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OIL AND GAS APPLICATIONS FOR TURBOMACHINERY

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OBJECTIVE

Upstream, midstream and downstream applications in the oil and gas industry , and application requirements are explained. Typical applications include pipeline compression, gas plan compression, gas lift, gas gathering, gas export, flash gas, gas storage, compressors for refrigeration and LNG processes, and refinery applications. In these applications, compressors are driven by gas turbines, steam turbines, expanders, constant speed and variable speed electric motors. A part of the tutorial is given to a discussion on the future of oil and gas applications, especially in the light of the use of renewables in power generation, and possibly in transport applications

TUTORIAL OUTLINE

In this tutorial, we explain the specific requirements imposed on turbomachinery by the specific applications in the oil and gas industry. After a quick overview of the function of turbomachinery, we will explain specific applications, groped into upstream, midstream and downstream tasks. We will also discuss specific requirements into the capability to use opportunity fuels, the requirements from packaging the equipment based on the severity of the environment, and concepts of process control for the machines. We will also address future aspects, such as hybrid concepts, hydrogen use and future industry requirements.

- Introduction and Purpose
- Intro to Gas Turbines and Compressors for Oil and Gas Applications
    - Function, Performance and Components
- Background of Oil and Gas Compression
- Upstream Applications Oil Production or what to do with the Gas
    - Flash Gas Compression
      Re-Injection
    - Gas Lift
    - Gas Export

- Water Removal
- Gas Field
- Wet Gas
- Gas Gathering
- Gas Plant
- CO2 Removal/Amine

- Midstream Applications
  - Pipeline Transport
  - Gas Storage
  - The Hydrogen Question

- Downstream Applications and LNG
  - LNG Process
  - Refinery Applications
  - Power Recovery Train Arrangements
  - Axial Frame Compressors
  - Power Recovery TH Expanders
- Turbomachinery equipment
  - Fuel
  - Packaging Features for Oil and Gas
  - Control
  - Technical realization of a hybrid drive

- What's the Future?
  - Some Trends
  - Technology Roadmaping for the Future