XP Towards Sustainable Upstream Operations

GPC 2023 Workshop
Go to Green-Sustain Oil Chain
Bakr Field, Ras Gharib
Egypt

OPERATIONS
DECARBONIZATION
SERVICES

Bart Wauterickx
XP Upgreen Director

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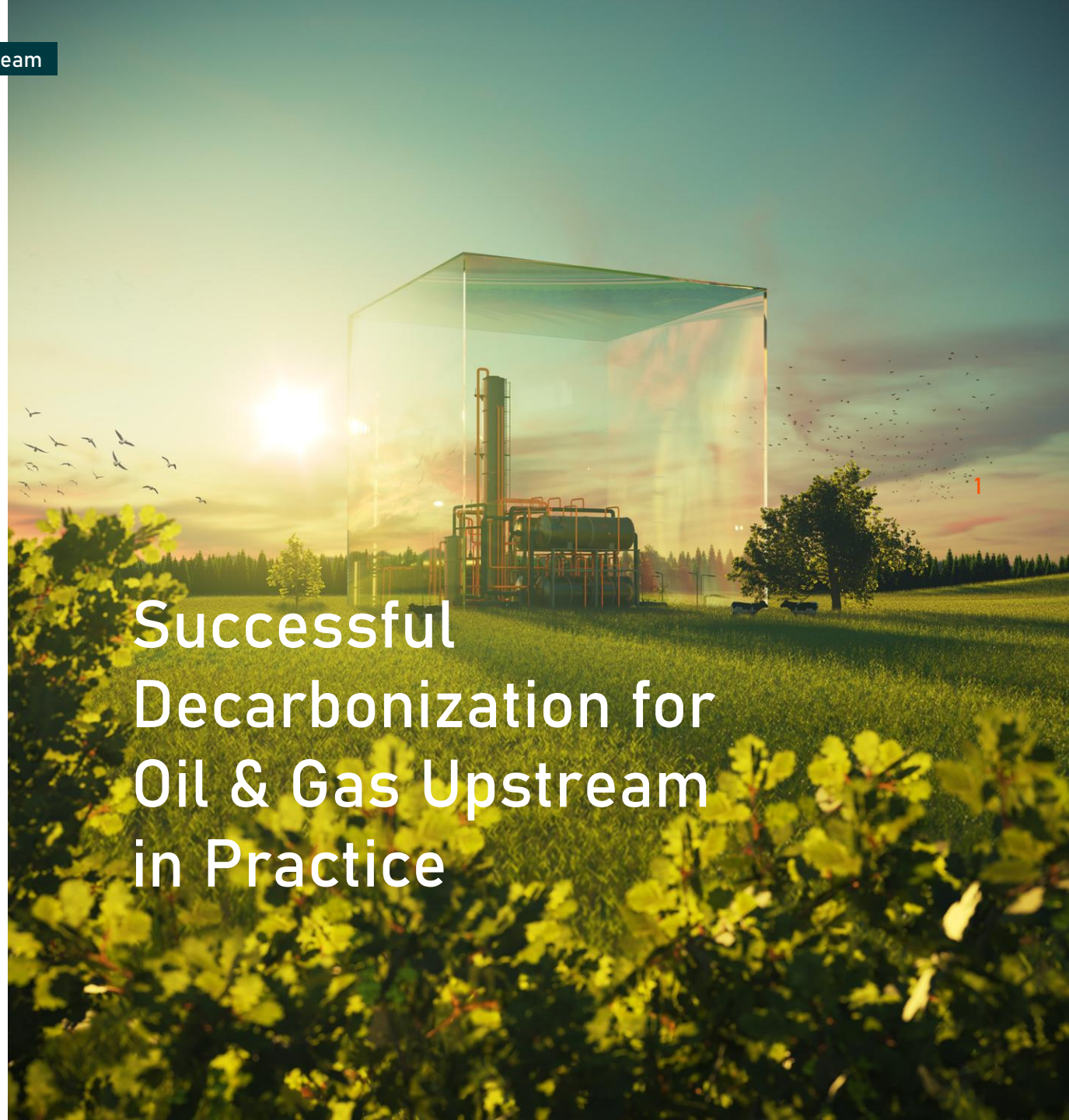

