

The background features a dark purple gradient with glowing cyan and magenta lines forming a diamond pattern. The text is centered in white.

AVEVA WORLD

ACCELERATE INDUSTRIAL INTELLIGENCE



From Overview to Detail

A Multi-Layer Dashboard for Plant Performance Insight

Cristina Bottani, Irene Frino, Alberto Panara

19 May 2026

Eni Company Introduction

Company Profile

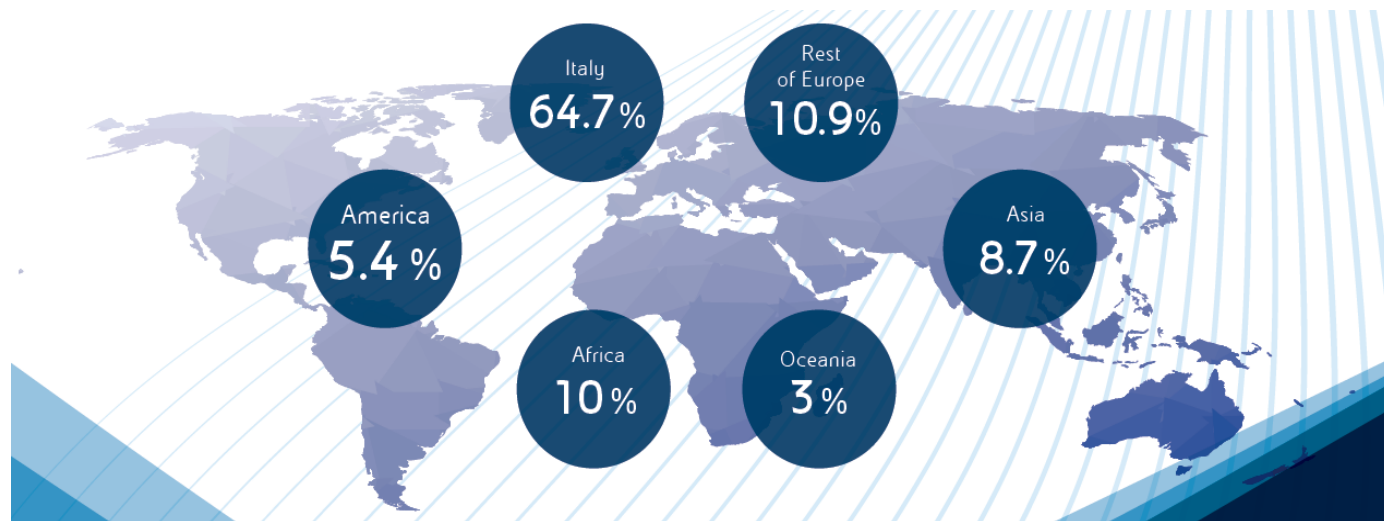
Eni is an **integrated energy company** with over 30.000 employees in 62 countries around the world.

The Company launched a new strategy in 2020 with the aim of achieving the target of **zero net emissions by 2050** and providing a variety of fully decarbonised products with a strong focus on technological leadership built on years of research and innovation.



62 Countries where we operate

+31,000 People



With its presence throughout the world, Eni meets the short and long-term **challenges** facing the energy sector.

Thanks to its consolidated alliances with producer countries, Eni contributes to an increasing diversity of supply sources, working in close synergy with local partners and institutions, and **offering its customers** a wide range of **energy products and services** that are increasingly sustainable.

Objectives



Expected Outcomes

Strengthen PROD 'Center of Excellence' by:

- Rationalising the KPIs to create a robust tool to support the Operations.
- Creating a cohesive and efficient KPI framework that enhances operational performance across all operating assets.
- Ensuring that KPIs are of effective support and operational units are accountable for their functionality and maintenance.

CENTER OF EXCELLENCE STRENGTHENING

KPI ENHANCEMENT

GRAPHICAL ASPECT REDESIGN

CONSENSUS BUILDING

Key Requirements for Successful Implementation



- Renew user experience
- Reuse PI AF Analytics
- Minimize custom developments





KPI Center of Excellence

2D Layout L1 Dashboard L2 Dashboard Power BI

Power PHOenIX eMADAM e-dof

AUSTRALIA - Blacktip	Stop
CONGO - Nguya FLNG	Stop
CONGO - Scarabeo 5	Stop
CONGO - Tango LNG	Run
EGYPT - Zohr	Run
GHANA - OCTP - Oil Field	Run
GHANA - OCTP NAG ORF	Run
INDONESIA - Jangkrik + Merakes hub	Run
IRAQ - DGS North	Run
IRAQ - Hammar IPF	Run
IRAQ - Rafidiya IPF	Run
IRAQ - Zubair IPF	Run
ITALY - Casalborsetti	Run
ITALY - Cassiopea	Run
ITALY - Centro Oli Val d Agri	Run
IVORY COAST - Baleine FPSO	Run
IVORY COAST - Petrojarl Kong FPSO	Run
KAZAKHSTAN - KPO	Run
MEXICO - Area1	Stop
MOZAMBIQUE - Coral South	Run
NIGERIA - ABO FPSO	Run
USA - Allegheny	Run
USA - Corral	Stop



Overall Portfolio Dashboard – Layer 2



Country	Asset	Performance KPI	Total Production	EII KPI / Therm Eff. (for LNG)	ICO2 KPI Stationary Combustion	Upset in the last 30 days	SPoE	Reservoir Field Performance KPI								
								Detail Page	Oil/Cond. Rate	Gas Rate	Water Rate	WC/ WGR	GOR/ CGR	VRR	Gas Injection	
AUSTRALIA	Blacktip	Stop	0 bboed													
CONGO	Nguya FLNG	Run	10 bboed													
CONGO	Scarabeo 5	Run	10 bboed													
CONGO	Tango LNG	Run	10 bboed	100%	100 tCO2eq/kboe	0										
EGYPT	Zohr	Run	10 bboed	100 GJ/boe	100 tCO2eq/kboe	0										
GHANA	OCTP - Total		10 bboed													
	OCTP - Oil Field	Run	10 bboed			0										
	OCTP NAG ORF	Run	10 bboed			0										
INDONESIA	Jangkrik + Merakes hub	Run	10 bboed	100 GJ/boe	100 tCO2eq/kboe	0										
	Jangkrik															
	Merakes															
IRAQ	DGS North	Run	10 bboed													
IRAQ	Hammar IPF	Run	10 bboed													
IRAQ	Zubair IPF	Run	10 bboed													
IRAQ	Rafidiya IPF	Run	10 bboed													
ITALY	Casalborsetti	Run	10 bboed	100 GJ/boe	100 tCO2eq/kboe	0										
ITALY	Cassiopea	Run	10 bboed			0										
ITALY	Centro Oli Val d Agri	Run	10 bboed	100 GJ/boe	100 tCO2eq/kboe	0										
IVORY COAST	Baleine FPSO	Run	10 bboed			0										
IVORY COAST	Petrojarl Kong FPSO	Run	10 bboed			0										
KAZAKHSTAN	KPO	Run	10 bboed			0										
MEXICO	Area1	Stop	0 bboed			0										
	Mizton															
	Amoca															
	Tecoalli															
MOZAMBIQUE	Coral South	Run	10 bboed	100%	100 tCO2eq/kboe	0										
NIGERIA	ABO FPSO															
USA	Allegheny	Run	10 bboed													
USA	Corral	Run	10 bboed	100 GJ/boe	100 tCO2eq/kboe	0										
USA	Devils Tower	Run	10 bboed	100 GJ/boe	100 tCO2eq/kboe	0										

PI AF - What's behind the scenes?



