INTRODUCTION

Mechanical driver selection for liquefaction compressors has a direct impact on the liquefaction process efficiency; furthermore, the mechanical driver choice defines the availability level of the LNG plant, the shaft line arrangement and casing configuration. New drivers have been developed in the last years thanks to LNG.

SELECTED STUDY OUTCOMES

- Main driver supplier and model and quantities of main drivers;
- Machinery configuration and quantities on each shaft line: starter/ helper;
- Parallel Operation or not; accordingly, the following could be estimated:
  - Layout and footprint requirements
  - Availability level
  - Operational flexibility/ rundown capabilities;
- Maximum available power and % of power utilization (ex: in case of temperature fluctuation);
- Fuel gas % of total feed gas;
- Estimated LNG production rate;
- Eventually the total cost of ownership could be estimated, then along with the % power utilization and estimated LNG production rate, the LNG plant commercial aspects are clarified, upon which a final techno-commercial selection could be made.

Based on its own experience, Operator choice shall be considered in the driver selection.

FUTURE PROSPECT

- Large electric motors with variable speed drive systems (with Voltage Source Inverter (VSI) topology-based) when the use of external electric power is feasible: Green energy for example or high efficiency combine cycle power plants. This would also improve the environmental impacts through zero or limited emissions;

DRIVER CONFIGURATION SELECTION

Shortlisting Few Best Choices

Initially the following external factors shall be well considered:

- Availability of nearby sources of power;
- Availability of power from electric grid at a competitive price;
- Proximity to combined cycle power plants … etc;
- Ambient Temperature:
  - Daily and/or seasonal fluctuations in temperature would mandate the use of a helper motor to compensate for periods of high ambient temperature and/or the addition of a air cooling systems;
  - Sub-zero conditions (as: Arctic conditions) will necessitate that need for anti-icing systems and equipment winterization;
- Environmental Conditions & Location:
  - Sand storms would impose having Inlet Air filtration systems which will adversely affect the power output of gas turbines;
  - Sea motions and Accelerations (for Floating LNG applications);
  - Remoteness could favour the application of steam turbines for their reliability or aeroderivative gas turbines for their swap possibility;
- Emissions
- Modularization versus Stick Built

In addition, the following LNG Process factors shall be well considered:

- Liquefaction Cycle and estimated specific power (required power divided by LNG production rate);
- Refrigeration Loops of the liquefaction cycle;
- Initial decision on number of LNG production trains;
- Fuel Gas Composition(s) and Pressure(s);

COORDINATION

The selection process requires Collaborative Work between:

- Process Licensor, Owner and EPC Contractor
- Process Engineers and Machinery Specialists
- Vendors and Specialists

Skilled & experienced specialists in LNG projects are key for a successful selection process.

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