Successful Decarbonization for Oil & Gas Upstream in Practice

XP Upgreen

Operations Decarbonization

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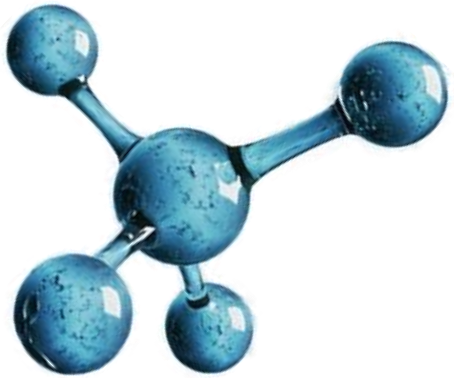
- XP Upgreen Director
- 30+ years of professional C-level experience in different industries
- CEO of The Sniffers for 7 years until 2022.
- At The Sniffers, advised and supported O&G companies, the EU Commission and governments around the world on cost-effective emission reduction policies and strategies.
- Executed +1000 carbon footprint reduction projects supported by reliable quantification technologies.
- Holds a Master in Mechanical Engineering from KUL Belgium and a Bachelor of Business Administration from UCL Belgium.



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XP is an oil and gas operator with a strong safety and decarbonization track-record

OILGAS

28 fields under management in 2 countries

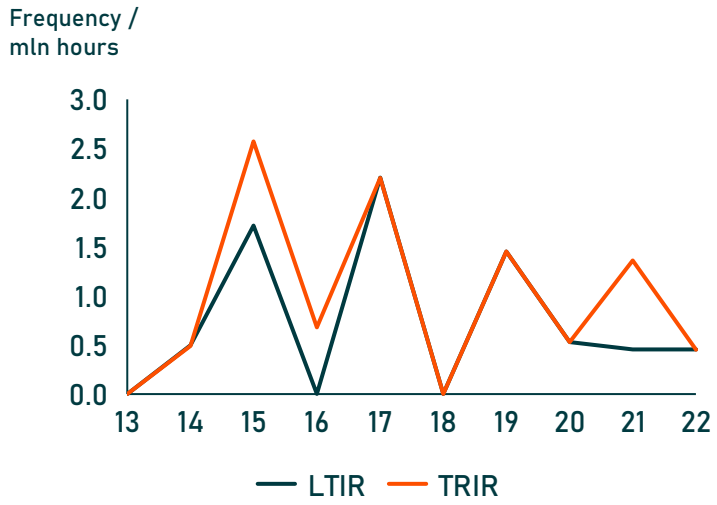
11,000 Boe/d production operations

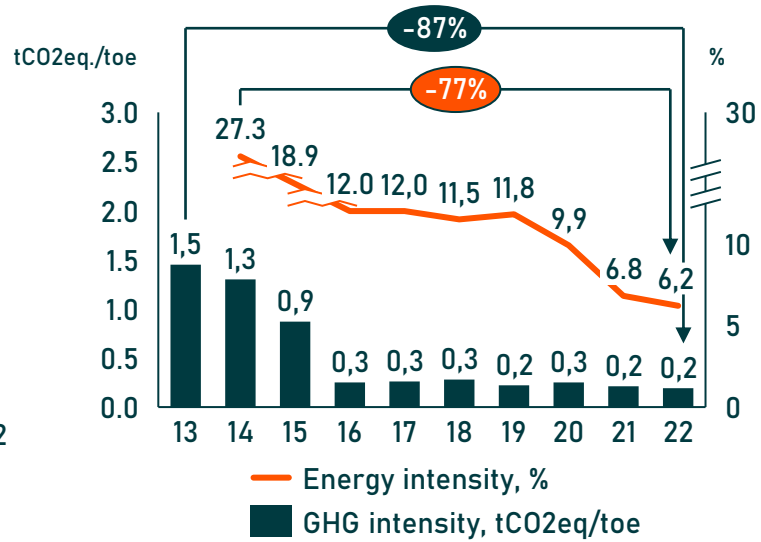
1,300 Operated wells, 600+ producing

1'000 Full time employees

+130 MM USD XP funded investment in the assets' development

460 Well workovers performed since '13 (incl. 15 new wells)





XP is currently operating in **Romania** and **Ukraine**

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XP has strong capabilities and track record in environmental footprint reduction