PI AF Tables

- Coordinates
- Technical data
- Tag names
- KPI thresholds
- Notification subscribers
- Descriptions for textual fields

Element Templates

- Single template for all the Assets
- Few templates for KPI calculations

Overall Portfolio Dashboard – Layer 2



Country	Asset	Performance KPI	Total Production	EII KPI / Therm Eff. (for LNG)	ICO2 KPI Stationary Combustion	Upset in the last 30 days	SPoF	Reservoir Field Performance KPI									
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AUSTRALIA	Blacktip	● Stop															
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CONGO	Scarabeo 5	● Run															
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USA	Corral	● Run	kboed	● Run	● Run												
USA	Devils Tower	● Run	kboed	● Run	● Run												

I: This KPI evaluates production performance by comparing real-time production with the previous month's average. It is based on **valorized production**, including export gas, fuel gas, and export liquids, while excluding flared or vented gas and non-revenue losses.

Performance Scale

- **Green (Good):** Real-time production \geq previous month's average.
- **Yellow (Alert):** Real-time production is 90-100% of the average.
- **Red (Critical):** Real-time production $<$ 90% of the average.
- **Gray (No Flow):** Main product flowrate is below treshold (10 bbl/d for Oil, 2 mmscfd for Gas, 10 m3/h for LNG). This condition determines plant "Stop".

This KPI helps track trends and detect underperformance.

Drill down – SPoF (Single Point of Failure)



Last update:
14/01/2026

Functional unit	SPOF calculation criteria	Type	Train	Status	Available	Notes	Manufacturer
PRICO LIQUEFACTION COMPR	0	Centrifugal Compressor Gas Turbine	23-C-0101 23-CD-0101	Available	✓		BH
PRICO LIQUEFACTION 101	1	Refrigerant Pumps Electric Motor	23-P-0101A	Available	✓		
		Refrigerant Pumps Electric Motor	23-P-0101B	Available	✓		Goulds
PRICO LIQUEFACTION 102	1	Refrigerant Pumps Electric Motor	23-P-0102A	Available	✓		
		Refrigerant Pumps Electric Motor	23-P-0102B	Available	✓		Goulds
FLASH/BOIL OFF GAS COMPRESSOR SYSTEM 101	1	LP BOG Compressor Electric Motor	26-C-0101 A 26-CM-0101 A	Available	✓		Kobelco
		LP BOG Compressor Electric Motor	26-C-0101 B 26-CM-0101 B	Out of Service	✗	vibration failiure, bearings replaced, functional test planned for the	Kobelco
FLASH/BOIL OFF GAS COMPRESSOR SYSTEM 102	1	HP BOG Compressor Electric Motor	26-C-0102 A 26-CM-0102 A	Available	✓		Kobelco
		HP BOG Compressor Electric Motor	26-C-0102 B 26-CM-0102 B	Available	✓		Kobelco
Power Generation	2	Gas/diesel Engine Electric Generator	9L34DF	Available	✓		Wartsila
		Gas/diesel Engine Electric Generator	9L34DF	Available	✓		Wartsila
		Gas/diesel Engine				✓	

Drill down – Production Performance KPI



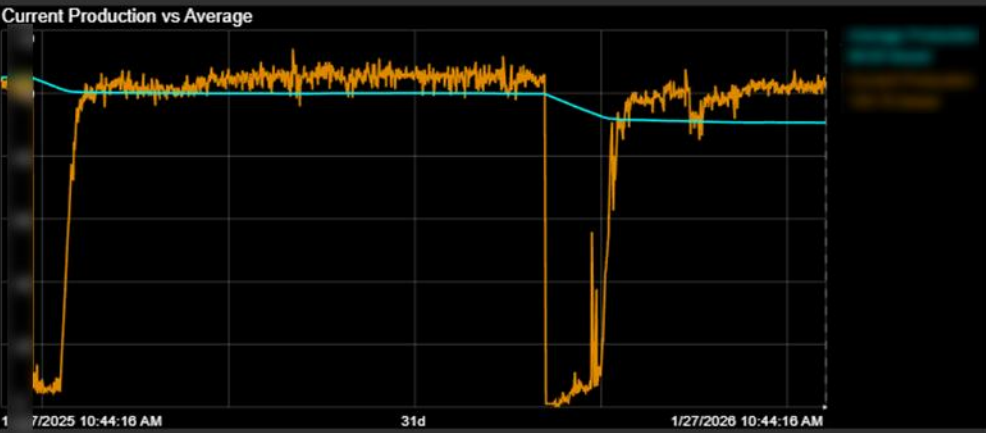
- KPI Scope
- KPI Methodology
- KPI Performance Scale



$$\text{KPI} = \frac{\text{Current Production [kboed]}}{\text{Avg Production [kboed]}} \times 100\%$$



PARAMETER	DEFINITION	VALUE
Current Production	Export gas, liquids and fuel gas	kboed
Avg Production	Production average in the previous 30 days	kboed
LNG Produced	LNG Rundown (TM-3700-FIC0027)	m3/h kboed
Condensate	Sum of condensate from stabilizer + debutanizer	kboed m3/h
	Condensate from stabilizer (TM-2100-FIC0006)	m3/h
	Condensate from debutanizer (TM-3200-FIC0023)	m3/h
Fuel Gas	Sum of FG to Power Gen and MR Turbines	mmscf/d kboed
	HP FG to Power Gen Gas Turbines (Sum of TM4700FT3(4/5/6)110)	
	HP FG to MR Turbine (Sum of TM3701(2)FT3110 + TM3701(2)FT4110)	

