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Overcoming Challenges in GHG Emission Reduction for Mature Oil/Gas Fields, Offshore Vietnam

Japan Vietnam Petroleum Company

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ENEOS Xplora

Outline

1. Introduction
2. Assessment
3. Trials
4. Summary and conclusion



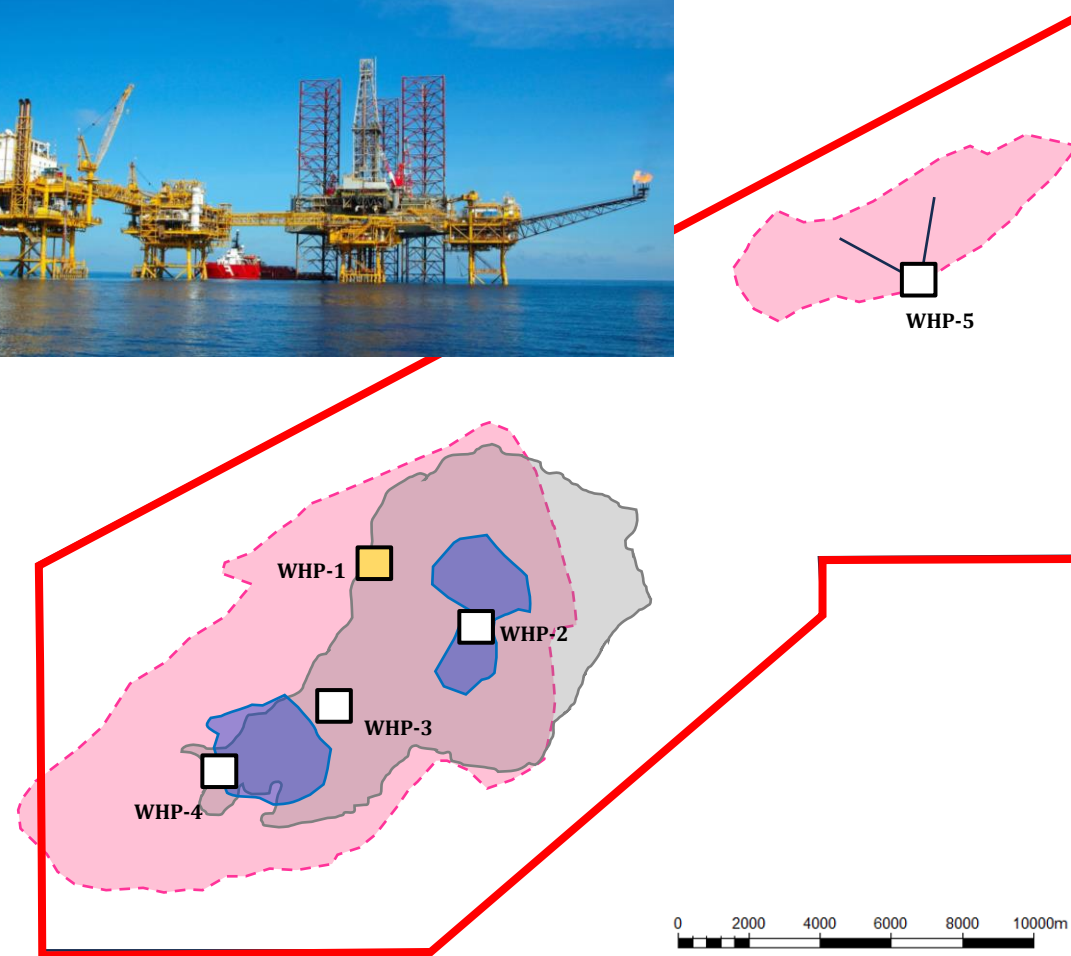
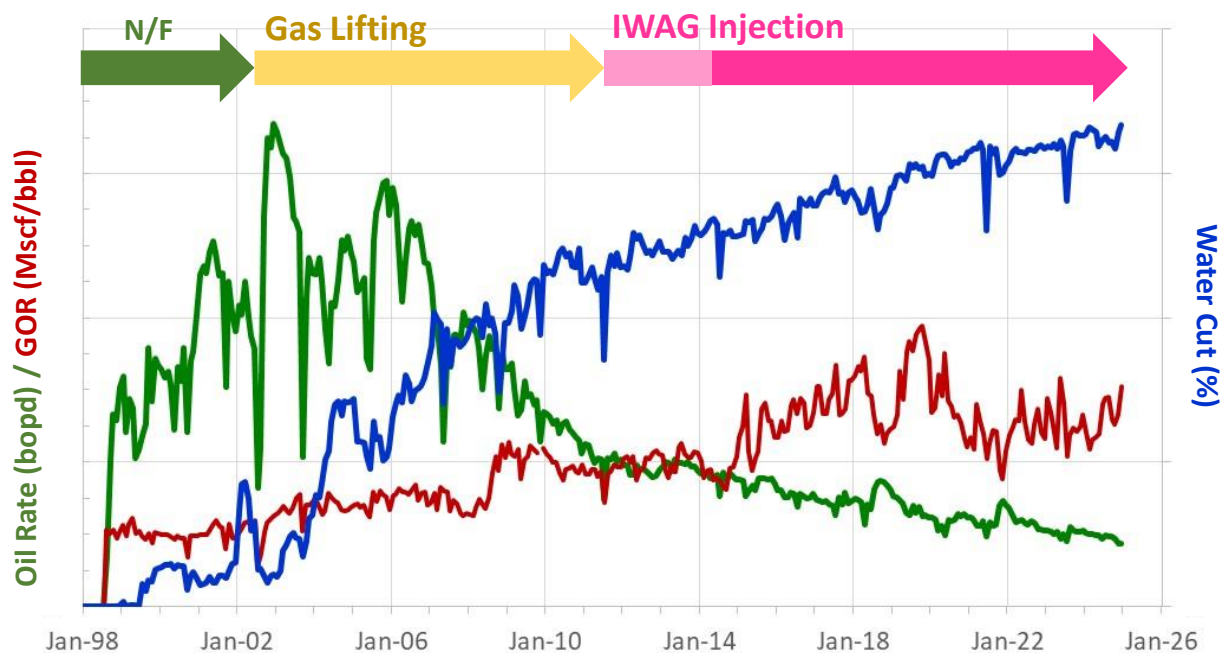
Introduction to JVPC(Japan Vietnam Petroleum Company)

