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Monthly Methane Mondays: MARCOGAZ technical recommendation On Venting & Flaring

Gas mid and downstream segment

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Existing guidance

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MGP
Best Practice
Guides

Definitions

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➢ Source characterisation:

		Types of emissions						
		Fugitives		Vented				
				Operational emissions				
		Permeation	Leaks due to connections	Purging/venting for works, commissioning and de- commissioning	Regular emissions of technical devices (e.g. pneumatic)	Start & Stop	Incidents	Incomplete combustion
Groups of assets	Main lines & service lines							
	Connections (flanges, seals, joints)							
	Measurement devices (chromatographs, analysers…)							
	Valves[2] (regul. stations, blending stations, compressor stations, block valve stations)							
	Pressure / Flow regulators							
	Safety valves							
	Combustion devices (turbines, engines, boilers…)							
	Compressors & compressor seals							
	Flares							

Definitions

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- **Source characterisation:**
  - *venting and flaring related emissions*

		Types of emissions				
		Vented				Incomplete combustion (flaring)
		Operational emissions			Incidents	
		Purging/venting for works, commissioning, and de-commissioning	Regular emissions of technical devices (e.g. pneumatic)	Start & Stop		
Groups of assets	Main lines					
	Service lines					
	Connections (flanges, seals, joints)					
	Measurement devices					
	Valve stations					
	Pressure / Flow regulators					
	Safety valves					
	Combustion devices : Turbines, Engines, Boilers					
	Compressors & compressor seals					
	Flares for safety reasons					
	Flares (others)					

Definitions

Vented emissions :

Gas released into the atmosphere intentionally from processes or activities/devices that are designed to do it, or unintentionally when equipment malfunctions or operations are not normal.

- ✓ Note : In the case of transmission and distribution grids, unintentional vented emissions during not normal operation cover also vents due to external interference (third-party damage), ground movements, over pressure, etc. This definition is in line with the MARCOGAZ-GIE-IPIECA-IOGP Glossary. Accessible at: WG_ME-736

Flaring:

Controlled burning of gases (for disposal) mainly for safety reasons.

- ✓ Note : This definition is in line with the definition in the MARCOGAZ-GIE-IPIECA-IOGP Glossary. Accessible at: WG_ME-736

Definitions

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Routine venting/flaring :

Operational release of gas carried out on a regular and/or periodic basis.

Safety venting/flaring :

Safety venting/flaring of gas is venting/flaring to ensure safe operations.

Non routine venting/flaring :

Non-routine venting/flaring of gas is all venting/flaring other than routine and safety flaring.

Specific examples:

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Safety :

- ✓ *The following examples illustrate less obvious cases to be considered for safety reasons:*
  - ✓ *Continuous **pilot flames** as they are part of safety flares to ensure quick ignition when required (concerns small volumes).*
  - ✓ *Pneumatic controllers are generally considered as routine venting/flaring. But vented gas from **pneumatic valves operated for safety reasons** (by definition rarely operated so rarely emitting) are considered as safety venting (in that case the gas pressure is the best way to insure a fast enough and safe operation).*

Specific Examples:

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Routine :

- *The definition implies that the following examples are considered as routine, they emphasize that routine is not always avoidable:*

  - ✓ *Emissions from technical devices such as gas driven pneumatic equipment.*
  - ✓ *Residual gas emissions from analysers.*
  - ✓ *Dry gas seals secondary stage vent.*

Non routine :

- ✓ *Temporary (partial) failure of equipment that handles the gas during normal operations, until its repair or replacement*
- ✓ *Depressurisation due to maintenance, repair activities..*
- ✓ *Construction and de-commissioning.*

European Context

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➢ In the EU methane strategy context

EUROPEAN
COMMISSION

Brussels, 14.10.2020
COM(2020) 663 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

on an EU strategy to reduce methane emissions

- *The Commission will consider legislation on eliminating **routine** venting and flaring in the energy sector covering the full supply chain, up to the point of production*
- *Venting and f be restricted **circumstance** safety reason verification pu*

