

# Managing Methane Emissions

## Design for Industry 4.0

Building Sustainable Digital Enterprises

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## Methane Emissions -Oil & Gas Value Chain

Source: ICF, Methane Emissions from the Oil and Gas Industry: "Making Sense of the Noise," 2015



#### PRODUCTION (46% EMISSIONS)

Well pads leaks, pneumatic devices, storage tanks, flaring, unloading liquids from wells, compressors, dehydrators

#### PROCESSING (11% EMISSIONS)

Emissions from gathering and processing centers - Dehydrators, compressors, pneumatic devices and flaring

#### TRANSMISSION& STORAGE (27% EMISSIONS)

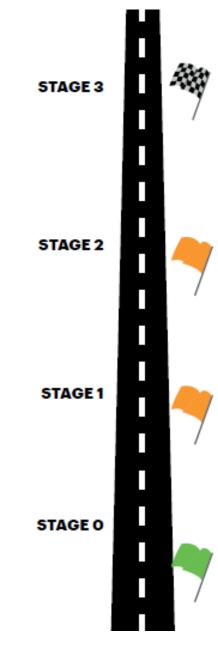
Underground storage facilities, compressor venting and leaks, transmission compressors leaks, pneumatic devices and compressors

#### DISTRIBUTION (16% EMISSIONS)

Above ground & below ground pipelines delivering the final product

## Oil & Gas industry adoption of Methane Emissions

Source: Environmental Defense Fund (EFD) with Accenture Strategy on Digital Methane Future



- Adopt integrated, systemsbased business brain technology to automate system optimization
- Leverage combinatorial technology applications and automated decision making to target zero emissions across the value chain
- Automate pattern and trend analysis to enable limited machine learning for trend detection
- Leverage robust historical data to train AI algorithms to predict and detect leaks and mechanical anomalies
- Adopt digitally enabled 'asset automation' capabilities, operators can manage network pressure in real time
- Adopt a cloud-based data management solution to centralise methane data
   Integrate methane emissions and operational data to run basic historical and correlation
- basic historical and correlation analyses and derive deeper insights around emissions trends
- Build an emissions baseline
   Build an integrated methane emissions strategy
- Conduct a methane technology assessment to identify areas where methane monitoring can be integrated into existing operational architecture

#### SHELL DEPLOYS AI TO IMPROVE OPERATING PERFORMANCE

Shell is aiming for improved operating performance with C3 IoT as its artificial intelligence (AI) platform. Shell will deploy the platform on Azure for a broad set of AI applications, starting with predictive maintenance for hundreds of thousands of critical pieces of equipment globally.<sup>31</sup>

#### **BP LOWERS METHANE EMISSIONS EVENTS BY 74%**

BP is leveraging San Francisco-based Kelvin Inc's sensor and Al-enabled solution to monitor and remotely manage production operations in Wyoming. BP estimates that methane emissions events from venting have declined 74%, while production volumes increased 20% and overall costs dropped 22%.

Recently, the Oil and Gas Climate Initiative Climate Investments fund announced that it has invested in Kelvin Inc., the first digital solution in the OGCI-CI portfolio.<sup>32</sup>

CONTINUOUS METHANE DETECTION AT EQUINOR Over the last several years, Equinor has been testing fixed, continuous methane monitors at onshore assets in the United States. This system integrates ambient data with methane readings from laser-based sensors to detect and quantify leaks. The data is transmitted to tablets and assigned an alarm designation based on the severity of the leak.<sup>33</sup>

#### METHANE REDUCTION PROGRAM AT XTO

ExxonMobil US subsidiary, XTO, has established a methane emissions reduction program for all US operations that both ensures compliance with applicable regulations and extends beyond regulatory requirements. XTO is in the process of phasing out high bleed pneumatic devices and as of 2018, they have replaced approximately two-thirds of them. The company has rolled out a LDAR program

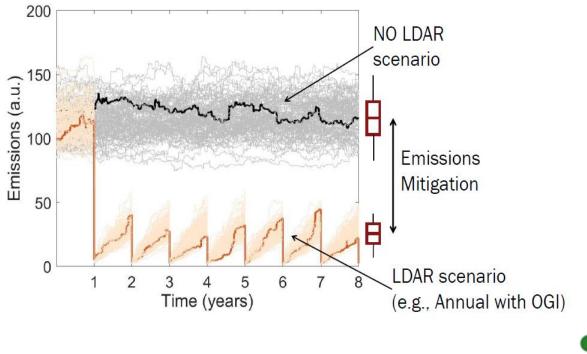
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### **Key Solutions**



- Methane leak hotspots detection through Satellite Images (from the oil fields)
- Pinpoint Methane leak location and identify the cause of the leak
- Estimate emission size and impact from Methane leaks and emissions
- Simulating effectiveness of methane leak detection programs
- Support in ESG Reporting through digital platforms

FEAST (Fugitive Emissions Abatement Simulation Toolkit) uses Monte Carlo simulations to estimate the range of methane emissions at a group of facilities under various emissions reduction scenarios

