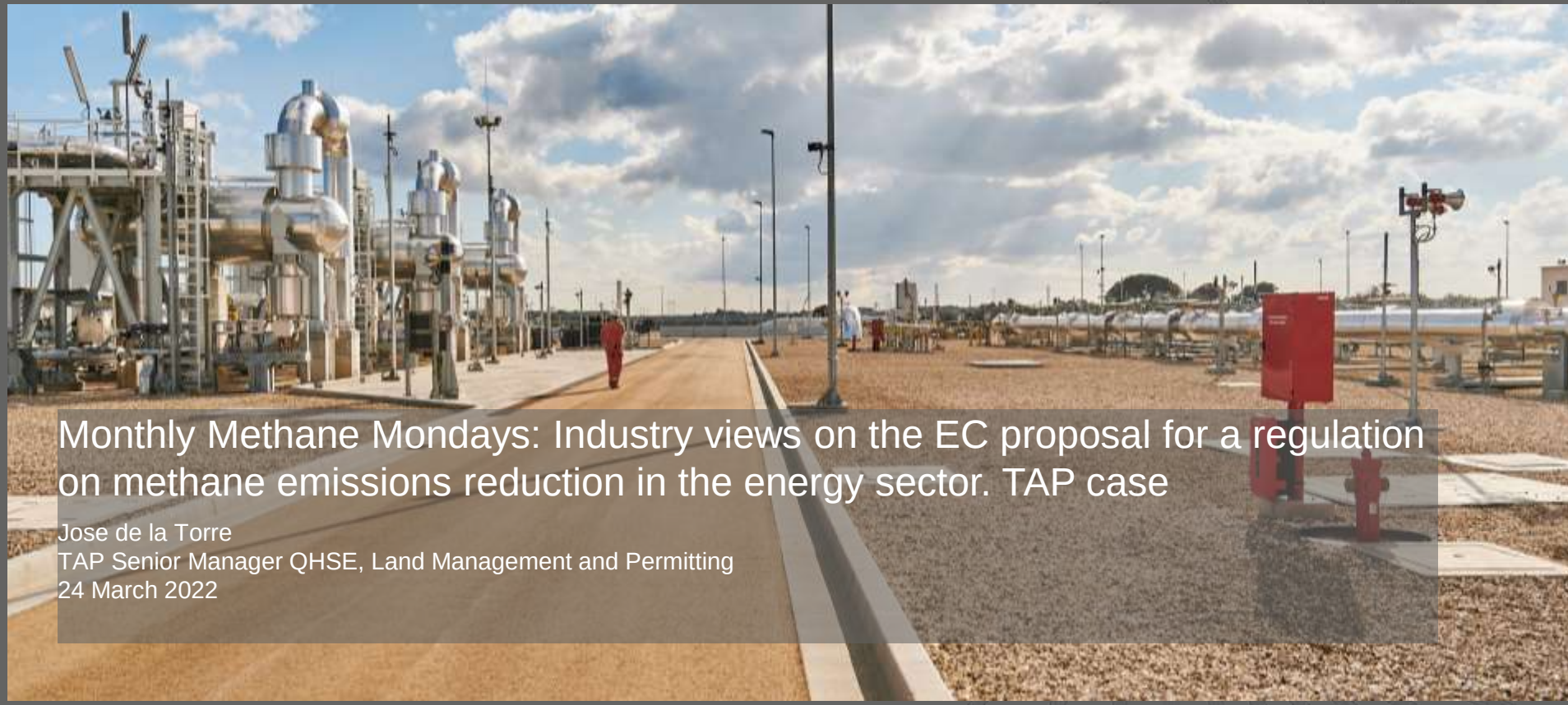
Trans Adriatic Pipeline



Monthly Methane Mondays: Industry views on the EC proposal for a regulation on methane emissions reduction in the energy sector. TAP case

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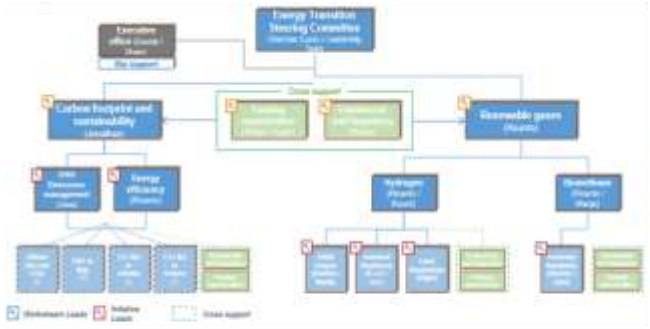
TAP in a nutshell