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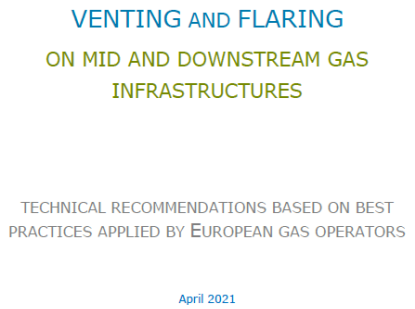
➢ GIE/Marcogaz drafted a recommendation docun



VENTING AND FLARING
ON MID AND DOWNSTREAM GAS INFRASTRUCTURES

TECHNICAL RECOMMENDATIONS BASED ON BEST PRACTICES APPLIED BY EUROPEAN GAS OPERATORS

April 2021

GIE/MARCOGAZ SURVEY

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➢ **A survey launched in January involving GIE/Marcogaz and ENTSOG**

The Scope of the survey was:

- ✓ *venting and flaring definitions*
- ✓ *avoidable and unavoidable circumstances*
- ✓ *B.A.T.s (usage rate, efficiency, cost),*
- ✓ *Identification of quick wins*
- ✓ *regulations, incentives and voluntary initiatives*

Answers received from:

- ✓ *16 countries*
- ✓ *17 TSOs*
- ✓ *14 DSOs*
- ✓ *10 SSOs*
- ✓ *10 LNG Terminal operators*

Volumes

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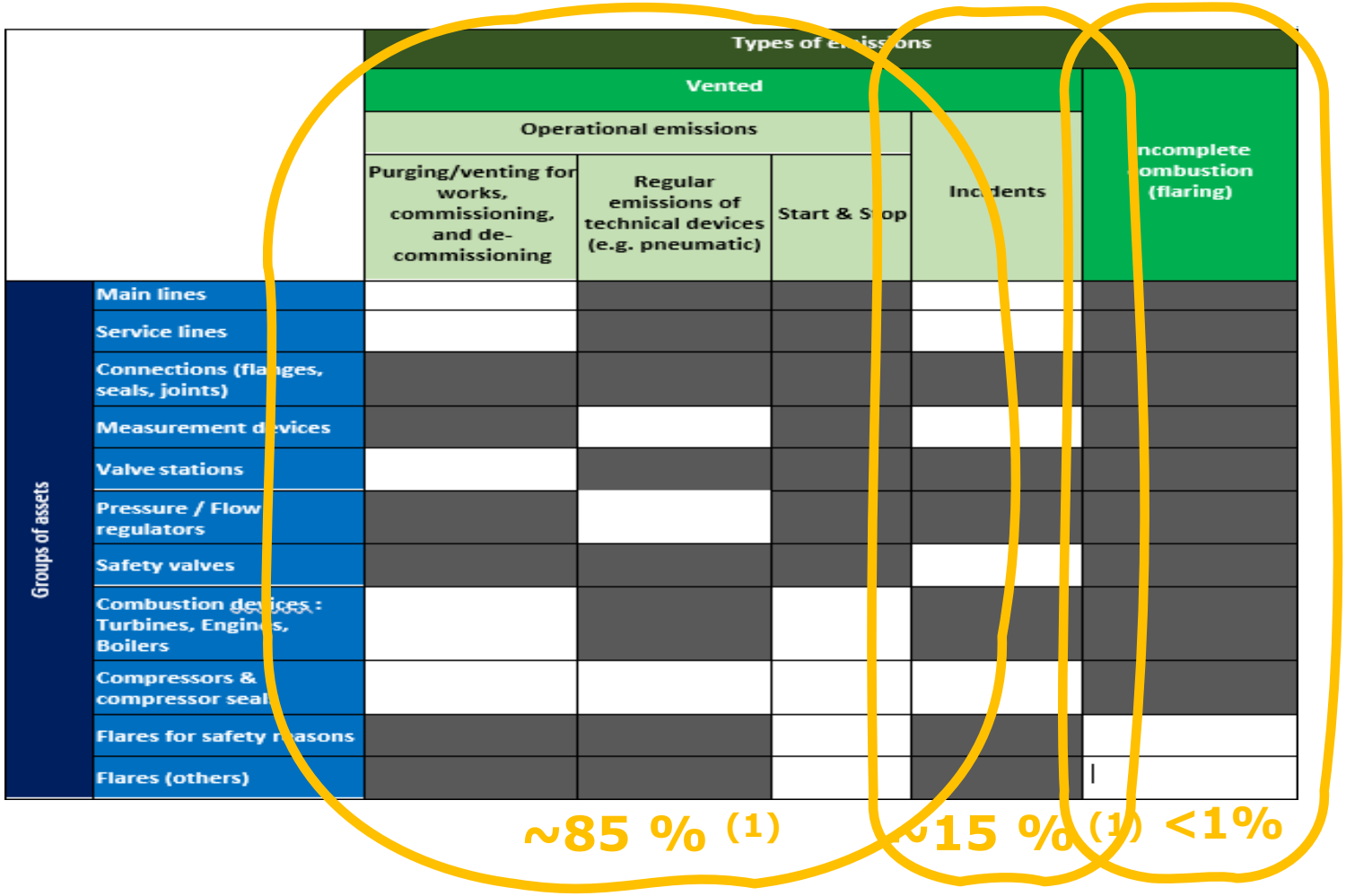
➢Venting & flaring volumes in European Mid/Downstream sector:



