



# Methane Emissions Resulting from Upstream Petroleum Activities in Turkey

**Emre Özgür, Ph.D.**

Global Methane Initiative  
Member of Turkish Oil & Gas Subcommittee

Calgary, Alberta, Canada  
12 June 2017

# Outline

- General Information about Turkey
- Upstream Petroleum Sector in Turkey
- Characteristics of Turkish Crude Oils
- Methodology for the Estimation of Methane Emission
- Methane Emission
- Actions for Greenhouse Gas Emission Reduction
- Evaluations



# General Information about Turkey



Capital City: Ankara

Area: 814,578 km<sup>2</sup>

Population: 80 millions

Annual Energy Consumption: 125 million toe

# Upstream Petroleum Sector in Turkey



18 million barrel crude oil production (annual)

0,4 billion m<sup>3</sup> (1,400 million scf) natural gas production (annual)

# Characteristics of Turkish Crude Oils

- Black Oil Type
- Relatively higher sulphur content
- Low gas content
- Weighted Average Gas/Oil Ratio (GOR): 70 scf/bbl



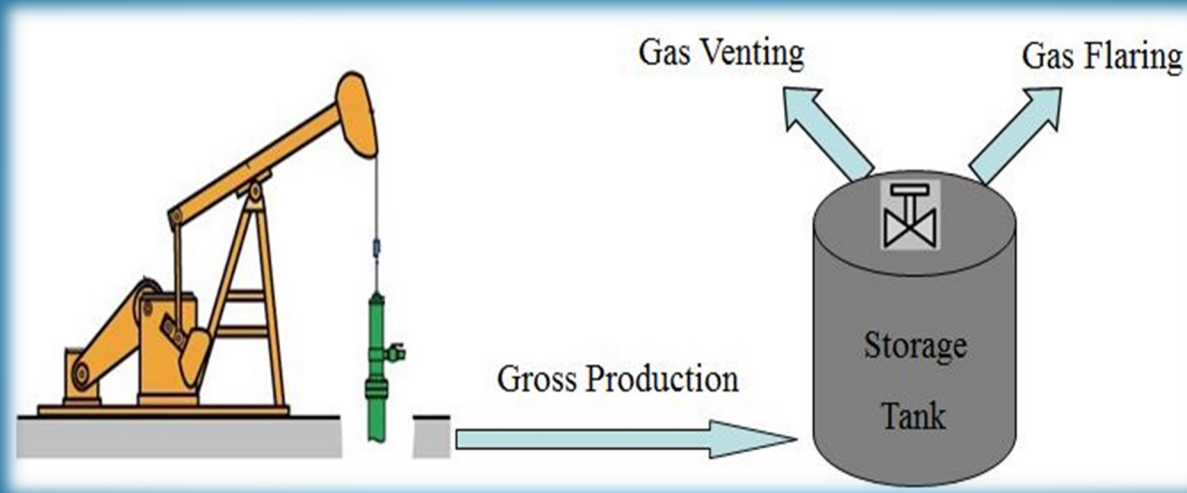
# Methodology for the Estimation of Methane Emission

- Production data of all crude oil fields were collected (120 no.)
- GOR data of all crude oil fields were collected
- The Multiplication of Production value by the GOR data of each field were summed up for Final Estimation

$$\text{Amount of Methane Emission} = \sum_{n=1}^{120} \text{Annual crude oil production of field}_n \times \text{Gas Oil Ratio (GOR) of field}_n$$

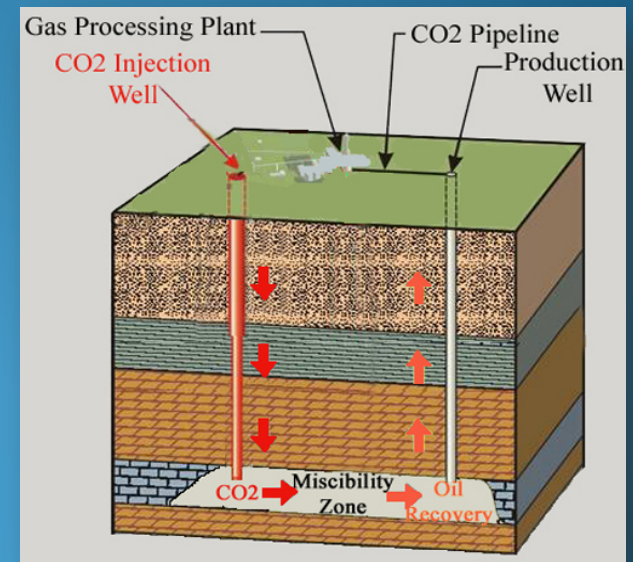
# Methane Emission

- Emitted Methane Amount of Turkey  $\approx 36$  million  $\text{m}^3$  (1.270 billion scf) annually coming from the “associated gas” (As the Result of the Previous Equation)
- Associated gas is processed through venting in most of the fields at storage tanks (half of the total methane emission) and is flared at few fields with high gas content (other half of the total methane emission)



# Actions for Greenhouse Gas Emission Reduction

- CO<sub>2</sub> Gas recycling unit at the largest oil field of Turkey, “Batı Raman” where “immiscible CO<sub>2</sub> injection” Project (Enhanced Oil Recovery) is active
- 13 billion scf CO<sub>2</sub> is injected annually
- 95% of CO<sub>2</sub> recycled at surface equipment and reinjected to reservoir





# Evaluations

- Relatively low greenhouse gas emission is observed in the oil & gas sector (upstream) activities in Turkey due the production level and gas ratio of crude oils
- New petroleum law introduced in 2013 includes environmental issues :
  - Submission of the evaluation form on the environmental effects of exploration and production operations by oil companies is compulsory.
  - Form should also include the effects of gas leakages and flare gases and etc.



Calgary, Alberta, Canada  
12 June 2017



# Methane Emissions Resulting from Upstream Petroleum Activities in Turkey

## Thank you

**Emre Özgür, Ph.D.**

Petroleum & Natural Gas Engineer

Global Methane Initiative  
Member of Turkish Oil & Gas Subcommittee

[emreozgur@gmail.com](mailto:emreozgur@gmail.com)  
[www.linkedin.com/in/dremreozgur](http://www.linkedin.com/in/dremreozgur)