-87 %

Reduced Green House Gas intensity (tCO2eq/toe) by 86% since 2013

-77 %

Reduced Energy intensity (%) by 77% since 2013

-93 %

Reduced Freshwater withdrawal intensity (m3/toe) by 93% since 2013

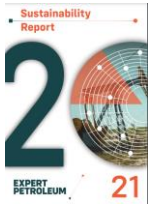
-74 %

Reduced spills intensity (number of spills/boe) by 74% since 2013

>10

Million USD invested in dozens of GHG reduction solutions since 2013,

5 years



Publishing sustainability report for 5 consecutive years (since 2018)

ISO

- ISO 9001 Management Systems
- ISO 14001 Environmental System
- ISO 45001 Occupational Health and Safety
- ISO 50001 Energy Management

Member of

GMP
Oil And Gas Methane Partnership 2.0

and part of

AIMING FOR ZERO
Methane Emissions Initiative

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Changing business environment in O&G industry requires different approach to environmental footprint reduction

Business context

Business environment in oil & gas industry has changed significantly over the last decade with the aim to reduce environmental footprint, and GHG emissions, in particular.

Market participants that are not adjusting to the environment are being severely penalized, while those that adhere and adopt can take advantage of the economic incentives and improve their image in eyes of different stakeholders.

Therefore, becoming “green” is not an optional solution anymore in oil & gas, it has become an important part of every company’s strategy, operational and financial performance, and management can create value via environmental footprint reduction

Overall Oil and Gas companies Objectives

Political

Governments are trying to combine Paris Agreement Climate goals and COP 27 with the need for cheap and reliable energy supply

Be ready to comply with upcoming EU regulation for state members and countries exporting hydrocarbonates to EU

Social

Fulfil increased demand for ESG performance from society

Retain talent leaving the "unsustainable" company / attract new talent

Make its impact towards prevention of Global Warning

Reduce pressure from peers, who steadily increase ESG standards in their operations

Economic

Reduce losses of commercial hydrocarbonates to maximize benefits from high price environment

Reduce energy intensity of upstream operations to reduce operational expenditures in high price environment for energy sources

Benefit from carbon credits under different carbon credits schemes

Solutions

- Understand regulatory requirements
- Implement proper measurement and reporting standards
- Identify areas for emissions reduction
- Reduce losses of commercial hydrocarbonates and GHG emissions
- Monetize emissions reduction