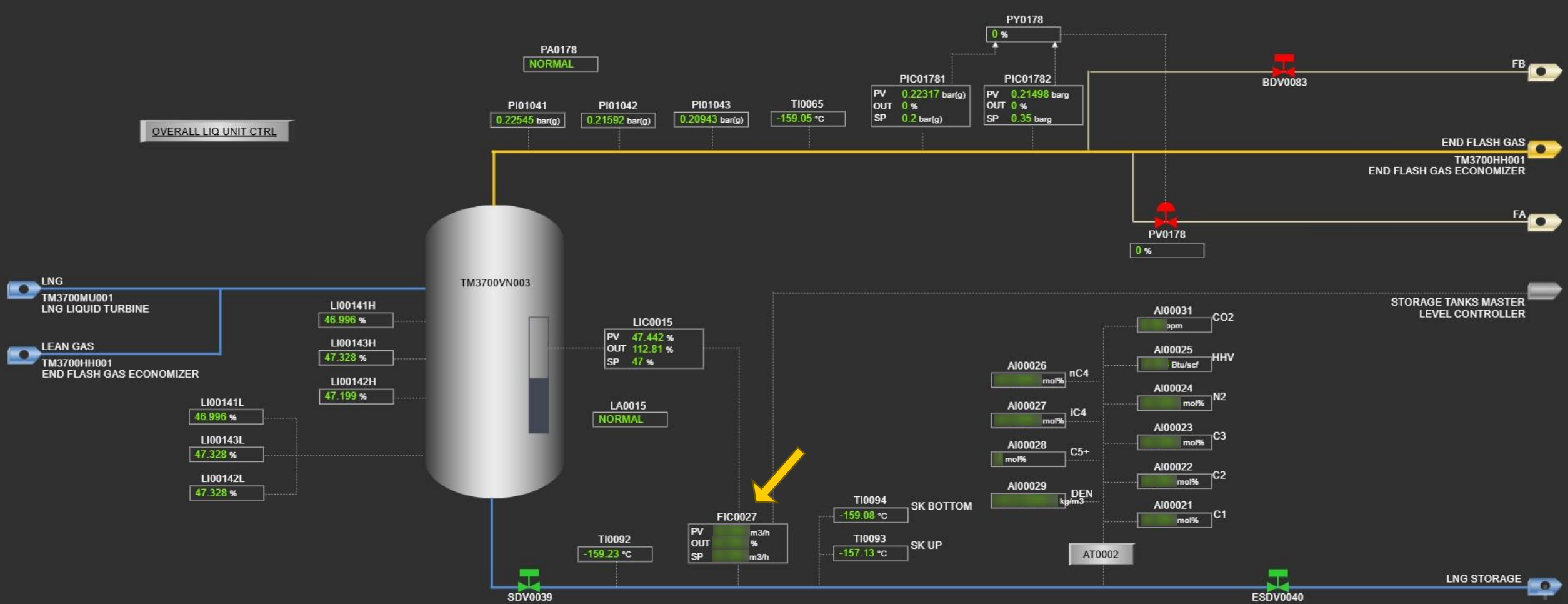


CONVERSION FACTORS		
HHV_LNG	MJ/Sm3	Daily Report
HHV_FEED GAS	MJ/Sm3	Daily Report
LNG Density at -159.8C and 0.1 barg	kg/m3	
Std Density LNG (vap)	kg/Sm3	
Gas conversion factor	1 Sm3 = 0.00675 boe	
Liquids conversion factor	1 m3 = 6.2898 bbl	
HP FG Density	kg/Sm3	

Drill down – Production Performance KPI



UNIT 370 - END FLASH DRUM S03 (TM3700)



Drill down – Operational Continuity KPI

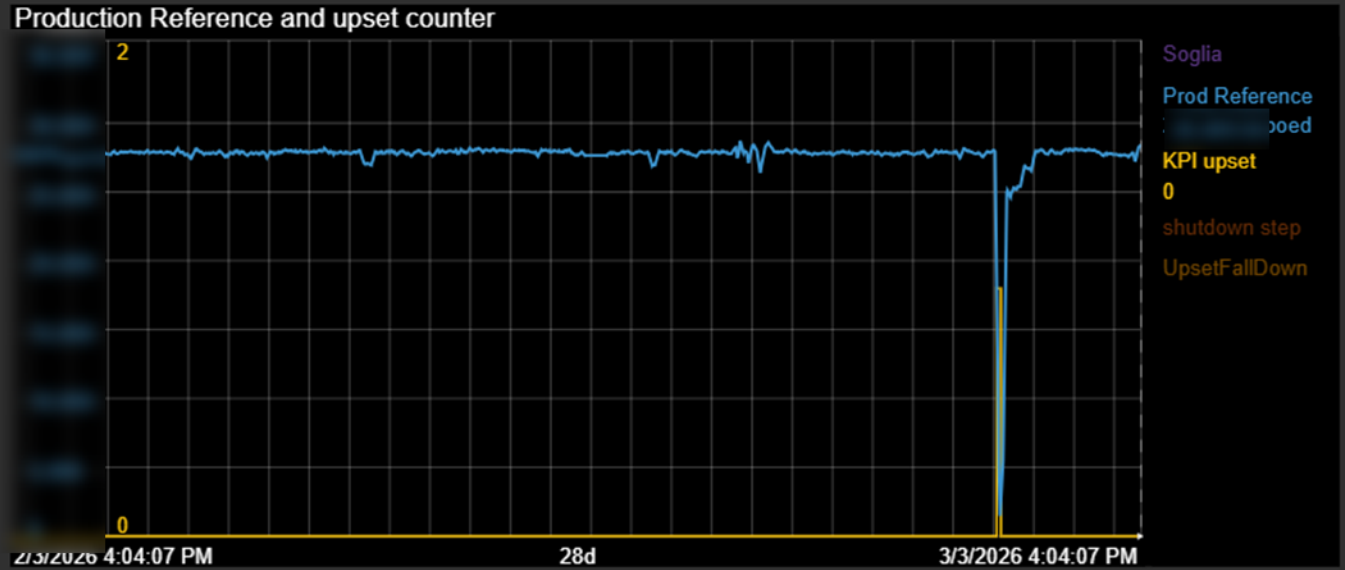


- KPI Scope
- KPI Methodology

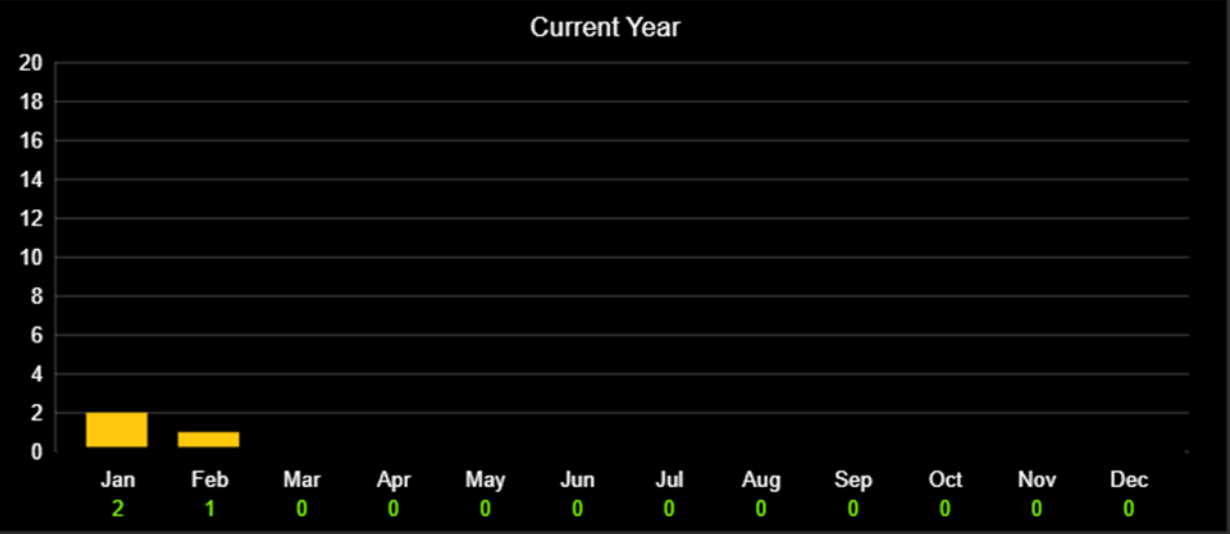
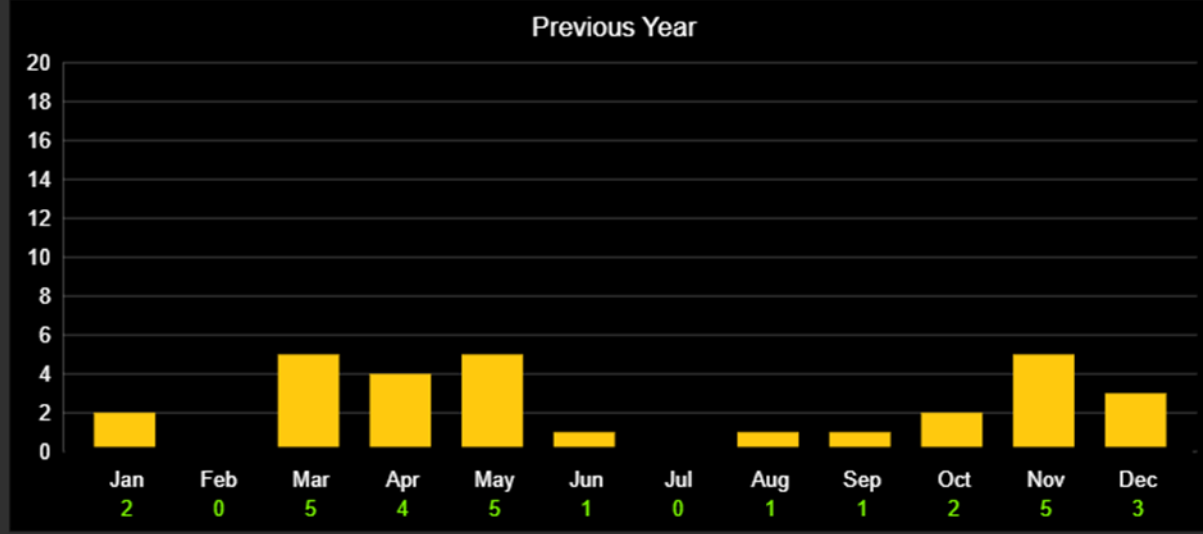


