

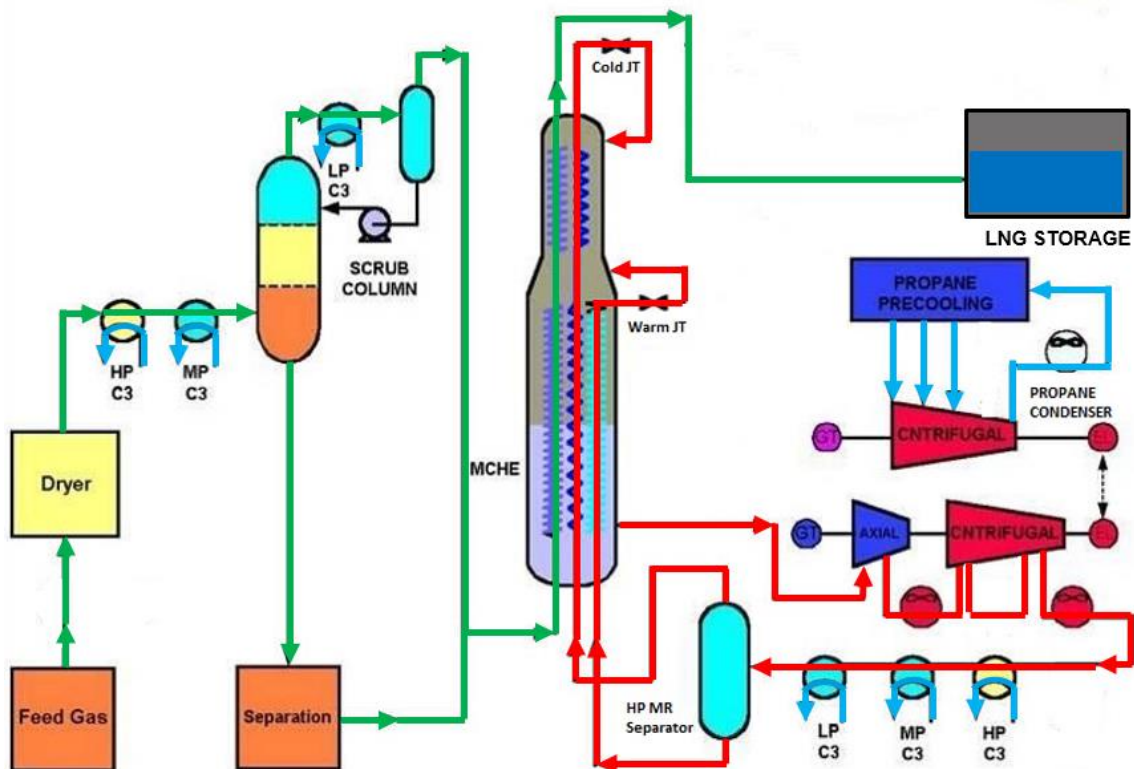
## **Specification of LNG Plant Optimization AI**

## 1. Overview

### 1.1 AI system development policy

- ◆ The purpose of this development is to develop an AI to optimize the operation of Natural Gas Liquefaction Process.
- ◆ Develop an operation-optimizing AI for plants using actual operation data of Donggi Senoro LNG (DSLNG) plant
- ◆ Target Variables are related to Liquefaction Efficiency (e.g. Specific Power etc.)
- ◆ Feature Variables are operating parameters (e.g. MR Composition, Pressure, Temperature, etc.)

### 1.2 Natural Gas Liquefaction Process



## 2. Request Items

### 2.1 Liquefaction Efficiency Regression AI base on Operating Data

#### 2.1.1 Inputs (Training Data)

- ◆ Latest Actual Operating Data from DSLNG (2019 ~ 2020)
  - Operating Data should be categorized based on plant operating mode (Holding mode (Normal Condition), Loading mode, Turndown, and Shutdown). Use Data of Holding mode.
  - For the period of data aggregation, select a period of time when the accuracy improves. (1-hour frequency is recommended as initial time.)
- ◆ The Evaluation Index is Liquefaction efficiency (Specific Power)
- ◆ The Specific Power cannot be measured directly, so it is calculated from several measurement points. See Table 1 for details.
- ◆ See Table 1 for a list of explanatory variables.
  - What we believe to be the minimum explanatory variable is indicated by "x" in the Input Column. If this does not take the regression, other measurements are added as explanatory variables.

### 2.2 Regression AI for Other Parameters bade on Operating Data

- ◆ Details to be determined.

### 2.3 Correlation analysis of Operating Data

- ◆ Details to be determined.

## 3. Output

### 3.1 Deliverables

- ◆ Program (or Source Code)
  - Python (3.8), Tensor Flow (2.3) with Keras
- ◆ Description of "how to use the program, how to install it, the libraries you use, etc. (You may include comments in the source code.)"
  - ※ Not Required in case of using the typical libraries in the program.
- ◆ Report (Includes empirical results, a brief description of the algorithm used, and problems)

### 3.2 Scheduled Date for Deliverables

- ◆ Service Agreement Schedule (End of December, 2020)