		Types of emissions				
		Vented				
		Operational emissions				
		Purging/venting for works, commissioning, and de-commissioning	Regular emissions of technical devices (e.g. pneumatic)	Start & Stop	Incidents	Incomplete combustion (flaring)
Groups of assets	Main lines					
	Service lines					
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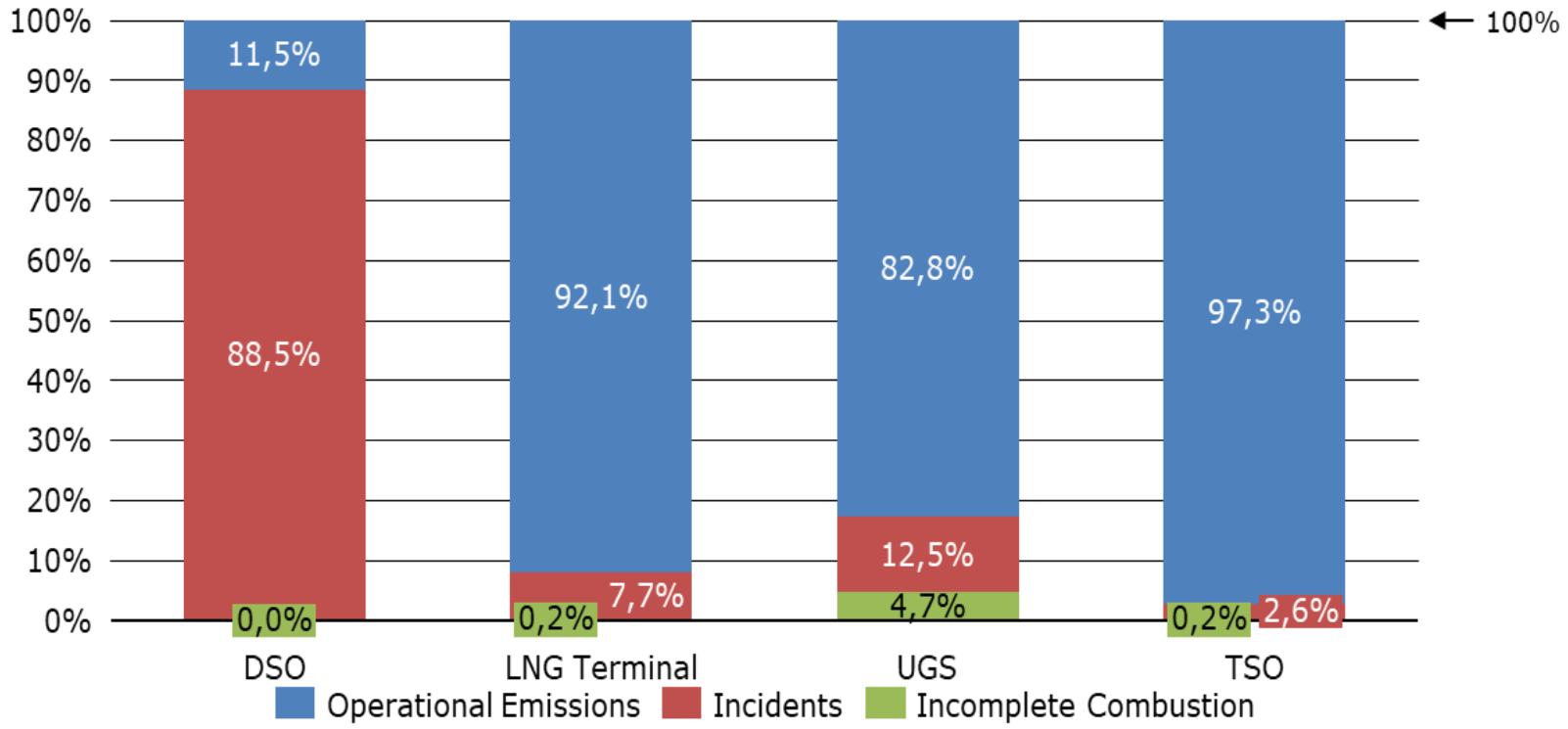
	Pressure / Flow regulators					
	Safety valves					
	Combustion devices : Turbines, Engines, Boilers					
	Compressors & compressor seal					
	Flares for safety reasons					
	Flares (others)					

