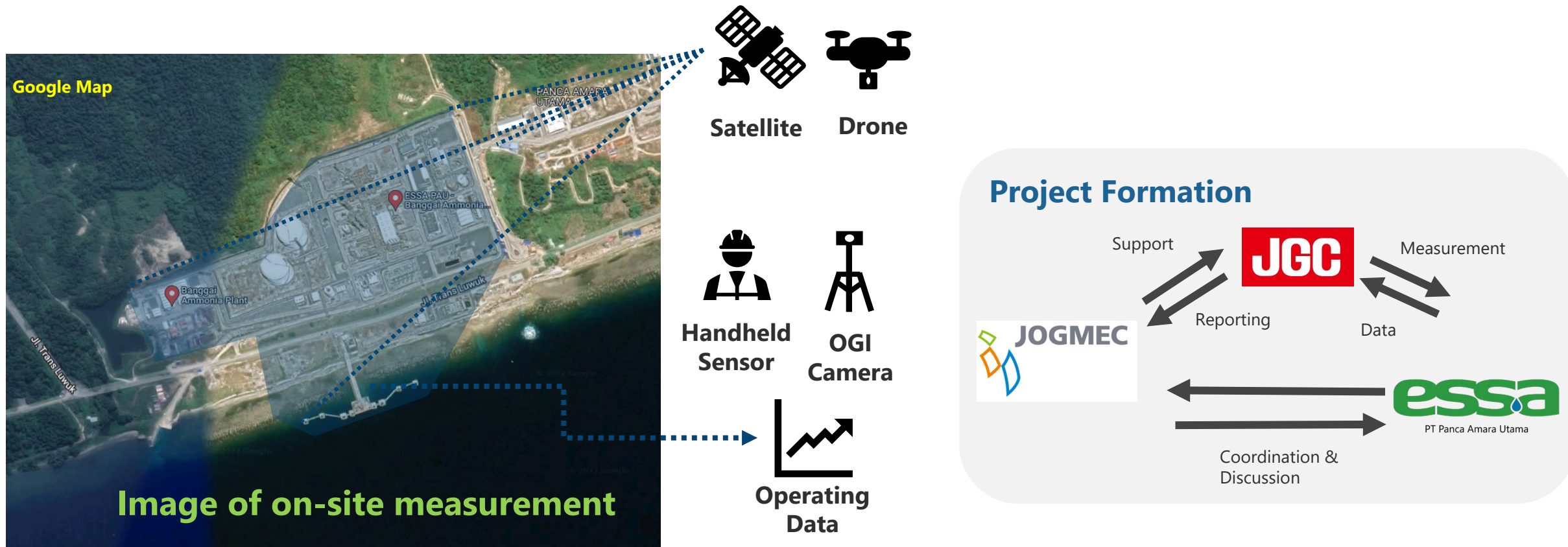
- JGC has been commissioned by Japan Oil, Gas and Metals National Corporation (JOGMEC) to develop their guidelines.
- The Institute of Energy Economics, Japan (IEEJ) has contracted JGC as a technical adviser for GHG MRV

Case Study : Quantification of Methane Emission in Ammonia Plant

(*) PAU: PT Panca Amara Utama

Project in Actual Plant

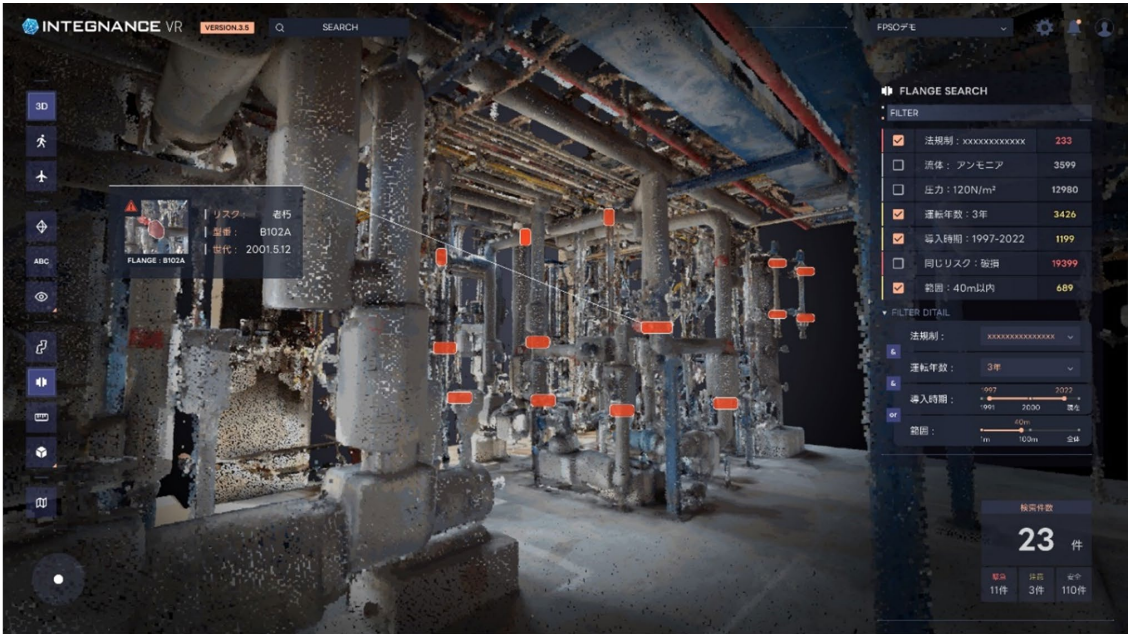
- JOGMEC/JGC completed **direct measurement** to quantify Methane emission in PAU(*) Ammonia Plant. (Dec-2022)
- **Satellite / Drone / Handheld Sensor / Camera** were used in the project
- CO2 calculation was conducted using operating data.



Utilizing Digital Twin Technology for Further Achievement



- JGC group company Brownreverse Corporation has signed a contact with PAU to begin a joint study. (Sep-2024)
- This joint study digitally replicates the ammonia production plant at PAU to investigate maintenance strategies and operating optimizations that reduce GHG emissions.
- The measured GHG emissions data from each facility will then be mapped onto the 3D viewer "INTEGNANCE VR" to visualize the emissions.



Conceptual drawing of GHG emissions visualization on INTEGNANCE VR



Memorandum of Understanding ceremony held in Indonesia