

Project title:**Investigation on Flare Gas Recovery for Generating Power in Iran (Gas to Wire Technology)**

Department : Chemistry and Process Engineering	Project Manager : Amirhossein Khalili-Garakani
Contractor : NRI	Project Code : PPCPN23
Project Staff : -	Completion date: May 2019

Abstract:

Flaring of gasses is the common facility for safety, pressure control and releasing gasses, in most of chemical processes like oil and gas refineries and petrochemical industries. In this system excess gasses which gathered different units burned in the flare stack. Most of these gasses have high fuel value and could be utilized as feed for other process units. Burning of these gasses not only have environmental problems due to greenhouse gas emissions but also losing economical resources. According to World Bank reports Iran is the third countries among top thirty flaring countries.

There are different methods for flare gas reduction (Figure 2). Among these CNG and LNG have some critical considerations in transportation to markets or storage. Also the cost of the facilities for compression and preparation is nearly high. In spite of first GTL plant in Brazil in 2011, GTL processes, have some technical maturity and high capital cost. Reinjection process, typically applied for enhanced oil recovery or for disposal of highly contaminated gas. Other considerations include compressor sparing philosophy and matching of compressor duties over full field life. Gas to power or gas to wire technology according to typically minimal gas pre-treatment requirement is highly considered (Ojjiagwo et al., 2016). Small-scale Gas to Wire uses stranded natural gas to generate electricity for own use or sale to local grid. Considering lower economical requirement of gas to wire process and utilizing gas engines it could be possible to generate power from associate gas in oil field areas or from flaring gasses of oil and gas refineries and petrochemical industries. Besides power generation in this way could resulted in lower fuel cost, lowering flames, less utility consumptions, lees greenhouse gas emissions and As stated by world bank in 2013 the cost of each MMBtu power generation by consuming associate gas is equal to 25% cost of the natural for generating the same power.

The project goal is to reveal that all oilfield associate gas, oil & gas refineries and petrochemical industries gas flares can be used to generate electric power. In many cases, the cost of generating the electricity may be offset by gains in oil production. In other cases, the cost of power generation may be offset by reduced purchase of electricity. It also results in reduced emissions, because flares generally produce significantly more NOX than distributed generation power plants.

Necessity of this project is the lack of comprehensive study on the capability of generating power from flare gasses of industries in Iran. Besides the requirement of power in some of the oil and gas facilities which could not or hardly provided from grids like offshore facility, near border or facilities far from grids. Also in some fields according to high load on power grids, development of the fields meet power requirement problems. So with running some projects like gas to power not only the requirement of power in these industries could satisfied but also in some cases the excess power produced could be transferred to the nearest power grid.

Project results:

- 1- Comprehensive study on associate gas of different oil fields and oil and gas refineries and petrochemical industries of Iran
- 2- Investigating Iran oil ministry program, plans and operational flare gas recovery units
- 3- Cause and effect analysis of the situation in Iran
- 4- Investigating different methods of flare gas recovery and utilization
- 5- Determine the evaluation indicators in each of the processes
- 6- Comparing and feasibility study on flare gas utilization options for some chosen systems
- 7- Prioritizing different options for generating electricity, and comparing with other flare gas recovery and utilization methods
- 8- Presenting an applicable process in power generation for different flare gas categories in Iran.

- 9- Preparing a smart system for selection of optimal flare gas recovery and utilization process according to gas conditions and parameters

Project Documents:

PPCPN23\E: Investigation on Flare Gas Recovery for Generating Power in Iran (Gas to Wire Technology), May 2019.