Note 1 – indicative only (extrapolated from Marcogaz survey)

Volumes:

Distribution of emissions from venting & flaring by activity–
From Marcogaz survey on European Infrastructures



QUANTIFICATION

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- ✓ **As for the other types of emissions; venting and flaring emissions can be quantified either by direct measurement, using of emission factors or engineering calculation .**
- ✓ **Generally speaking, direct measurements should be considered first. However, it is important to highlight that depending on the type of vents, alternative quantification methodologies can be more appropriate.**

Direct measurement most suitable devices:

- ✓ *Ultrasonic flow meter*
- ✓ *Hotwire anemometer.*
- ✓ *bagging*
- ✓ *…*

Emission factors:

In some cases, the use of measurement-based emission factors or/together with proven engineering calculations can be the only feasible approach. For example, in case of pneumatic devices (extensive population of small emitters).

QUANTIFICATION

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- ✓ **In a lot of cases, a calculation is particularly relevant (and may be more accurate than a measurement). Typically, when the pressure in and the volumes of the vented asset are known or when fixed flow rate is set (e.g. gas compressor stops, asset/pipeline depressurization for maintenance, third party damage, emission from measurement device sampling flow…).**

Determination of the vented volume of an asset:

$$V_v = V_i - V_f = V_i - \frac{P_i V_i T_f}{P_f T_i}$$

Vv = the volume of gas vented as a result of equipment/system depressurization

Vi = Volume of gas within the equipment/system prior to depressurization

Vf = Volume of remaining in the equipment/system following depressurization

Pi = Initial pressure of the gas in the equipment/system to be depressurized

Pf = Remaining pressure of the equipment/system

Ti = Initial gas temperature prior to depressurization

Tf = Gas temperature in the equipment/system following depressurization (in Kelvin)

Avoidable and Unavoidable Emissions

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➢ Based on the survey

		Types of emissions				
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	Flares for safety reasons					
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✓ ***Avoidable**: The gas emission can be avoided under certain conditions (e.g. costs vs environmental benefits, impact of asset unavailability, security of supply, safety, etc).*