- A member of ENEOS Xplora
- Operator of a block in Vietnam since 1992
- Front runner of innovative technology in Vietnam oil and gas industry with high responsibility for environmental protection.
- Key achievement
 - Starting operation in the block (1992-)
 - Production start(1998-)
 - Clean Development Mechanism (2006-)
 - CO2-EOR Pilot Test (2011-)
 - HCG-EOR implementation (2011-)



Block offshore Vietnam

- Mature offshore oil fields, remote area
- Producing from 2 oil fields (inc. 5 reservoirs)
- Facility: 1 central and 4 satellite platforms
- Well: 41 producers and 11 injectors



Initial assessment



Company Data Management

For evaluating opportunity, a company-wide task force team was organized then Initial assessment was conducted.

- Both of technical and business team joined.
- Workflow analysis
- Screening for opportunity findings

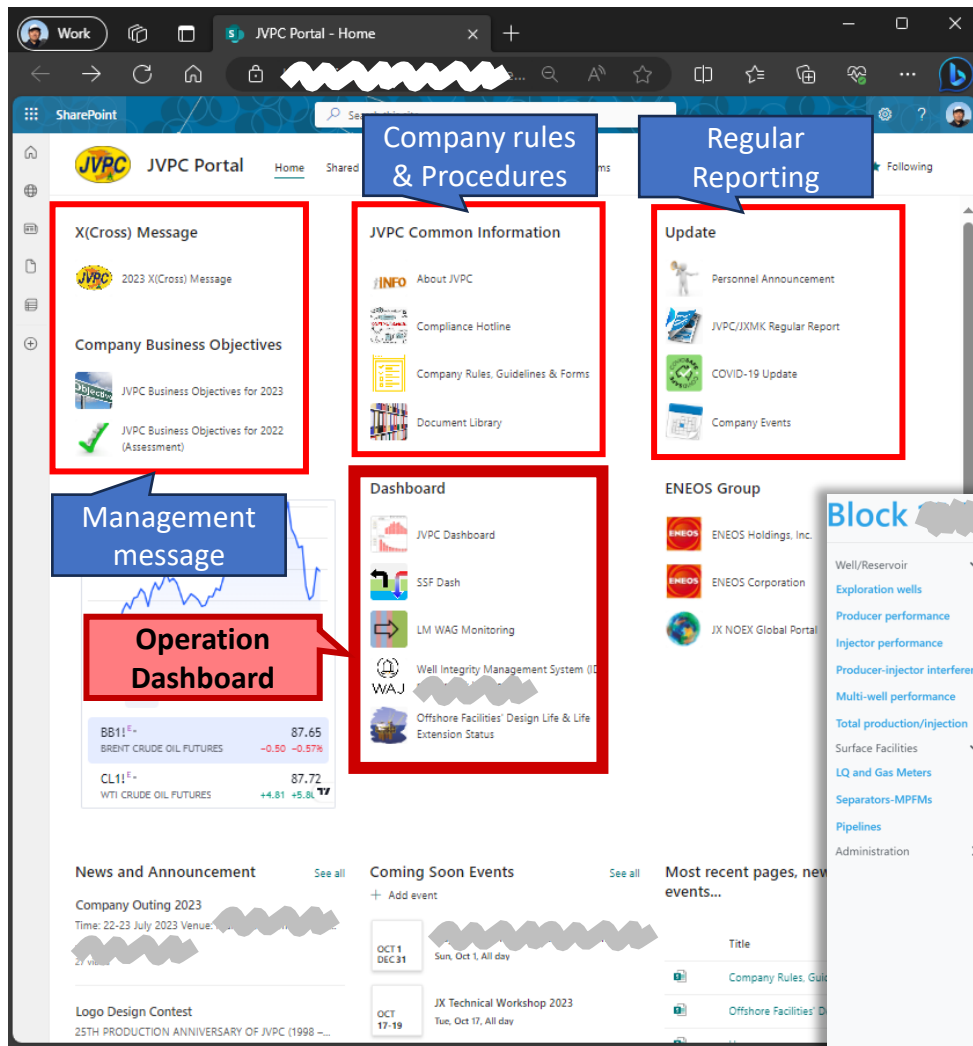
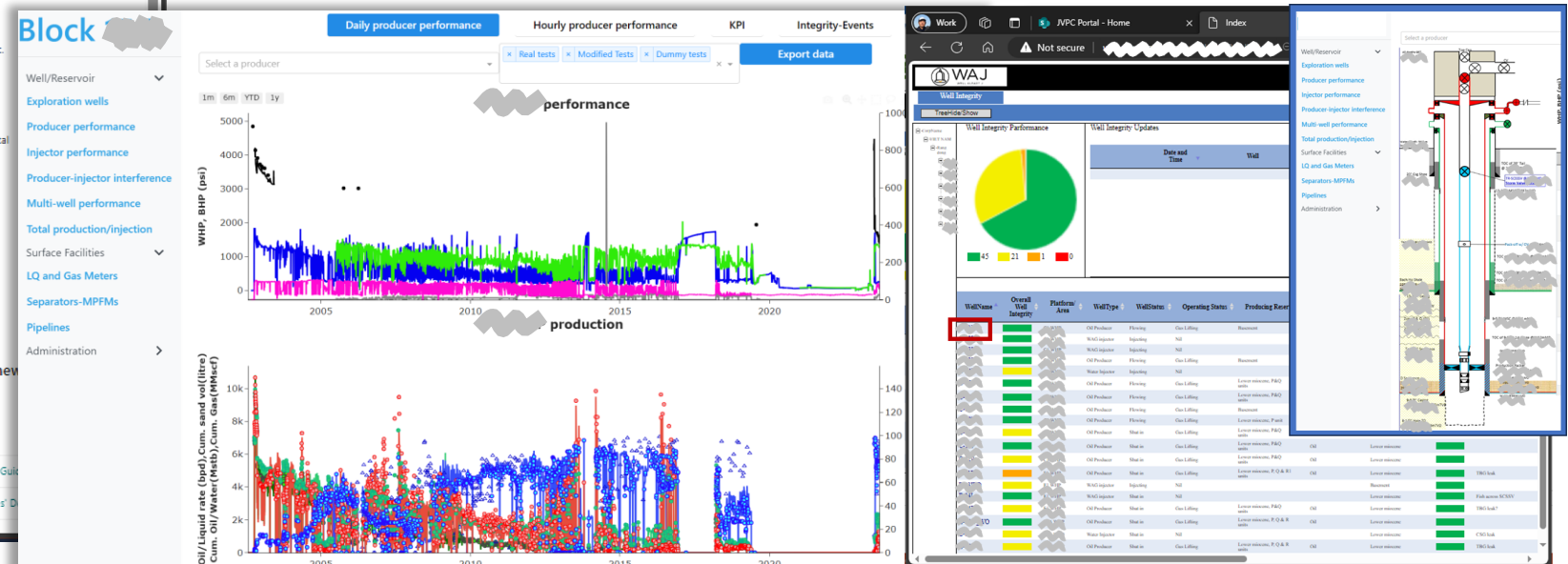
Several opportunities were identified in the one-year assessment work

