

# **An Interesting transition driven by AI**

Area: Industry (Self-driving mobility/Demand forecasting)

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The AI-Driven transition is an indispensable phenomenon in an industrial field. It can be said that the effects that can occur when classical industry merges with AI are endless. In this article, I would like to introduce some special operating status and briefly explain where AI is needed.

## **1. Smart Patrol – Self-driving vehicles or drones**

The Korea Gas Corporation is mainly responsible for importing natural gas from natural gas producing countries/importing countries, regasifying it at LNG production bases (acquisition bases), and supplying it to local customers (city gas companies and power plants) through natural gas supply pipelines. Therefore, the pipeline network is operated from production bases to local customers and is 4,945 kilometers long. Also, there are 413 supply management stations in certain sections. It is patrolled twice a day by an internal combustion engine human-crewed vehicle to secure the above section's stability. It is a group of two people per team, which is performed through outsourcing.

Such patrol duties may be performed by using autonomous vehicles or drones. If self-driving cars and drones are used, AI technologies such as sensor technology and mapping technology should be incorporated. AI technologies that can replace humans, such as communication technology and video/signal processing technology, will also be needed.

Through these methods, it is possible to overcome the time constraints of patrol twice a day and can also be expected to save costs on outsourcing. Besides, assuming that drones can be used, environmental problems with internal combustion engines can be improved.

## 2. Artificial Intelligence pigging

In-Line-Inspection pigging (ILI pigging) is a technology that runs an inspection "pig" in the pipeline network to conduct an abnormal diagnosis of physical defects and corrosion inside the pipe and can be diagnosed inside the pipeline without interruption in gas supply. Pig cleans the pipelines in a long and narrow tube. It generally refers to maintenance equipment usually inserted inside a pipe and moved by internal fluids as an inspection and repair equipment.

Currently, it is operated by performing pigging using various types of pigs and then checking the collected data to determine whether to repair the pipes. Suppose multiple AI technologies such as video/signal recognition/analysis technology, sensor technology, communication technology, and robot control technology are combined. In that case, intelligent pigs can be efficiently operated through learning/cognition-based manipulation, and economic effects are expected from the overall decision-making system improvement and simplification of inspection procedures.

## 3. Forecasting natural gas demand

Korea's natural gas charges are divided into wholesale and retail charges, and wholesale charges consist of raw material costs (LNG introduction + incidental costs) and gas

supply costs through the main pipeline, and retail charges consist of wholesale and retail city gas supply costs. LNG storage tanks at LNG acquisition bases store LNG during the season when city gas demand is low and replenish LNG during the winter when demand is higher than supply, with operating costs included in wholesale charges and reflected in retail charges. Therefore, it is crucial to properly predict natural gas demand because it also affects natural gas charges by enhancing LNG storage tank operations' efficiency.

Demand forecasting may not be included as an industry category in a narrow sense, but it could be classified as a category of the gas industry in a broad sense. Modeling natural gas demand forecasting using AI can be said to be an AI-Driven transition. Through systematic and active supply and demand management using modeling, mid-to long-term plans can be established, and stable natural gas supply in Korea can be expected by securing timely supplies.

More precise demand forecasting will lead to optimized operational improvements in LNG introduction/transportation/storage/supply, which can eventually affect raw material costs and introductory incidental costs, so economic effects can be expected.