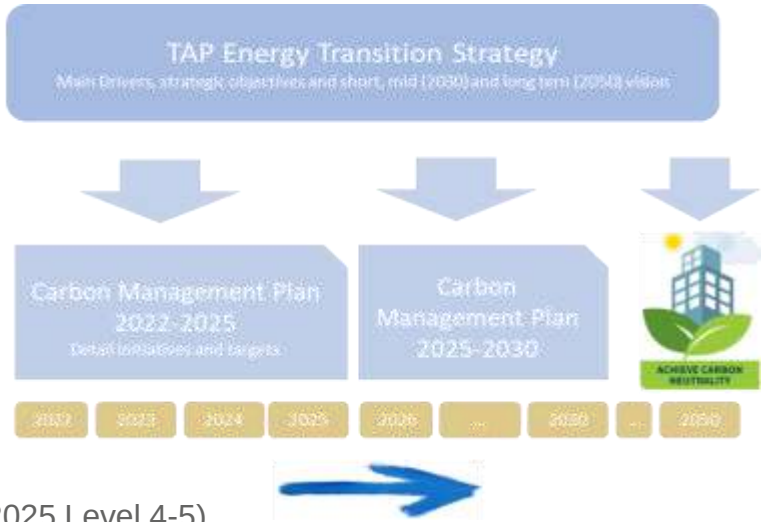
Diversity and security of energy supply for Europe

- TAP is the European leg of the **Southern Gas Corridor**, a value chain that improves the security and diversity of energy supply, by connecting European markets to new sources of natural gas in the Caspian Sea.
- 10 bcm/a initially available from Shah Deniz II corresponds to the amount of energy necessary to supply 7 million households in Southeastern and Western Europe
- 878 km pipeline (550 Km in Greece, 215 Km in Albania, 105 Km offshore, 8 Km Italy), 2 compressor stations and 1 pipeline receiving terminal.

TAP in a nutshell

- TAP started operation in Dec 2020 being 2021 its first operating year. BAT installed
- Since the beginning TAP has implemented **voluntary mechanisms** in **identification** and **quantification GHG emissions** including **Methane emissions**
- Definition **“Energy Transition Strategy”** and “**Carbon Management Plan”** with emission reduction **targets**

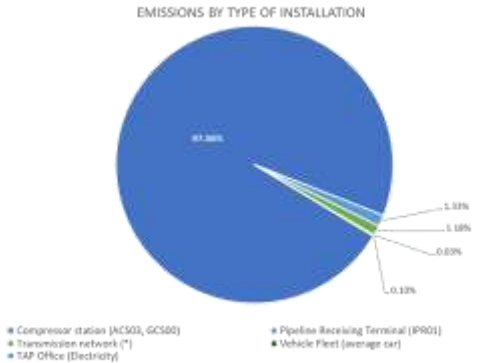




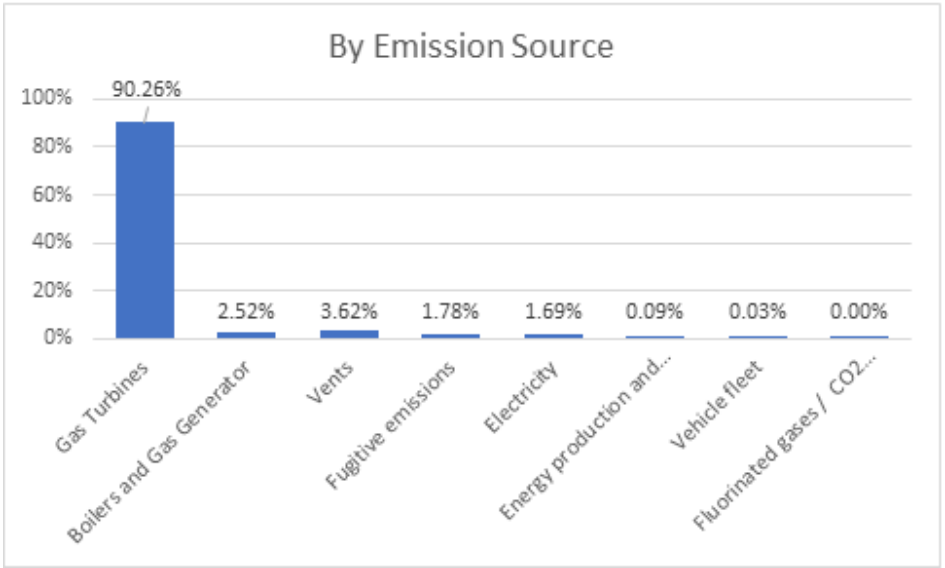
- **OGMP 2.0** (2022 level 2-3, 2023 level 3-4, 2024 level 4 and 2025 Level 4-5)

TAP GHG emissions analysis 2022

- Direct emissions (**Scope 1**) represent **98.3**% of total emissions
- Indirect emissions related to electricity consumption (**Scope 2**) represent **1.7**% of total emissions
- **94.6%** of the TAP GHG emissions corresponds to **CO2** emissions, generated mainly during the combustion of natural gas and diesel in stationary sources (emergency systems (power generation and firefighting equipment, gas turbines, gas generator and boilers).
- **CH4** emissions, represent **5,4%** of the footprint, are mainly due to emissions from natural gas vents and fugitive emissions.
- The emissions generated by the **compression station and PRT** account for more than **99%** of the total footprint emissions, mainly due to self-consumption of natural gas in turbo-compressors.
- Emissions from **transmission networks** represent **1.2%** of total emissions.
- Emissions from **the vehicle fleet** represent **0.03%** of total emissions.
- Emissions from the **electricity of TAP offices** represent 0.10% of total emissions.