- Cooperate data management is foundation for enhancing digital approaches.
- A large room for optimization in data management and information sharing.

Data management

All necessary information are shared in the company portal.
We see same data and discuss based on same information.

- Widely used tool (MS SharePoint, Power BI, Teams) and in-house tool (python base) are utilized for integration.
- Production data is managed in SQL and accessible from the portal.
- Single source data using shared GUI is used for decision making.

Field gas management is key in GHG emission control

Fuel gas and flaring dominant GHG emission of Block.

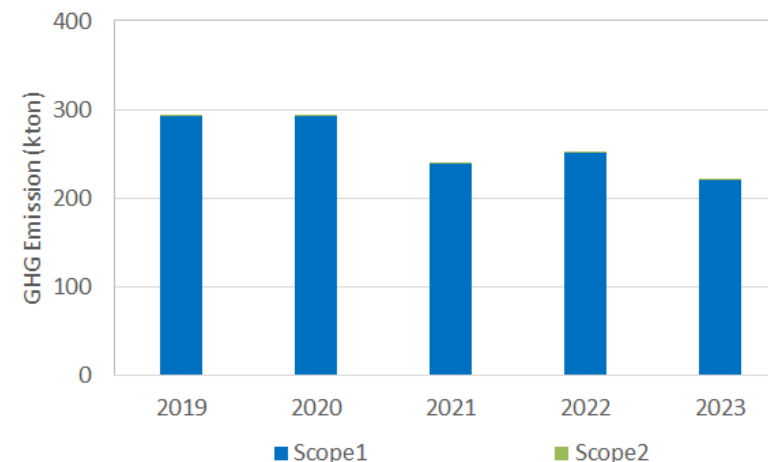
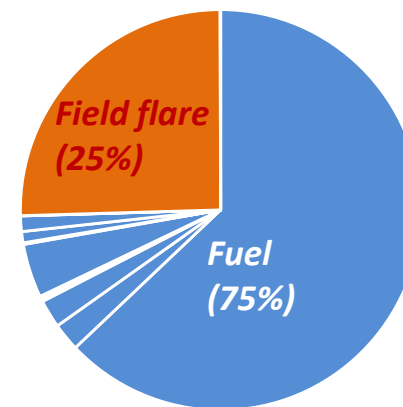
As a nature of remote offshore fields, operation is fuelled by produced natural gas.

- Large gas turbine driven gas compressors (Gas lifting, EOR injection), water injection pump and power generators.
- Fuel gas supply to FSO's Boilers for power generation

Gas flare still occupies a large portion in GHG emission.

- Periodical maintenance of Compressors
- Pilot flaring

Flare reduction is recognized as one of the key initiatives (preserving and effective usage of resource)