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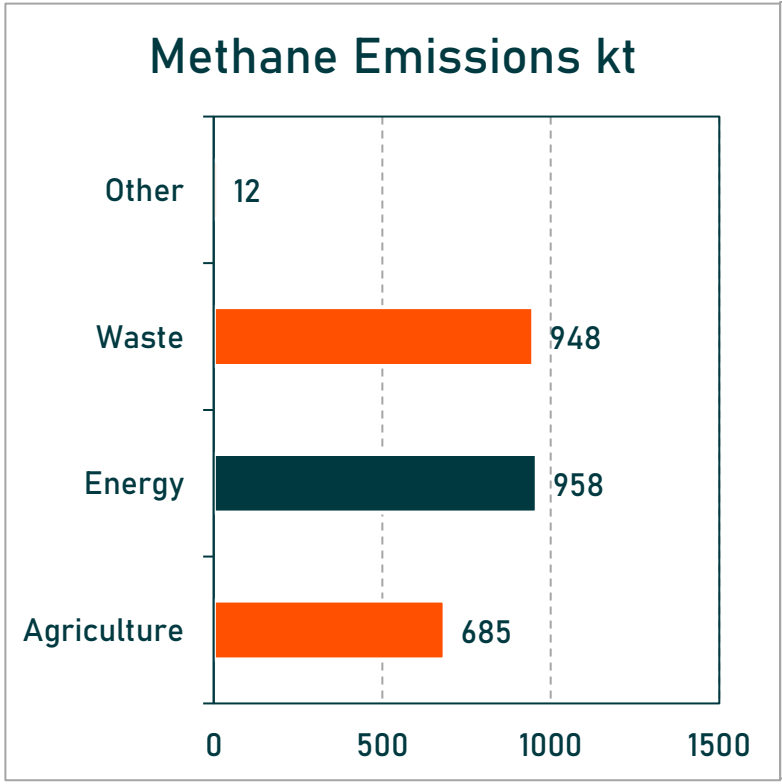
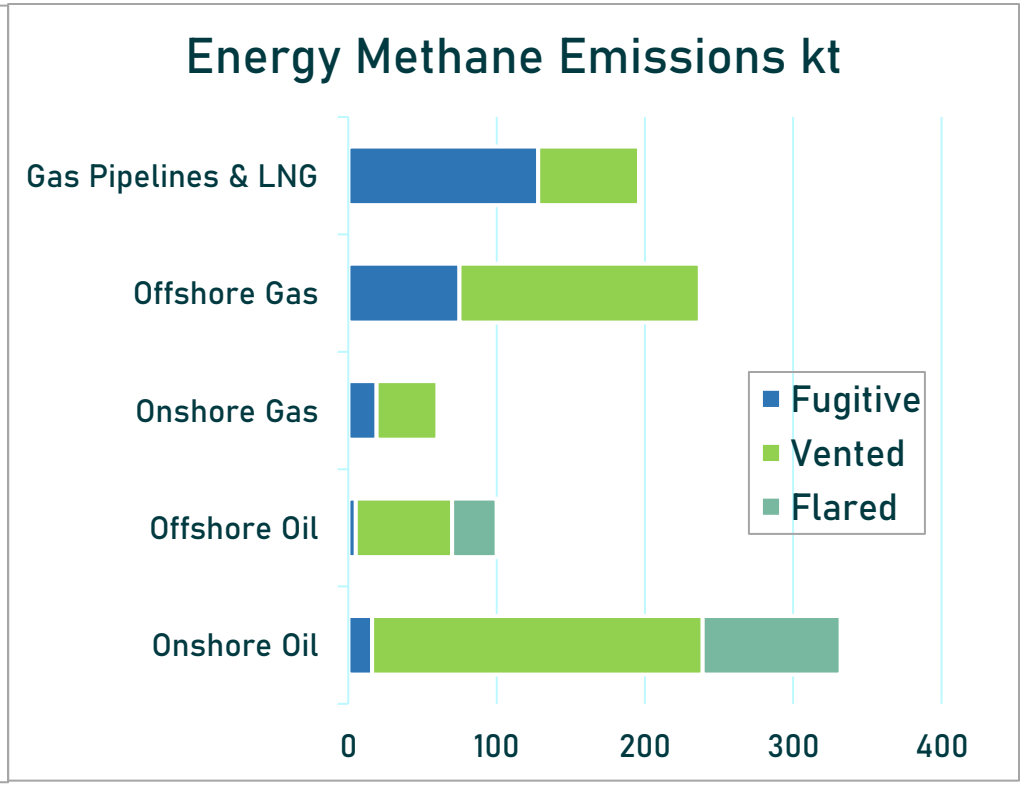
METHANE EMISSIONS IN EGYPT

Egypt emits 2603 kt

Energy sector 37%





Important opportunities in the Energy Upstream sector

IEA – UNEP – IMEO
75% can be mitigated with existing technologies
of which +50% at no net cost

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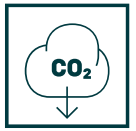
Upgreen aims for material impact on companies entire environmental footprint

Upgreen's Promise

Grow your production commercial volume



Reduce environmental footprint

Monetize out-performance (e.g. CO2 monetization)

Turn a liability into value

Potential in-scope impact

- Water utilization
- Energy consumption
- Hydrocarbon spills
- GHG emissions (venting, flaring and leaks)
- Solid waste production

Comprehensive approach

Structured approach

Diagnose the current situation

Assess the opportunities

Prepare for impact & change

Introduce Operating model change

Scale & speed up impact

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1 GHG emissions detection, measurement & monitoring services

XP measures all emissions data from production operations to accurate report and analyse for improvements.

