

Commercial Presentation Theatre & Process Equipment Zone (Hall 1)

Day: 24th October
Time: 10,30 - 10,50

EXERGY INTERNATIONAL
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Applications of Organic Rankine Cycle systems for the decarbonization in Oil & Gas processes

Climate change is affecting almost every industry, and few more so than the oil and gas sector. While IEA highlights the world is far from being on track to achieve NetZero targets by 2050, the pressure for the industry to increase efficiency regarding energy usage and carbon output continues to grow.

For the oil and gas market, to maximize efficiency and reduce its overall carbon emissions, exhaust-heat recovery offers a huge potential. Anywhere between 20–50% of industrial energy usage is eventually released as waste heat. Gas turbines sit firmly at the top of the scale, rejecting roughly 50% of the energy in the fuel into the atmosphere through their exhaust systems.

This presentation details the Organic Rankine Cycle (ORC) technology features and advantages and highlights its possibilities of integration in several Oil&Gas processes to increase the efficiency and the sustainability of the operations. By exploiting exhaust heat streams in O&G processes, including low temperature streams, ORCs allow to convert these into carbon-free electricity for on-site production and use.

The presentation outlines ORCs applications in:

- Gas compressor stations. Gas turbines driving compressors in use in pipelines could benefit from the implementation of ORC heat waste recovery systems to reach optimal emission and consumption figures. One ORC system can be applied to multiple gas turbines driving the station so, one single power plant can increase the power output by up to 40% and, therefore, reduce the use of fossil fuels to drive the compression.

- LNG regasification processes. In LNG regasification terminals the recovery of cold thermal energy to generate additional power through an ORC system is an effective solution to improve the efficiency, the sustainability and reduce the costs of the LNG plant. The ORC cycle exploits the cold water of the LNG regasification process as heat sink hence giving the double advantage of avoiding water consumption and exploiting the "cold energy" stored in LNG. Exergy conceived in its R&D department a specific Cold Energy Plant (CEP) based on ORC technology which regasifies LNG and converts the heat absorbed from sea water into electricity.
- Gas pressure let-down stations. In pressure let-down stations, natural gas pressure must be decreased to distribution network pressure. In this process, potential energy, available as high-pressure difference, is completely lost in the lamination process through a valve. This waste energy can be efficiently recovered to produce zero emission electricity through a gas expander. Exergy has designed a natural gas expander system that integrates into existing pressure let-down gas stations, serving both industries and residential buildings, to increase the efficiency and sustainability of the gas distribution system.
- Refining and petrochemical processes. The heat typically dissipated in head condensers or in any cooling unit where it is not recovered by means of an effective heat exchangers train, could be recovered by means of an ORC, also at low temperatures, producing electricity that increases the efficiency of the plant. This concept applies to all chemical, petrochemical, oil and gas plant and could be used in new plants or as retrofit of existing plants.