- **90.3%** of emissions are generated by self-consumption of natural gas in **turbo-compressors** located in the compression stations.
- Emissions from **boilers and gas generators** represent **2.52%** of total emissions.
- Methane **vented** in normal operations, maintenance, special operations and emergency operations represent **3.6%** of total emissions.
- **Fugitive emissions** (methane) identified during Leak Detection And Repair (LDAR) campaign are currently responsible for **1.8%** of GHG emissions.
- The **rest** of the emission sources (**Energy production, firefighting system, vehicle fleet and electricity consumption**) represent **0.12%** of total emissions.



LDAR campaign

- ✓ A fugitive emissions **detection and quantification campaign** (HYBRID LDAR measurement campaign) was carried out in a series of facilities selected by TAP located in Greece, Albania and Italy in Sept-Oct 2021.

- ✓ The scope of this campaign was the **identification** and **quantification** of **fugitive emissions** at selected TAP facilities. For this purpose, **all structures and components** susceptible to fugitive emissions **were reviewed**. This review consisted of a hybrid fugitive emissions detection sampling (HYBRID LDAR), through initial identification by a FLIR GFx-320 infrared camera and subsequent concentration measurement with a SENSIT HXG-3P quantification equipment

Methodoly: Method **EPA 21** and **EN 15446:2008**

The components to be sampled were those prone to fugitive emissions (leaks):

- **Valves (V):** In valve housings consisting of multiple parts, it was measured at all points where it could leak. When valves are installed with *flanges*, these are generally considered as *separate components* rather than part of the valve and will be included in another category of leakage points to be cited below (Other: where flanges are included).

- **Connectors (C)**: This category includes all types of threaded joints, fittings, threaded plugs, etc.

- **Other (O):** Flange, blind flange, etc.

- **PSV'S or Safety Valves (PSV):** in most of these mechanisms it is difficult to sample at the seat seal. They usually leak through the body flange, cap and, if applicable, tube (atmospheric outlet).

- **Open End (OE):** Vents, Exhaust, Flowmeter condenser purges, etc.

LDAR campaign

Once the leak was identified and quantified, it was labelled.

As for the labels, 3 colours are used according to the concentration detected:

- **Green:** For points whose concentration is higher than 500 ppm (leakage threshold) and does not exceed 10,000 ppm.
- **Yellow:** For points whose concentration is between 10,000 and 50,000 ppm.
- **Red:** For those points exceeding 50,000 ppm (clamp value).

In parallel, each and every one of the detected leaks were recorded in a **Field Sheet** for subsequent computer processing and to obtain the methane emission rate (TonCH4/year).

Block Valves

An extrapolation has been done per country (GR and AL) considering worst case scenario from the highest value obtained.

LDAR campaign. Main conclusions

- ✓ **Zoning**: The zones with the **highest number of points** with detected leaks correspond to turbocompressor.
- ✓ **Priority**: of the total **fugitive emissions initially identified** in the campaign **after the parallel repair**, 114 were considered high priority (red label), 30 medium priority (yellow label), 46 low priority (green label).
- ✓ **Component**: the **component with the highest number of emission points** and the highest emissions was the **Open End (OE),** (aprox. 60% of the emission rate).
- ✓ Only 5 flanges have presented fugitive emissions out of the total number of flanges verified
- ✓ An action Plan is ongoing to mitigate the leaks identified

2022: Target testing and Emissions reductions opportunities

- Target testing
- List of measures for each source of emission and Methane Emissions Reduction Plan
- Setting of emissions reduction targets
- Yearly calculation methane emission footprint using OGMP 2.0 reporting questionnaire and guidelines

2023: Methane emissions monitoring programme (3 countries)

- LDAR campaign to ensure that targets identified are being met, according to measures implemented in the methane reduction plan
- Yearly calculation methane emission footprint using OGMP 2.0 reporting questionnaire and guidelines.

Trans Adriatic Pipeline

Thank you!

Thanks to non-invasive technologies, TAP preserved a small holm oak wood in Italy, located along the pipeline route. We also planted 117 new trees, enhancing this precious ecosystem. The shape resembles a green heart - perfectly capturing the bond established with the local territory.