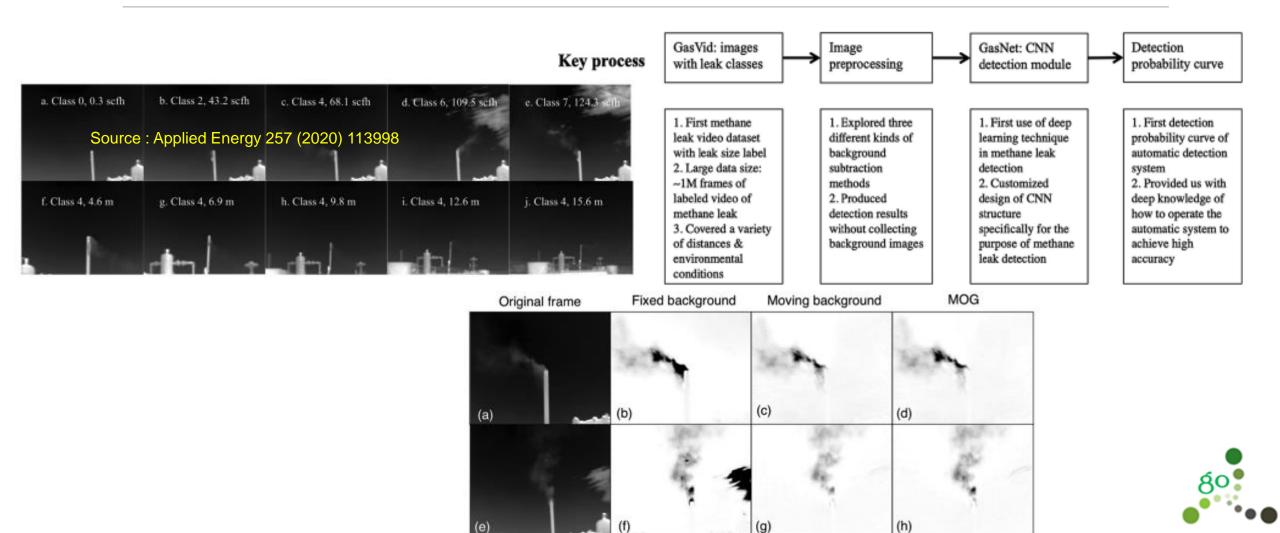


\* Leak Detection and Repair (LDAR) Optical Gas Imaging (OGI)



### Methane Emissions Detection - Computer Vision





### Methane Metrics - ESG Reporting Compliance



METRIC	DESCRIPTION	WHY IT'S IMPORTANT	HOW/WHERE TO REPORT				LEADING COMPANY EXAMPLES			
			CDP	SUSTAINABILITY REPORT		US 10-K FILING				
				GRI	IPIECA	SASB				
EMISSIONS RATE	Methane Emissions/ Gas Production (or throughput) <sup>19</sup>	Enables comparison of company performance over time, and comparisons in methane performance between companies.	OG 7.5	SRS 505-4, page 21 line 412	E1-C3, page 45	NR0101-01 and NR0102-01	Marathon Oil, Chevron, and EOG report a methane emissions rate.	BEGINNER	INTERMEDIATE	EXPERT
EMISSIONS REDUCTION TARGET	Quantitative, time-bound target to reduce emissions.	Targets signal importance of issue, and drive management and staff performance.	OG 7.7	SRS 302-2-c-iii, page 12 line 144	N/A	N/A	Southwestern Energy reports a goal of keeping methance emissions below 0.36 percent of production.	<ul> <li>Reports on one of the methane metrics</li> <li>Reports methane emissions data separate from other GHGs.</li> <li>No methane reduction target or firm plans to set one.</li> <li>Does not support shareholder resolutions seeking improved methane</li> </ul>	<ul> <li>Reports against 2-3 methane metrics.</li> <li>Uses best management practice quantitative target, (e.g. conducting LDAR on a % of assets, reducing methane leaks incidence rate per inspection, improve frequency of LDAR)</li> <li>Neutral stance on methane disclosure resolutions.</li> </ul>	<ul> <li>Reports against all the abore metrics.</li> <li>Reported information is audited by third-party.</li> <li>Transparently reports progress against public methane reduction targets.</li> <li>Supports appropriate methane disclosure shareholder resolutions, if a second se</li></ul>
LEAK DETECTION AND REPAIR (LDAR) PROTOCOL	Frequency, scope (% of assets covered), and methodology (i.e. type of equipment used) of LDAR program.	LDAR is the most important operational practice to identify and fix accidental leaks, and all three aspects drive effectiveness.	OG 7.3	SRS 301-2-c-iii, page 12 line 144	N/A	NR0101-03 and NR0102-02	Southwestern Energy reports conducting LDAR at least once a year on 88% of total well count using an OGI/FLIR camera.			
METHANE POLICY POSITION	Company position on the role of regulation to limit industry emissions and how this position differs from that of trade associations and other third party organizations to which the company is a member.	Leading corporate actors not only have best-in-class operations to limit emissions, but also support policies which reduce reputational and product risk for the whole industry.		SRS 615-1.2, page 10 line 102	SE14-01, page 124	NR0101-25	Statoil has disclosed a public policy position on methane regulations to "support with minor exceptions." <sup>20</sup>	disclosure.		applicable.





## **Thank You**

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