Venting emissions

- Natural gas driven pneumatic equipment
- Centrifugal compressor shaft seals
- Reciprocating compressor rod packing
- Glycol dehydrators
- Tanks
- Well liquids unloading
- Well casing head venting
- Hydraulic fracture completions

Fugitives emissions

Leaks detection surveys for :

- Valves
- Pump seals
- Connectors
- Flanges
- Open ended lines
- Others

Emissions from Stationary combustion

- Turbines
- Heaters/Boilers
- Power Generators

Emissions from flaring

- Quantify and qualify combustion
- Flaring system efficiencies

Using the latest technologies:

- Optical gas Imaging, such as an infrared (IR) leak imaging camera (designed to visually identify hydrocarbon emissions).
- Remote Methane Leak Detector (handheld device which uses tunable diode laser absorption spectroscopy for detection of methane).
- Leak sensors such as a Flame Ionization Detector (FID), an Organic Vapor Analyzer (OVA) or a Toxic Vapor Analyzer (TVA) equipped with both Photo Ionization Detector (PID) and FID
- Acoustic Leak Detection.
- Calibrated vent bag, High-volume sampler, Vane anemometer, Hotwire anemometer, Turbine meter.
- Drones and satellites
- Permanent sensors and software

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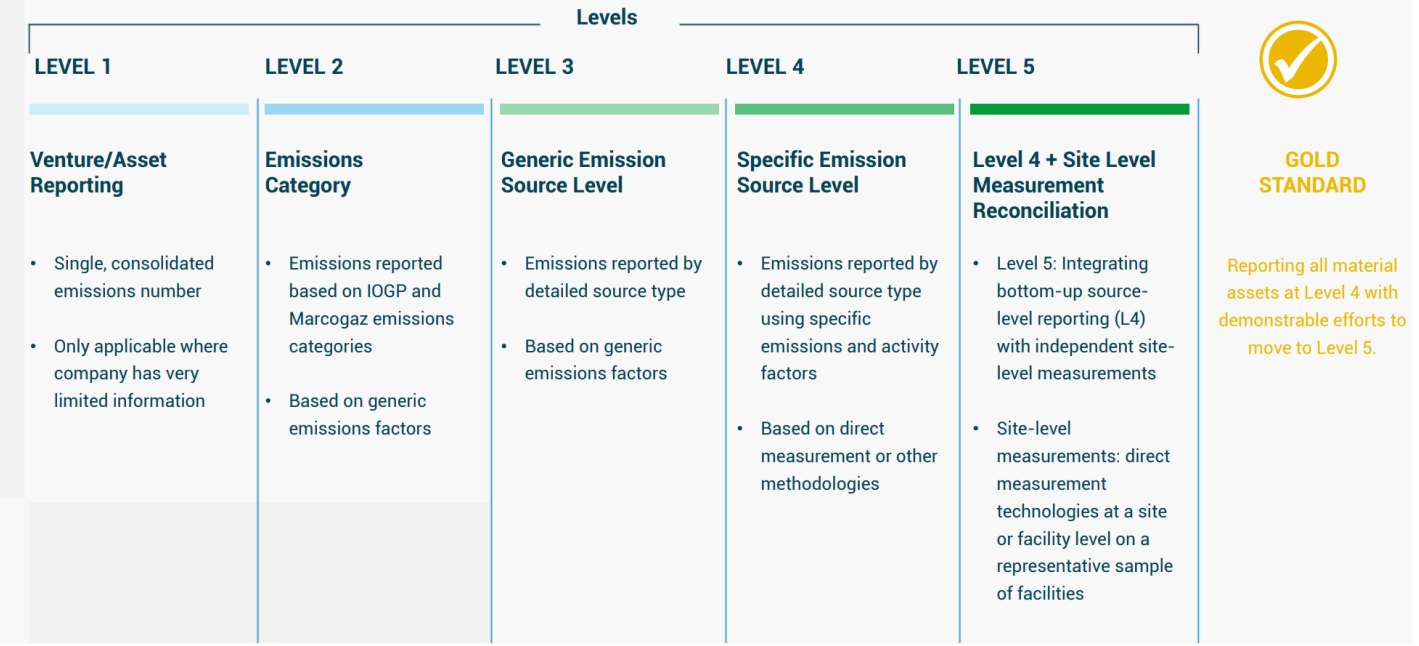
2

GHG emissions reporting services

Example: OGMP reporting

UNEP's comprehensive, measurement-based reporting framework for oil and gas industry.
Over 100 companies are member.