✓ ***Unavoidable**:The reduction of emissions is not possible or leads to significant technical and economic challenges and/or technical solutions do not exist (yet).*

Best Available Techniques

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➢ **According to Marcogaz Survey :**

The 5 more used mitigation techniques

- ✓ ***Reduce pressure*** *before venting*
- ✓ *Recover and recompress emission in the process gas:* ***stationary compressor.***
- ✓ *Recover and recompress emission in the process gas****: mobile compressor.***
- ✓ *Recover and* ***reuse emissions*** *in another device (boiler…).*
- ✓ ***Flaring*** *as replacement of venting (to reduce the environmental impact).*

Other important BATs:

- ✓ *Replace* ***pneumatic*** *valves by* ***electric or compressed air*** *devices*
- ✓ *Replace* ***pneumatic*** *valves by* ***low bleed*** *devices*
- ✓ ***Hot tapping***
- ✓ ***Dry Gas Seals*** *instead of Wet Seals*
- ✓ ***Hermetically sealed*** *compressors.*
- ✓ *Gas turbine* ***electric starters*** *(instead of gas starters)*

Pipeline work emissions Mitigation

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Gas recovery

- ✓ *Pressure reduction*
- ✓ *Mobile compressor gas recovery*
- ✓ *Potentially flaring of residual gas (mobile flare)*

Hot taping

- ✓ *Pressure reduction*
- ✓ *Hot taping*

Source : MGP reduction of methane emission best practice guide

Stationary compression recovery

Blow down gas at compressor stations

- ✓ *Compressor blow down when stopped or for maintenance*
- ✓ *Also applicable to Dry Gas Seal Primary Vent recovery*

Boil Of Gas recovery in LNG terminals

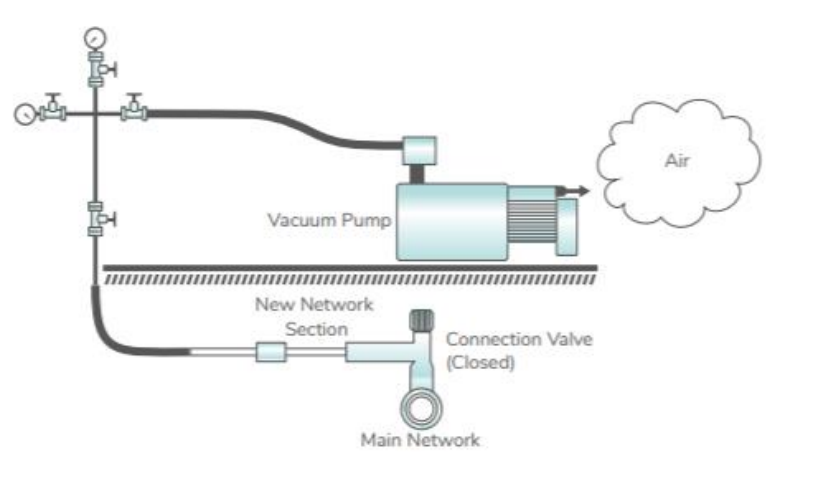
- ✓ *BOG compressors to inject non-recoverable BOG into the grid during loading and unloading operations and zero or low send-out modes.*

Source : MGP reduction of methane emission best practice guide

Distribution grid vented emissions mitigation examples

Commissioning with vacuum pumps

- ✓ *before to put a new pipe into service the inner air must be removed*
- ✓ *This is normally done **purging** with **gas released in the atmosphere***
- ✓ *Here a **vacuum pump instead**.*



Installing excess-flow valves in service lines

- ✓ *automatic flow-cutting devices into PE service lines to stop the flow when a damage occurs.*
- ✓ *Can be installed without a trench nor interruption of the gas flow*

Source : MGP reduction of methane emission best practice guide

Thank you for your attention!

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