KPI Construction Parameters

Production Reference:		
Total production (oil + export gas) - Avg 2h	boed	
Reduction used to define the 'upset'	10 %	
Minimum value for upset detection	boed	



Monthly upset trend



Pages

Layer 1

Layer 2

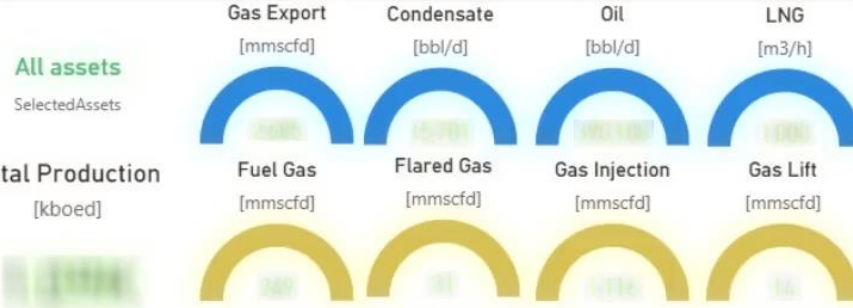
File Export Share Explore Subscribe Set alert Monitor

Date Picker

12/24/2025

1/27/2026

- Assets
- Select all
 - AUSTRALIA
 - CONGO
 - EGYPT
 - GHANA
 - INDONESIA
 - ITALY
 - IVORY COAST
 - KAZAKHSTAN
 - MEXICO
 - MOZAMBIQUE
 - NIGERIA
 - USA



Production vs Name Plate

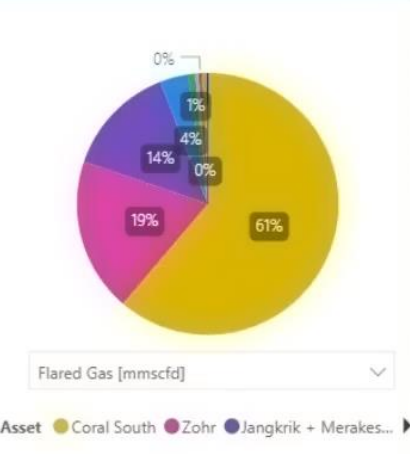
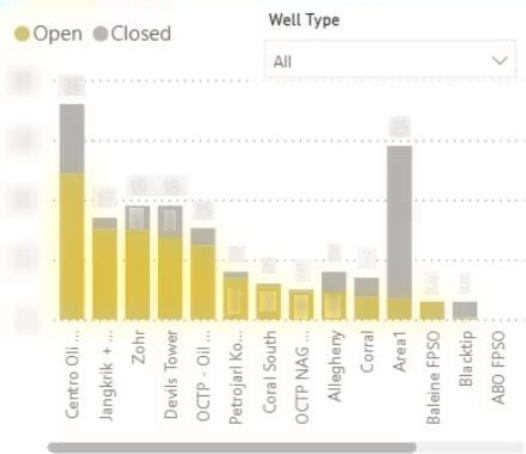
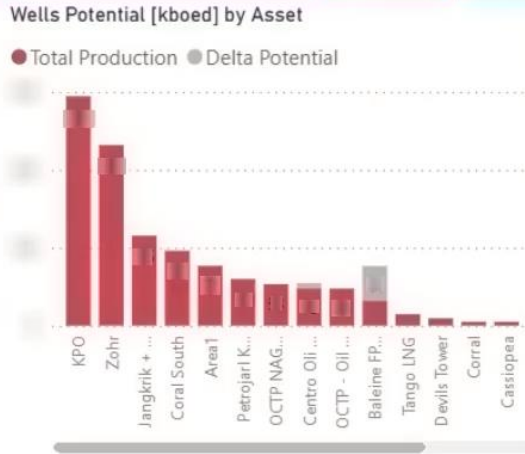
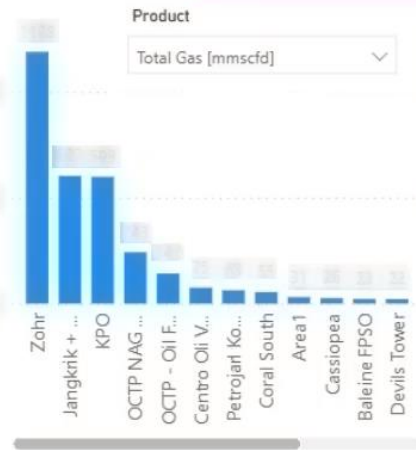
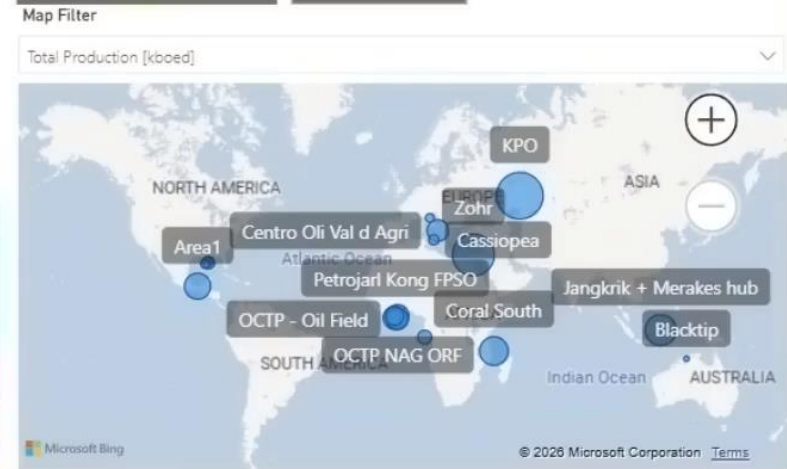
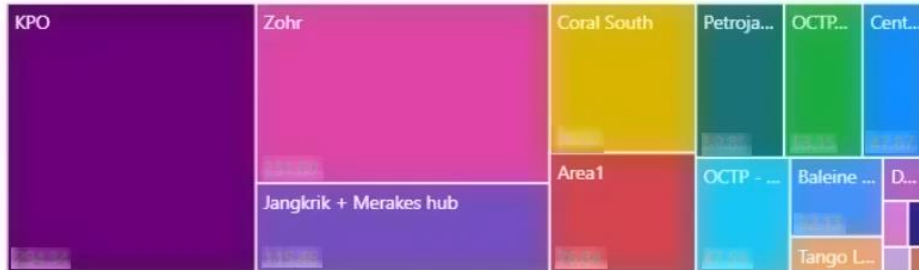
- < 50%
- Between 50% and 80%
- > 80%

Main

- Gas
- Oil
- LNG

Total Production [kboed]

Total Production [kboed] by Asset



More...