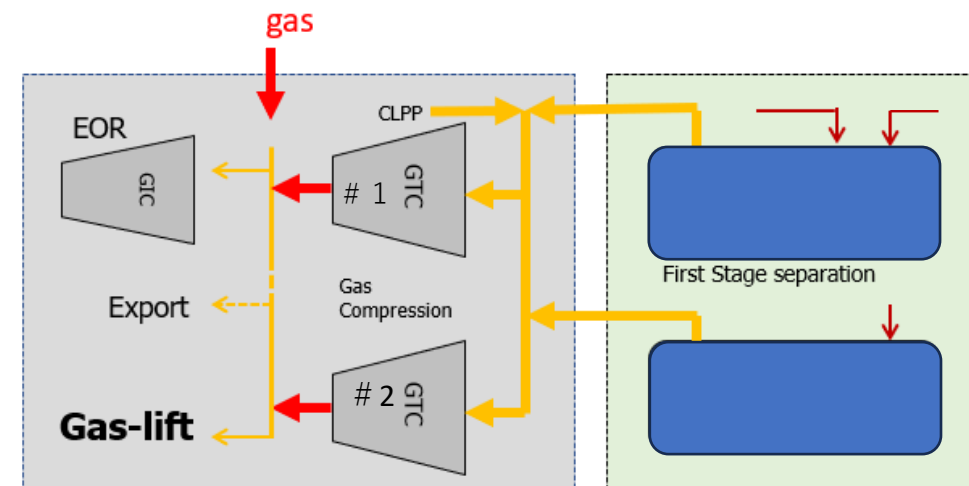
Maintenance Flare Reduction

Gas flaring during periodical compressor maintenance has been identified an opportunity of GHG emission reduction.

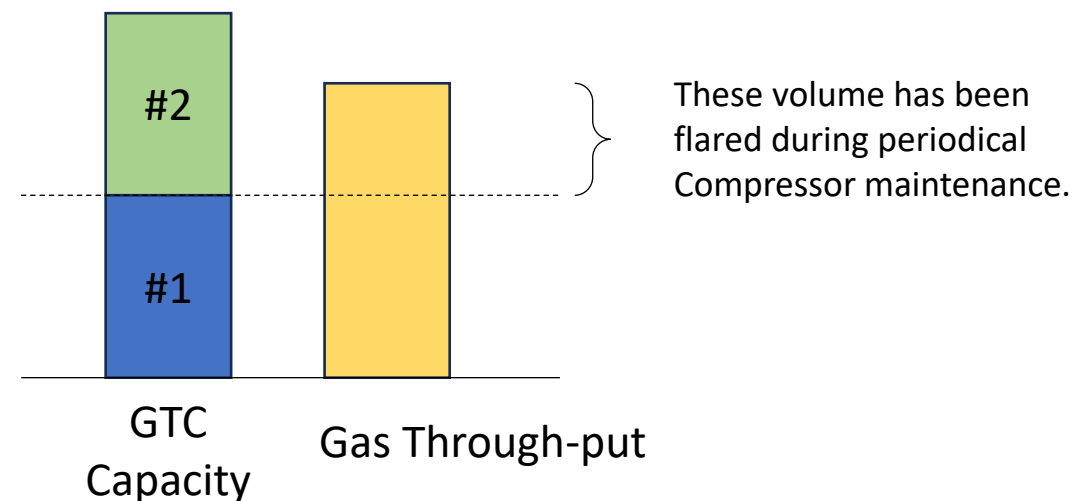
A certain volume of produced gas has been flared for several reasons.

- Achieving oil production target
- Operation sustainability
- Operation challenges
 - Complexed production network
 - Sensitive wells - Sanding, weak flow, gas-lifting

Several approaches have been taken for the purpose of “securing precious resource” and “achieving long-term revenue”



