remove water from the natural gas. Natural gas liquid (NGL) is fractionated from the dehydrated natural gas. Thereafter, the natural gas is liquefied.

However, the conventional LNG producing method requires a significant amount of capital investment in order to construct LNG plants, and requires a significant amount of maintenance expenses. In addition, a large amount of power is needed to cool and liquefy natural gas to a cryogenic temperature. Hence, if the production costs of natural gas would be saved by reducing the construction costs of LNG liquefaction plants, it may be advantageous in terms of cost reduction to produce and transport LNG even in the case of small and medium-sized gas fields, which have been determined as being uneconomical when using a conventional method for liquefying and transporting natural gas. Therefore, LNG plants in which several processes are removed from the conventional LNG producing method have been developed. These LNG plants will be described below.

A conventional LNG production system is disclosed in Korean Patent Registration No. 358825, entitled "IMPROVED SYSTEM FOR PROCESSING, STORING, AND TRANSPORTING LIQUEFIED NATURAL GAS." The system includes a feed gas reception facility for receiving natural gas and removing liquid hydrocarbon from the natural gas, a dehydration facility for sufficiently removing water vapor from the natural gas to prevent freezing of the natural gas while being processed, and a liquefaction facility for converting the natural gas to LNG.

However, the conventional LNG production system still needs the process of fractionating liquid hydrocarbon, i.e., NGL, and the feed gas reception facility therefor. Hence, there is a limitation in reducing plant construction costs and energy utilization. Therefore, the conventional LNG production system is disadvantageous in terms of economic feasibility in the production of LNG.

SUMMARY ~~OF THE INVENTION~~

T~~An aspect of the~~ present ~~invention~~disclosure is directed to reduce plant construction costs

and maintenance expenses and to reduce power consumption necessary for cooling and liquefying natural gas to a cryogenic temperature, leading to a reduction in LNG production costs.

TAnother aspect of the present inventiondisclosure is also directed to guarantee high economic profit and reduce payback period in small and medium-sized gas fields, from which economic feasibility could not be ensured by the use of a conventional method.

According to an embodiment of the present inventiondisclosure, a method for producing pressurized liquefied natural gas includes: performing a dehydration process to remove water from natural gas supplied from a natural gas field, without a process of removing acid gas from the natural gas; and performing a liquefaction process to produce pressurized liquefied natural gas by liquefying the natural gas, which has undergone the dehydration process, at a pressure of 13 to 25 bar and a temperature of -120 to -95°C, without a process of fractionating natural gas liquid (NGL).

The method may further include performing a carbon-dioxide removal process to remove carbon dioxide by freezing the carbon dioxide in the liquefaction process, when an amount of the carbon dioxide existing in the natural gas after the dehydration process is 10% or less.

The method may further include performing a storing process to store the pressurized liquefied natural gas, which has undergone the liquefaction process, in a storage container having a dual structure.

In a first aspect of the present disclosure, there is provided a system for producing pressurized liquefied natural gas, comprising:

a dehydration facility configured to remove water from natural gas supplied from a natural gas field; and

a liquefaction facility configured to produce pressurized liquefied natural gas by liquefying the natural gas, which has passed through the dehydration facility, at a pressure of 13 to 25 bar and a temperature of -120 to -95°C; and

a carbon-dioxide removal facility configured to remove carbon dioxide by freezing the carbon dioxide at the pressure and the temperature used in a liquefaction process, when an amount of the carbon dioxide existing in the natural gas having passed through the dehydration facility is 10% or less,

wherein the carbon-dioxide removal facility comprises:

an expansion valve installed in a supply line, through which the pressurized natural gas is supplied, and configured to depressurize the pressurized natural gas to a low pressure;

a solidified carbon-dioxide filter installed at a rear end of the expansion valve and configured to filter frozen solid carbon dioxide existing in the natural gas liquefied while passing through the expansion valve;

first and second on/off valves installed at a front end of the expansion valve and a rear end of the solidified carbon-dioxide filter and configured to open and close the flow of the high-pressure natural gas and the liquefied natural gas;

a heating unit configured to supply heat to vaporize solidified carbon dioxide of the expansion valve and the solidified carbon-dioxide filter;

a third on/off valve installed to open and close the exhaust of carbon dioxide recycled by the heating unit in an exhaust line branched from the supply line between the first on/off valve and the expansion valve,

wherein the carbon-dioxide removal facility is provided in plurality, and

wherein when the first and second on/off valves of some of the carbon-dioxide removal facilities are opened, the third on/off valves of some of the carbon-dioxide removal facilities are closed, and simultaneously the first, second and third on/off valves of others of carbon-dioxide removal facilities perform perform an opposite operation.

According to another embodiment of the present ~~invention~~disclosure, a system for producing pressurized liquefied natural gas includes: a dehydration facility configured to remove water from natural gas supplied from a natural gas field; and a liquefaction facility configured to produce pressurized liquefied natural gas by liquefying the natural gas, which has passed through the dehydration facility, at a pressure of 13 to 25 bar and a temperature of -120 to -95°C.

The system may further include a carbon-dioxide removal facility configured to remove carbon dioxide by freezing the carbon dioxide in a liquefaction process, when an