CLAIMS

1. A plant that consumes a reformed gas obtained by reforming a source gas including at least methane and carbon dioxide, the plant comprising:

a reforming device including a reforming catalyst for reforming the source gas and an electric power supply member for supplying electric power to the reforming catalyst, the reforming device being configured to supply electric power to the reforming catalyst to reform the source gas; and

a reformed gas consuming apparatus configured to consume the reformed gas, wherein

a reaction temperature of a reforming reaction of the source gas in the reforming device is adjustable by adjusting a supply amount of a heating medium to the reforming device when heat exchange between the source gas and the heat medium is performed in the reforming gas, the heat medium including exhaust heat generated due to consumption of the reformed gas in the reformed gas consuming apparatus

wherein the reformed gas consuming apparatus is a methanol synthesis apparatus in which the reformed gas is consumed as a raw material of synthesis of a methanol, and

the reforming reaction of the source gas includes both:

steam reforming in which methane and a steam react with each other; and

dry reforming in which methane and carbon dioxide react with each other.

2. The plant according to claim 1, wherein

the heating medium includes:

a first steam generated by a reaction heat of the synthesis reaction of the methanol; and

an added steam different from the first steam.

3. The plant according to claim 2, further comprising:

a boiler, wherein

the added steam includes a second steam generated by the boiler.

4. The plant according to claim 2 or 3, further comprising:

a vaporizer, wherein

the added steam includes a third steam generated by the vaporizer.

5. A plant that consumes a reformed gas obtained by reforming a source gas including at least methane and carbon dioxide, the plant comprising:

a reforming device including a reforming catalyst for reforming the source gas and an electric power supply member for supplying electric power to the reforming catalyst, the reforming device being configured to supply electric power to the reforming catalyst to reform the source gas; and

a reformed gas consuming apparatus configured to consume the reformed gas, wherein

a reaction temperature of a reforming reaction of the source gas in the reforming device is adjustable by adjusting a supply amount of a heating medium to the reforming device when heat exchange between the source gas and the heat medium is performed in the reforming gas, the heat medium including exhaust heat generated due to consumption of the reformed gas in the reformed gas consuming apparatus,

wherein the reformed gas consuming apparatus is a solid oxide fuel cell configured to produce electric power by consuming the reformed gas, and the heating medium includes an exhaust gas exhausted from the device solid oxide fuel cell.

6. The plant according to any one of claims 1 to 5, wherein

a portion of the carbon dioxide is received from outside the plant.

7. The plant according to any one of claims 1 to 6, wherein

a reaction temperature of the reforming reaction of the source gas is in a range from 373K to 700K.

8. The plant according to any one of claims 1 to 7, wherein

the reforming device includes at least three plates arranged in parallel,

a source gas circulation chamber in which the source gas circulates and a heating medium circulation chamber in which the heating medium circulates are formed between adjacent plates so as to be arranged alternately in a direction in which the plates are arranged in parallel,

the reforming catalyst is accommodated in the source gas circulation chamber, and

the electric power supply member supplies electric power to the plates.

9. A method for reforming a source gas including at least methane and carbon dioxide, the method comprising:

a reforming step of reforming the source gas by supplying electric power to a reforming catalyst for reforming the source gas;

a consuming step of consuming a reformed gas obtained by reforming the source gas in the reforming step; and

an adjusting step of adjusting a reaction temperature of a reforming reaction of the source gas in the reforming step by adjusting a supply amount of a heating medium when heat exchange between the source gas and the heat medium is performed, the heat medium including exhaust heat generated due to consumption of the reformed gas

wherein in the consuming step, the reformed gas is consumed to synthesize methanol in a methanol synthesis apparatus, and

the reforming reaction of the source gas includes both:

steam reforming in which methane and a steam react with each other; and

dry reforming in which methane and carbon dioxide react with each other.

10. A method for reforming a source gas including at least methane and carbon dioxide, the method comprising:

a reforming step of reforming the source gas by supplying electric power to a reforming catalyst for reforming the source gas;

a consuming step of consuming a reformed gas obtained by reforming the source gas in the reforming step; and

an adjusting step of adjusting a reaction temperature of a reforming reaction of the source gas in the reforming step by adjusting a supply amount of a heating medium when heat exchange between the source gas and the heat medium is performed, the heat medium including exhaust heat generated due to consumption of the reformed gas,

wherein in the consuming step, the reformed gas is consumed to produce electric power in a solid oxide fuel cell, and

wherein the heating medium includes an exhaust gas exhausted from the solid oxide fuel cell.