OGMP
Oil And Gas Methane Partnership 2.0

Requirements

- Define & disclose methane reduction target
- Submit implementation plan on pathway to Gold Standard
- Report annually on methane emissions from operated non-operated asset

Publicly reported data

- Declared methane reduction targets
- Company total emissions (aggregated by core source and by level (1-5)
- Progress towards targets
- Members can review company fact sheet before publication
- Confidential asset level data and/or country level emissions data will not be publicly disclosed

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3 Advisory Services

- As Is Environmental footprint
  - Gather, digitize, acquire and integrate data to analyse, quantify and qualify your current environmental footprint.
- Gap Analysis
  - Gap analysis between the As Is situation and legislation and/or industry best practices.
- Preliminary Solutions
  - Identify and prioritize areas for improvement. Recommend field proven, cost-effective solutions in new technologies, processes and infrastructure upgrade, standard operating procedures updates and IT solutions.
- Implementation plan and design
  - Provide engineering and design, project schedule, budgetary cost, key steps in implementation program…

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4 Example of Field Proven abatement solutions

Wells

- Vapor Recovery Units
- Mobile Well test units
- Artificial lift for liquid unloading
- Flaring instead of venting
- Permanent monitoring

Pipelines

- Real-time pressure monitoring
- Mobile compression
- Purge pipelines with inert gas
- Hot Tapping
- Flaring instead of venting

Compressors

- Convert gas starter motors to electric starter motors or compressed air
- Convert wet seals to dry seals where feasible
- Flaring instead of venting
- Leak detection and repair (LDAR)
- Vapor Recovery Units

CH_4 Process Facilities

- Vapor Recovery Unit (VRU's)
- Recover gas during condensate loading
- Flaring instead of venting
- Separator Automatic liquid Blowdown
- Leak detection and repair (LDAR)

CO_2 Process Facilities

- Continuous Flaring Reduction
- Continuous Flaring Process Alternative Techniques for improving energy and combustion process efficiency
- Leak detection and repair (LDAR)