Customised Operational Dashboard – Layer 3



Wells

5	nmscfd	Open to SC	1/17/2026 1:41:12 PM
6	nmscfd	Open to SC	1/19/2026 6:18:12 AM
8	mmscfd	Open to SC	1/17/2026 10:23:15 AM
7	nmscfd	Open to SC	1/17/2026 4:32:39 PM
9	mmscfd	Open to SC	1/18/2026 12:42:13 AM
10	mmscfd	Open to SC	1/21/2026 9:06:00 AM

MEG Injection:

- within recommended value
- within recommended value
- within recommended value
- within recommended value
- overdosage - slightly higher
- overdosage - slightly higher

Production

Run

Total Production: 100 boed

Feed Gas: 100 mmscfd

LNG Produced: 100 m3/h

LNG Run-down APCI Target: 100 m3/h

Plant utilization Capacity: 100 %

Flaring and CO2 Emissions

tCO2eq/kboe

Current Flaring: 100 mmscfd

tCO2eq/kboe

Thermal Efficiency

78%

Thermal Efficiency: 78 %

Auto-consumption: 10 %

Fuel Gas: 100 MM scfd

Refrigeration Specific Power

KPI SP: 100 %

SP APCI Target: 100 kWh/t

SP Actual: 100 kWh/t

Chemical Overview

Item	Available Volume	Average Consumption	Remaining Stock [days]
EB to U300 TT1200TZ101	L	L	/month 894
Reverse EB TT1200TZ102	L	L	/month 1,364
Scale Inhibitor TT1200TZ103	L	L	/month 239
Antifoam SAG7133 TT3300TZ601	L	L	/month 58
35% HCl to 390 TT3900TC511	L	L	/month 143
Oxy Scav (SBS) TT3900TC521	L	L	/month 19
33% HCl to 530 TT5300TA110	L	L	/month 99
NaClO 12% TT5300TA113	L	L	/month 173
Antiscalant TT5300TA116	L	L	/month 30
Oxy Scav (SBS) TT5300TA119	L	L	/month 98
Non Ox - Biocide TT5300TA137	L	L	/month 43
30% NaOH TT5600TZ202	L	L	/month 25
EB Flocculant TT5600TZ203	L	L	/month 235

Gas Pretreatment

CO2 Alert Increase

Feed Gas

Acid gas Absorber

Amine Regenerator

Gas Dehydration

MRU

CO2 (TM3350AI0001) -0.06 ppm / 50 ppmv

H2O (TM3350AI0002) ppm / 0.5 ppmv

Gas Liquefaction U370

Gas Pressure Drop Monitoring

Booster Compressor

WMCHE

Liquid Turbine

Economizer

MR1

MR2

MR1 PUMPS

CMCHE

End Flash Drum

LNG to Storage

HHV (TM3700AI00025) Btu/scfd

C5+ (TM3700AI00028) mol% / 0.03%mol

CO2 (TM3700AI00031) ppm / 50.0 ppm

Density (TM3700AI00029) kg/m3

BOG Treatment

BOG Compressor tr 1

BOG Compressor tr 2

Fuel Gas System

FG to LP Users

HP FG MIX LNG Drum

MR1 T1

MR1 T2

MR2 T1

MR2 T2

GTA

GTB

GTC

GTD

FG Main Consumers Eff. and SPI

MR1

MR2

GTG EFFICIENCY [%]

GTG SPI [kSm3/MWh]

Condensate Stabilization

Stabilizer

Offgas Compressor

Fuel Gas

Preflash Drum

BS&W (TM2100AI0002) %vol / 0.5 %vol

RVP (TM2100AI0011) psia / 11 psia

TVP (TM2100AI0012) psia / 13 psia

Condensate to storage

NGL Section U320

Hydrates Formation Risk

BTX (TM3800AI00011) ppm / 2 ppm

C5+ (TM3800AI00018) ppm / 700 ppm

De-meth

De-but

De-eth

De-prop

Comander

Recompressor

LTS

RVP (TM3200AI00071) psia / 11 psia

LNG Storage

Total Volume m3

Spare Volume m3

Filled 27%

Spare 73%

Equivalent number of LNG Cargo YTD

Equivalent number of LNG Cargo since SIU

Last offloading completed on:

1P	-150.27 °C	2P	-140.03 °C	3P	-143.15 °C	4P	-109.82 °C	1S	-151.88 °C	2S	-143.25 °C	3S	-138.94 °C	4S	-119.00 °C
	-159.70 °C		-159.79 °C		-159.79 °C		-159.79 °C		-159.89 °C		-159.82 °C		-159.82 °C		-159.82 °C

Water Cooling

CW to header

To Sea

Seawater Filters

SW/CW Heat Exchangers

Main Sea Water Pumps

Rotating Machinery Unavailability

Risk Exposure Impacted Area: 0

GTG Power Generation System Unavailable unit:

Main Sea Water Pumps Unavailable unit:

Rotating Machinery Running Time

Plant Availability

3 upset in the last 30 days

Monthly Plant Availability [%]

Current year: 91 %

Current year running hrs: 536 h

Link Summary

HIGH LEVEL	PROCESS FOCUS	ROTATING MACHINERY FOCUS
Wells (Reval display)	Gas Dehydration KPI	Rot. Machinery Running Time
Wells MEG Injection KPI	Gas Delta P Monitoring	Power Gen. Risk Exposure
Production Details	Economizer Performance	Main SW Pumps Risk Exposure
Plant utilization Capacity	Hydrates Formation Risk	GTG Efficiency and SPI
IC02 Emissions	Economizer ROC	MR1 GTG Efficiency and SPI
Plant Availability	Demethanizer Cold Box ROC	MR2 GTG Efficiency and SPI
Thermal Efficiency	Stabilizer OW	
KPI Specific Power	Demethanizer OW	
eDOF Block Diagram	CW/SW HEX Performance	