GTC: Gas Turbine Compressor



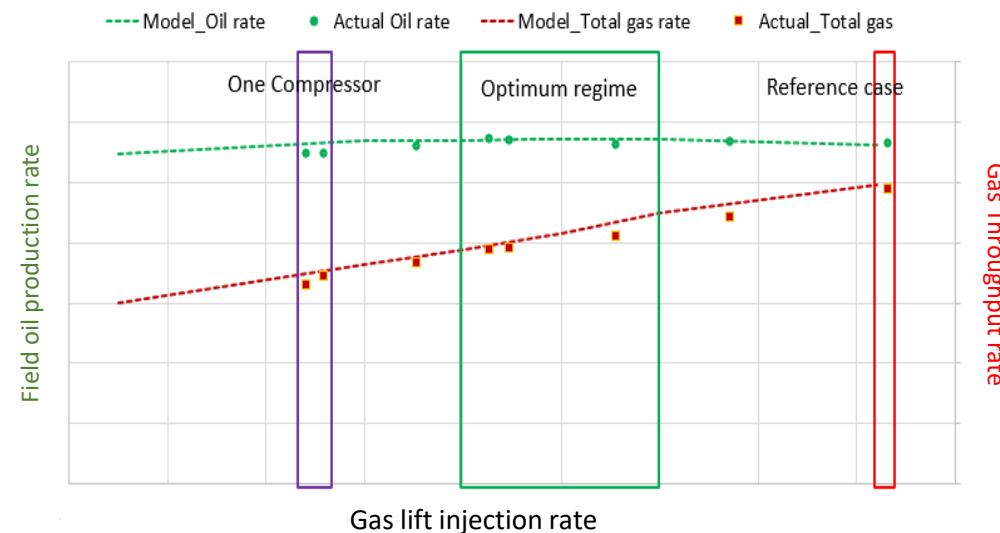
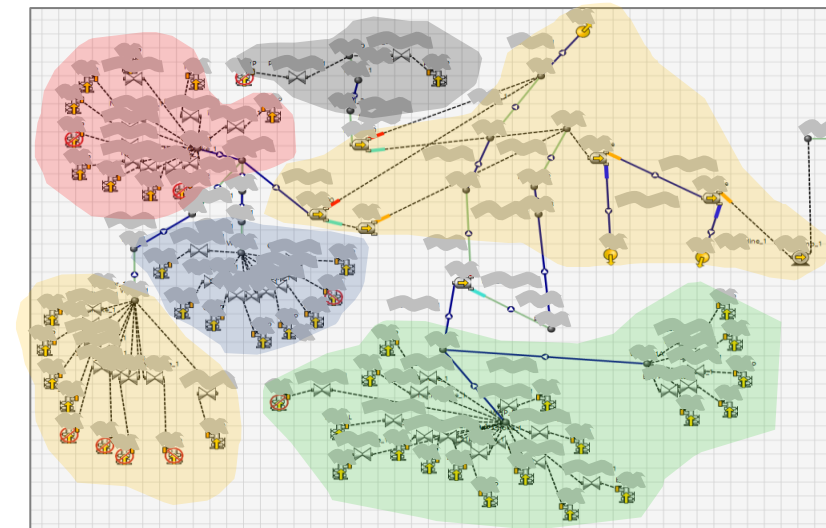
Maintenance Flare Reduction

With support from the related groups, several “demonstrations” have been conducted in the field.

- An integrated surface production network has been constructed for job planning.
- Detail operation programs have been generated based on the engineering/operational approach.
- Post-implementation evaluation and assessment

Through trial-and-error process, we have achieved several successes in several cases

- Significantly reduced flare gas while minimizing oil production loss
- Reduced usual gas lift through put
- Established reasonable operational protocol.



Emission verification/reduction - ongoing

Our challenge

- **Goal** : Verify flare, venting and micro-leakage conditions to further enhance emission reductions.
- **Background** : Accurate and enhance emission reporting with high transparency is required by international community such as OGMP framework
- **Expectation** : Identify all possible sources of emission for appropriate reduction to ALARP (as-low-as-reasonably-practicable) level.

Actions

1. Flare Quantification and Analysis

- Create Flare balance table throughout all platforms and facilities with several operation modes(Normal/Abnormal/Maintenance) by using historical data and actual measurement.
- Data inconsistencies might be identified.

2. Leakage Investigation

- Investigate micro-leakage from equipment/piping to quantify unmeasured/unreported leaks.
- Conduct inspections on valves for flare system leaks.
- Incorporate findings into JVPC's maintenance plan as LDAR.

3. Study possible technical/ operational solutions for improving fuel efficiency of major machineries.

Summary and Conclusion

Think big, do specific!

- A company-wide, comprehensive approach towards opportunity findings.
- Prioritized items are selected to pursue, in line with the company's strategy and appropriate to current business constraints

Data management and integration helped improving operation workflow

- Widely available tools (MS SharePoint, Power BI, MS Teams) and in-house tool work as good platform
- Single source data is fundamental for communication and project management

Integrated field trials succeeded to significant GHG reduction

- Flare and gas release reduction was prioritized in GHG reduction
- Gas lift optimization and maintenance optimization achieved clear contributions



Thank you