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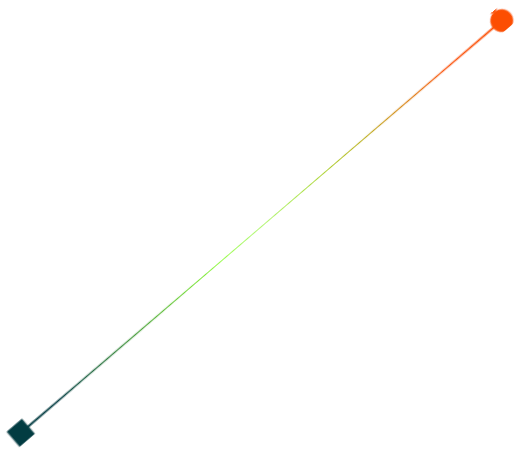
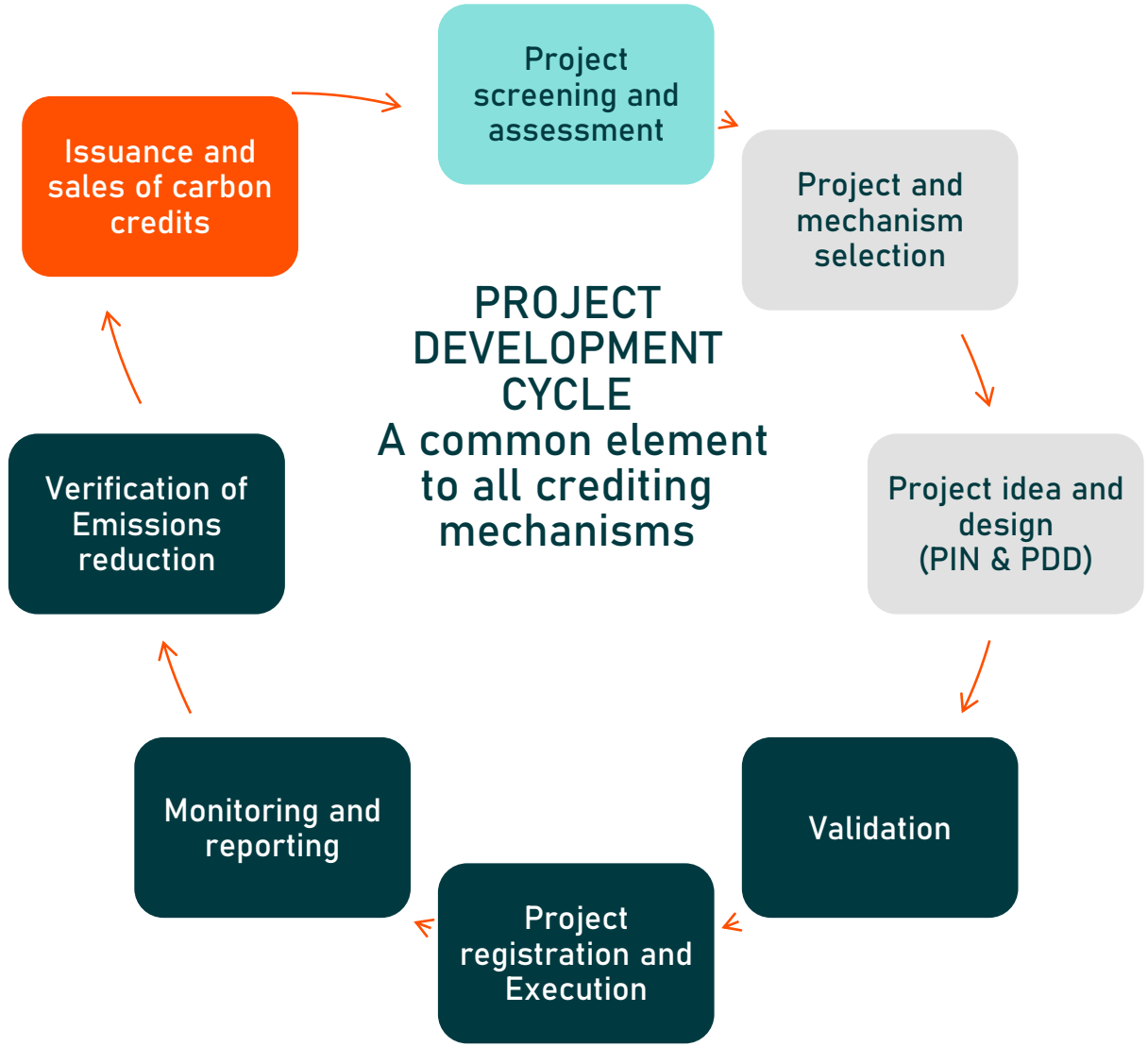
5 Carbon Credit Monetization

XP will assist you through the carbon credit project development cycle from project screening to the issuance of the carbon credit





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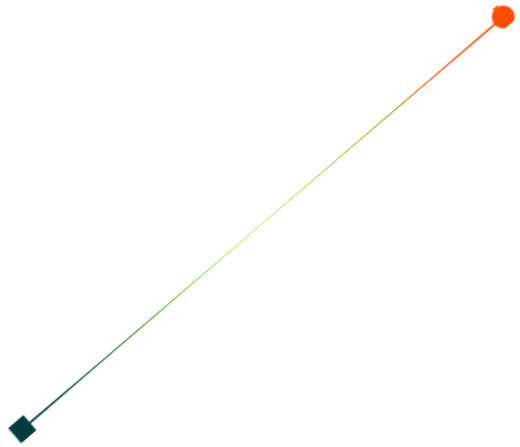
Financial Engagement Models



- Engineering, Procurement, Construction Management (EPCM)
  - detailed design and overall management of the project
  - supervise, manage and co-ordinate construction

- Turn key Engineering, Procurement, Construction (EPC)
  - develop, build and deliver
  - from commencement to final completion
  - direct agreements with the sub-contractors and sub-vendors,

- Performance Based Contract
  - XP will finance the solutions
  - and get paid based on results achieved

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Case Study: Artificial lift and surface facilities restructuring and stranded gas solution

About Pordeanu

Pordeanu is a remote oil and gas field discovered in 1975. 69 wells were drilled, 10 are still in production.

At take over in 2013, the field produced 160bbls/day of oil and 55 boe/d of gas

25 employees were operating 2 production facility, one gas compression facility and a tank farm.