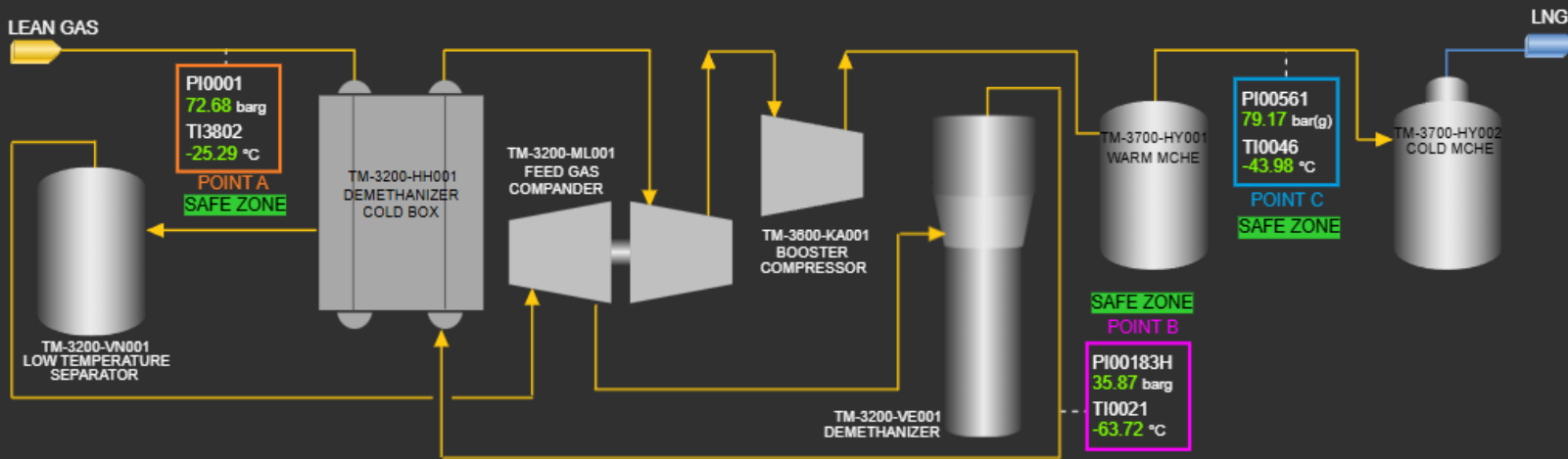
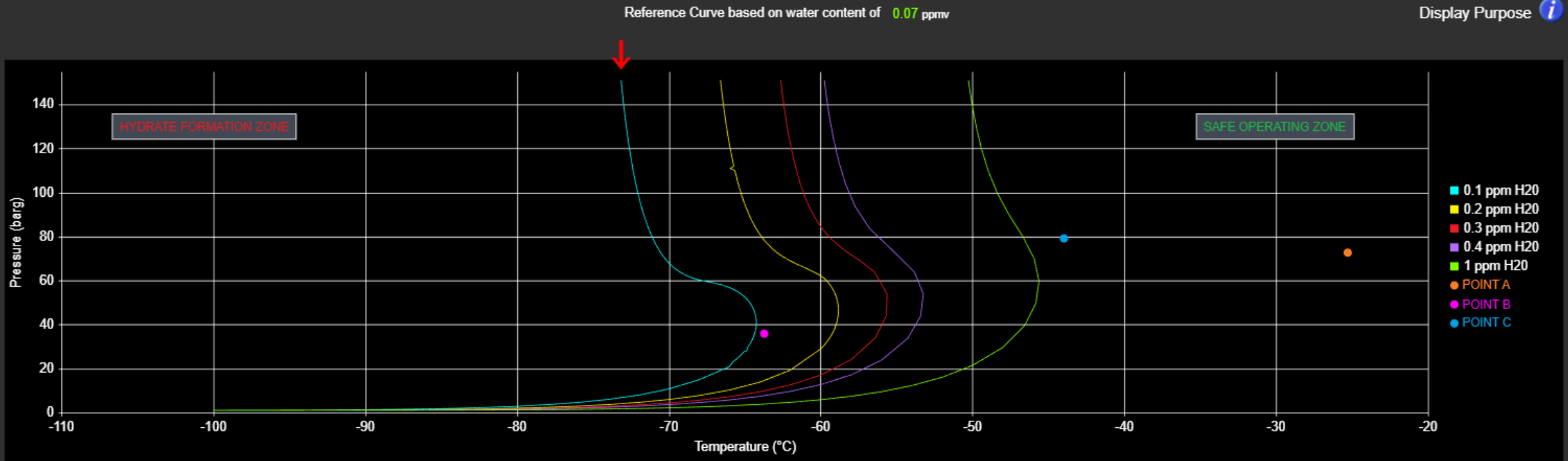
Process Solvent Consumption Monitoring

Amine Virtual	m3	m3	/month 2
Lean MEG Virtual	m3	m3	/month
Ethane Virtual	m3	m3	/month 39
Butane Virtual	m3	m3	/month 46

KPI - Hydrates Formation Monitoring

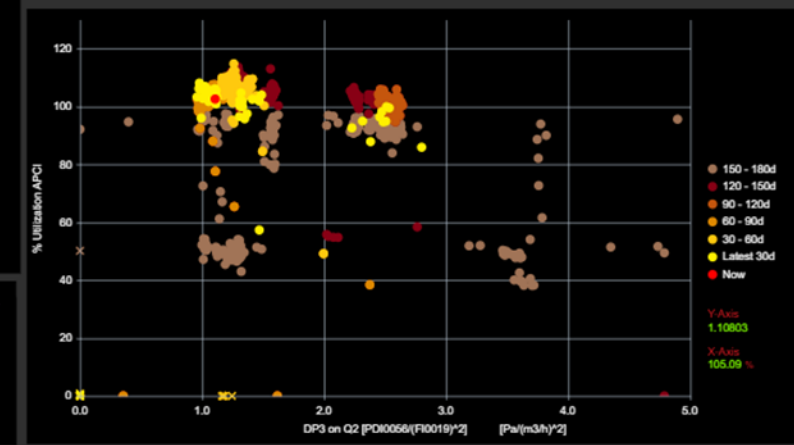
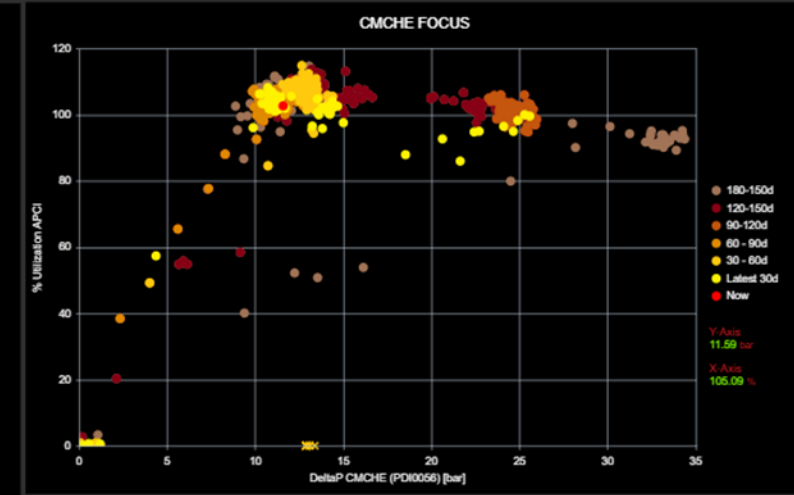
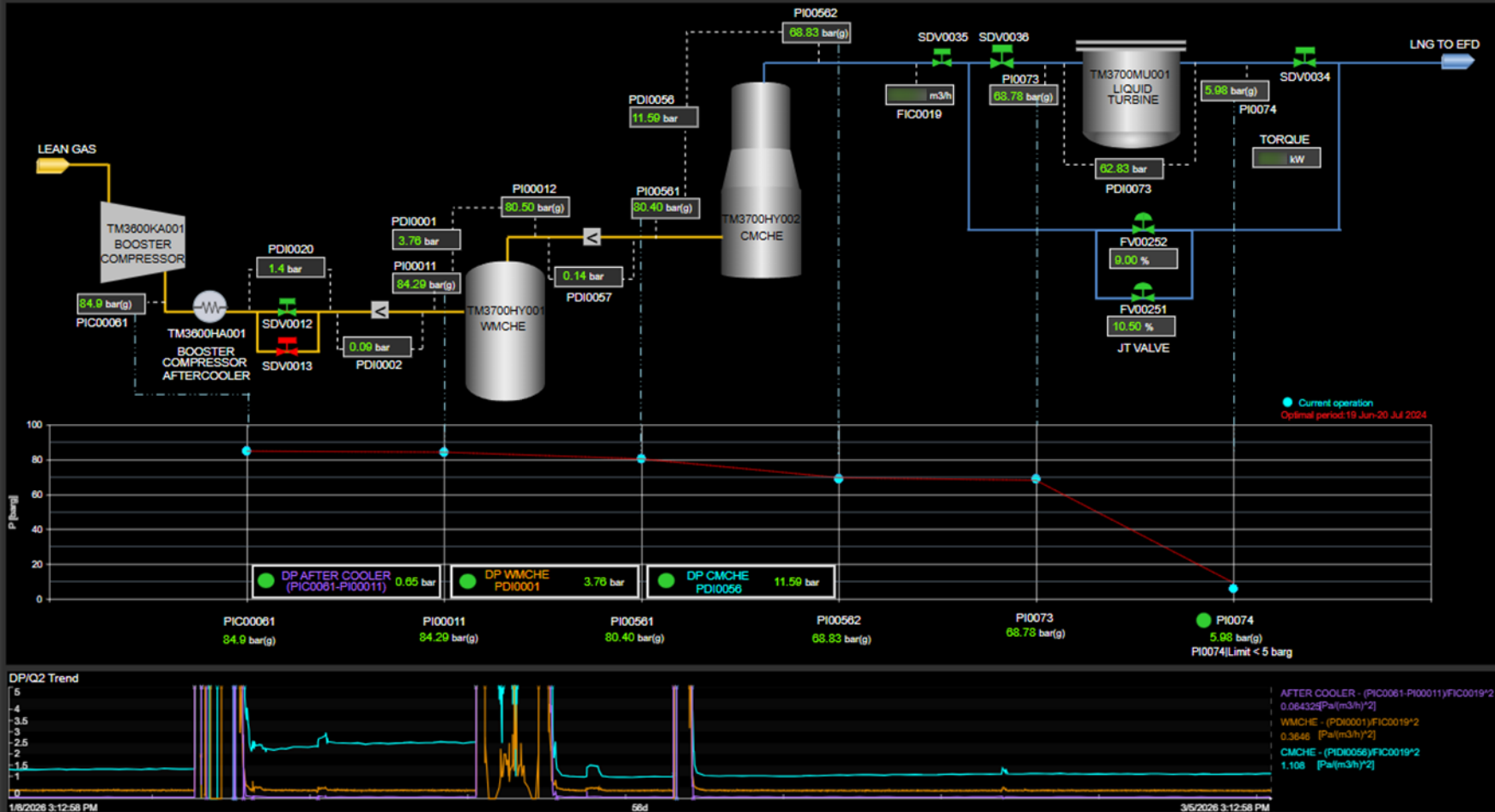


Display Purpose






Water Content in Lean Gas	Type	Value [ppm]
TM3350VF001	Online Analyzer (outlet MRU)	0.07 ppm
TM3350SPT3051	LIMS (outlet MRU)	0.02 ppmv
TM3100SPT3052	LIMS (outlet 310)	0.00 ppmv

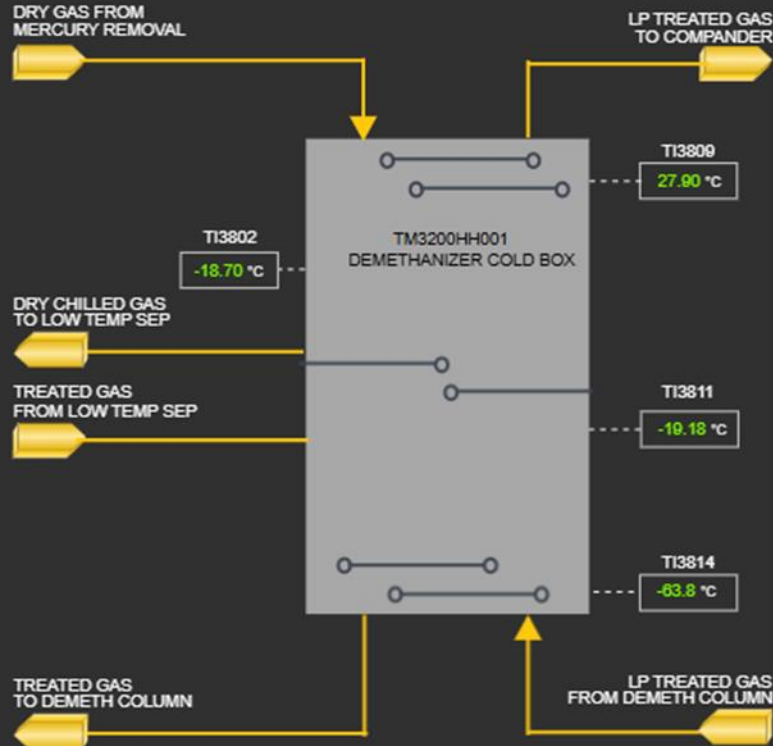
KPI – Pressure Drop Monitoring



KPI – Temperature Rate of Change (RoC)

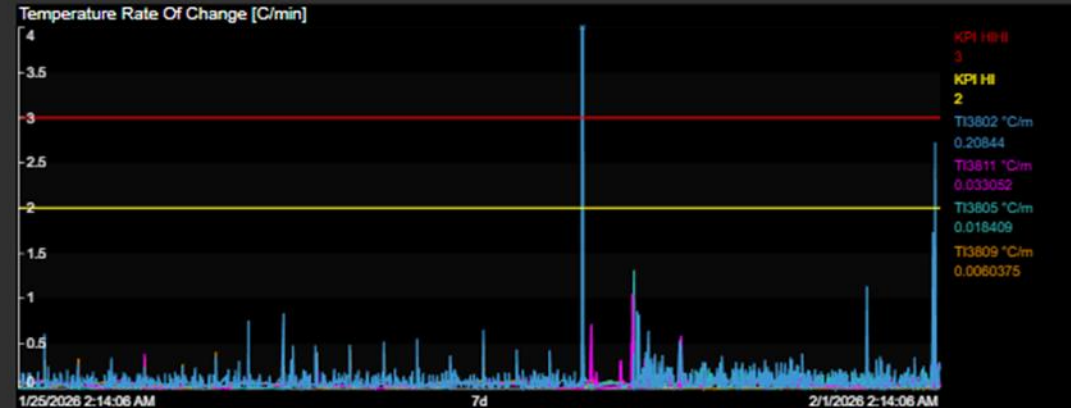
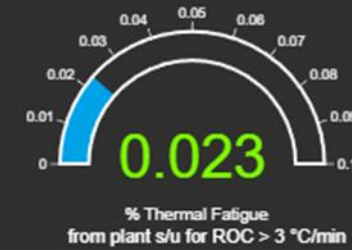


-  KPI Scale
-  KPI Scope
-  KPI Calculation Methodology



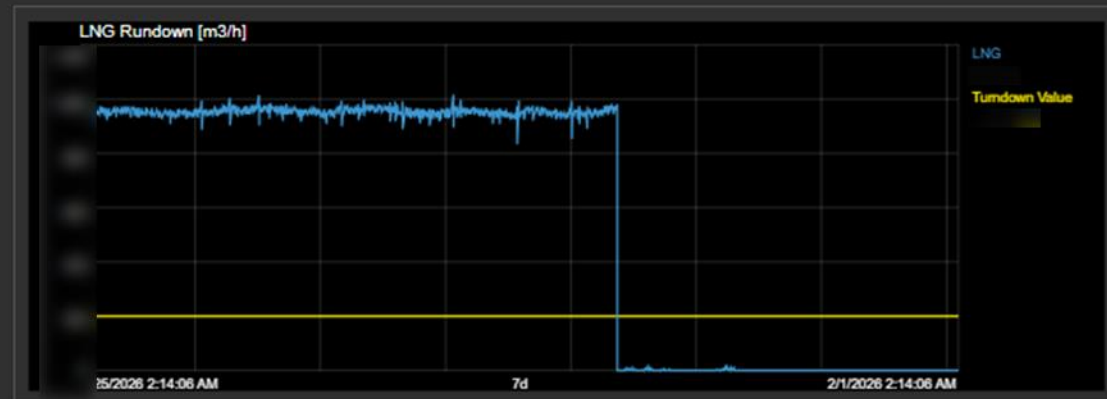
Time from start-up 1,755,614 Minutes

ROC Treshold [°C/min]	Minutes	%
Between 2 and 3 °C/min	445.21	0.025 %
Between 3 and 4 °C/min	168.01	0.010 %
Between 4 and 5 °C/min	75.07	0.004 %
Above 5 °C/min	159.33	0.009 %



Temperature	Current [°C]	ROC [°C/min] *	ROC [°C/h]
TI3802	-18.70 °C	0.208	6.696
TI3811	-19.18 °C	0.033	6.888
TI3814	-63.77 °C	0.018	2.329
TI3809	27.90 °C	0.006	0.319

* The indicators in the table are highlighted only when LNG rundown is below the tumdown threshold of [redacted], in order to tracks transient conditions.