The challenges

Old gas lift system made of large and inefficient gas compressors, long and high pressure gas surface pipelines, spread facilities with significant: fugitive emissions very high consumption of energy (electricity mainly) and freshwater (cooling towers)

Associated gas burnt in boilers or vented, no gas delivery pipeline available.

The solutions implemented

Around 10MUSD was invested by XP over 2 years to study and redesign the process and consequently

- The existing gas lift system was shut down and modern electrical submersible pumping systems were installed on well by well basis.
- A Gas to Power plant was built to use the vented gas.
- The surface facilities were restructured and modernized to one production facility with a tank farm.

The results

XP generated since inception around 380,000 Bbls of incremental oil in Pordeanu and 53 GWH of electricity from the gas to power.

Reduced GHG emissions by 80%, Energy intensity by 60%, Freshwater withdrawal by 75% and opex/boe by 40%

Reduce manpower to operate the facilities by 56%

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Case Study: Mobile well testing unit

About well testing procedures in Ukraine

- As a country procedure gas resulted from new drilling wells is flared while for workovers and regular testing (imposed to be performed twice per year) is simply vented
- Regular testing period (venting) - 0.5 days
- Testing after workover period (venting) - 1 day
- New wells testing period (flaring) - 3 days

The challenges

- High environmental impact
- Loses of valuable gas

The solutions implemented

XP designed and built mobile well-test separator in Ukraine in 2021 to reduce gas losses and GHG emissions during well testing

- Total Investment: USD 150'000

The results

- Allows to clean-up and test all gas wells after well interventions without venting and flaring,
- Reduced GHG emissions by >8'500 tCO2 eq./year, and saved 1 mln m3 of trade gas / year

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Case Study: gas treatment plant modernization

About Calacea Degasolination plant

Calacea is a complex gas processing facility designed to separate condensates of the rich gases extracted from the PEC Timis fields.

The condensates is separated from the rich gas by adsorption on activated charcoal and desorption with steam at high-temperature.

The steam required for the condensate desorption was initially provided by 7 gas boilers. 2 were still active when we took over consuming

The challenges

Energy intensive

Important quantities of combustion emissions from the gas boilers were emitted into the atmosphere through the 7 dispersion stacks.

High opex

Large surface footprint to be managed

The solutions implemented

More than 2MUSD was invested by XP to study and redesign the process and consequently the old and large activated charcoal and desorption plant was replaced with a modern Low Temperature Separator (LTS).

In the LTS the rich gas is filtered and then cooled in few stages to -40 °C, using as cooling agent propylene compressed by an electro-compressor. The mixture flow in a two-phase cold separator, where gas separates from the condensate, thus recovered.

The results

Energy consumption of the plant was reduced by 86%

Reduced GHG emissions of the plant by more than 95%, which reduce OMV Petrom requirements for emissions certificate at the EU ETS and further generated carbon credits as part of a Upstream Emissions Reduction directive project.

Reduce average Opex per year of the plant by 26% (-700KUSD per year)

Reduce surface footprint by 85%

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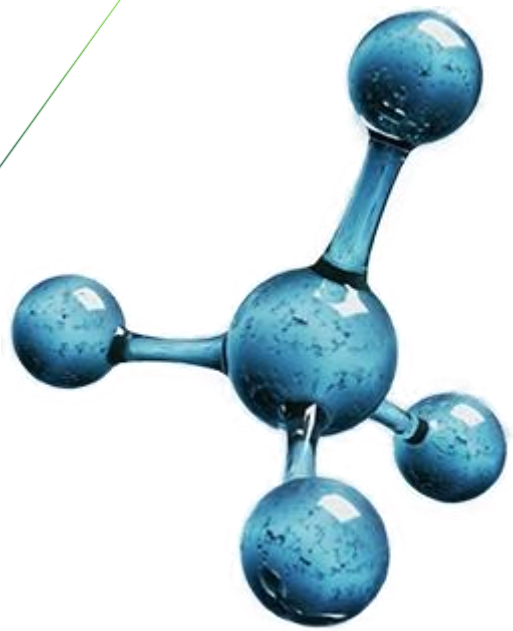

Thank You!

Let us tackle these GHG Emissions Together while increasing Production Volumes

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