Eni empowers global real-time visibility of plant performance

Challenge

- Evolving e-dof™ KPIs through standardization and harmonization
- Supporting Operations in HQ and Gus
- Empowering the Center of Excellence

Solution

- Deployment of a multi-layer dashboard based on the e-KMS System™ for comprehensive monitoring of plant performance

Results

- KPI-driven real-time insights
- Measurable performance improvements
- Global performance and accountability
- Data-driven culture enablement



e-KMS Success Story

CONTEXT

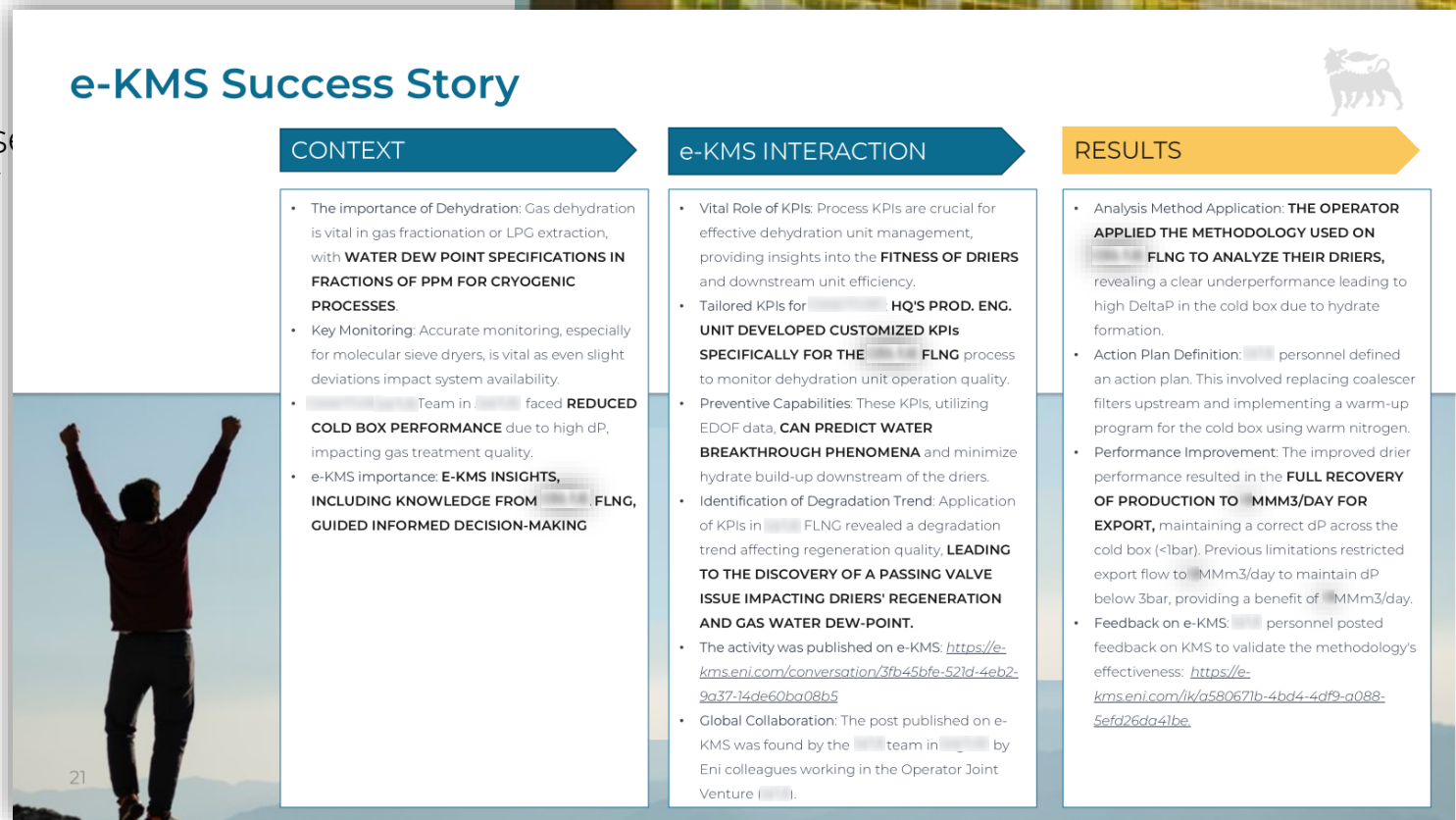
- The importance of Dehydration: Gas dehydration is vital in gas fractionation or LPG extraction, with **WATER DEW POINT SPECIFICATIONS IN FRACTIONS OF PPM FOR CRYOGENIC PROCESSES**.
- Key Monitoring: Accurate monitoring, especially for molecular sieve dryers, is vital as even slight deviations impact system availability.
- [REDACTED] Team in [REDACTED] faced **REDUCED COLD BOX PERFORMANCE** due to high dP, impacting gas treatment quality.
- e-KMS importance: **E-KMS INSIGHTS, INCLUDING KNOWLEDGE FROM [REDACTED] FLNG, GUIDED INFORMED DECISION-MAKING**

e-KMS INTERACTION

- Vital Role of KPIs: Process KPIs are crucial for effective dehydration unit management, providing insights into the **FITNESS OF DRIERS** and downstream unit efficiency.
- Tailored KPIs for [REDACTED] **HQ'S PROD. ENG. UNIT DEVELOPED CUSTOMIZED KPIs SPECIFICALLY FOR THE [REDACTED] FLNG** process to monitor dehydration unit operation quality.
- Preventive Capabilities: These KPIs, utilizing EDOD data, **CAN PREDICT WATER BREAKTHROUGH PHENOMENA** and minimize hydrate build-up downstream of the driers.
- Identification of Degradation Trend: Application of KPIs in [REDACTED] FLNG revealed a degradation trend affecting regeneration quality, **LEADING TO THE DISCOVERY OF A PASSING VALVE ISSUE IMPACTING DRIERS' REGENERATION AND GAS WATER DEW-POINT**.
- The activity was published on e-KMS: <https://e-kms.eni.com/conversation/3fb45bfe-521d-4eb2-9a37-14de60ba08b5>
- Global Collaboration: The post published on e-KMS was found by the [REDACTED] team in [REDACTED] by Eni colleagues working in the Operator Joint Venture ([REDACTED]).

RESULTS

- Analysis Method Application: **THE OPERATOR APPLIED THE METHODOLOGY USED ON [REDACTED] FLNG TO ANALYZE THEIR DRIERS**, revealing a clear underperformance leading to high DeltaP in the cold box due to hydrate formation.
- Action Plan Definition: [REDACTED] personnel defined an action plan. This involved replacing coalescer filters upstream and implementing a warm-up program for the cold box using warm nitrogen.
- Performance Improvement: The improved drier performance resulted in the **FULL RECOVERY OF PRODUCTION TO [REDACTED] MMM3/DAY FOR EXPORT**, maintaining a correct dP across the cold box (<1bar). Previous limitations restricted export flow to [REDACTED] MMm3/day to maintain dP below 3bar, providing a benefit of [REDACTED] MMm3/day.
- Feedback on e-KMS: [REDACTED] personnel posted feedback on KMS to validate the methodology's effectiveness: <https://e-kms.eni.com/lik/g580671b-4bd4-4df9-a088-5efd26da41be>.



Thank you for the attention



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Questions?

