CLAIMS

1. A plant operation assistance device that determines a fuel procurement plan which is a plan related to procurement of a plurality of types of fuel used in a fuel combustion plant, the device comprising:

a device information storage unit configured to store device information related to devices that constitute the fuel combustion plant;

a plant operation plan acquisition unit configured to acquire an operation plan which is a plan related to operation of the fuel combustion plant operated by a plant operator;

a candidate fuel information acquisition unit configured to acquire candidate fuel information including at least one of a fuel property, an available amount, and a fuel cost of each of the plurality of types of fuel provided from a plurality of fuel suppliers;

a constituent device information acquisition unit configured to acquire the device information of the at least one of devices that constitute the fuel combustion plant from the device information storage unit; and

a fuel procurement plan determination unit configured to determine the fuel procurement plan capable of realizing the operation plan by determining a procurement amount in each prescribed period, of each of the plurality of types of fuel supplied from each of the plurality of fuel suppliers on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices,

the device further comprising:

a fuel procurement plan feedback unit configured to transmit at least part of information of the fuel procurement plan to at least one of the plurality of fuel suppliers.

2. The plant operation assistance device according to claim 1, wherein

the fuel procurement plan feedback unit acquires adjustability information indicating whether the available amount of each of the plurality of types of fuel provided from the plurality of fuel suppliers can be adjusted and determines a destination fuel supplier to which

at least part of information of the fuel procurement plan is transmitted on the basis of the adjustability information.

3. A plant operation assistance device that determines a fuel procurement plan which is a plan related to procurement of a plurality of types of fuel used in a fuel combustion plant, the device comprising:

a device information storage unit configured to store device information related to devices that constitute the fuel combustion plant;

a plant operation plan acquisition unit configured to acquire an operation plan which is a plan related to operation of the fuel combustion plant operated by a plant operator;

a candidate fuel information acquisition unit configured to acquire candidate fuel information including at least one of a fuel property, an available amount, and a fuel cost of each of the plurality of types of fuel provided from a plurality of fuel suppliers;

a constituent device information acquisition unit configured to acquire the device information of the at least one of devices that constitute the fuel combustion plant from the device information storage unit; and

a fuel procurement plan determination unit configured to determine the fuel procurement plan capable of realizing the operation plan by determining a procurement amount in each prescribed period, of each of the plurality of types of fuel supplied from each of the plurality of fuel suppliers on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices,

the device further comprising:

a fuel use record acquisition unit configured to acquire a fuel use record obtained when the fuel combustion plant is operated according to the fuel procurement plan, the fuel use record including a combustion performance or a fuel use amount of at least one of the plurality of types of fuel; and

a fuel use record feedback unit configured to transmit at least part of information of the fuel use record to at least one of the fuel suppliers.

4. The plant operation assistance device according to claim 3, wherein

the candidate fuel information acquisition unit acquires the candidate fuel information that the fuel supplier has corrected on the basis of the fuel use record.

5. The plant operation assistance device according to any one of claims 1 to 4, further comprising:

a maintenance plan determination unit configured to determine a maintenance plan of the fuel combustion plant on the basis of the device information, the operation plan, and the fuel procurement plan.

6. The plant operation assistance device according to claim 5, further comprising:

an operation data record acquisition unit configured to acquire an operation data record obtained when the fuel combustion plant is operated according to the fuel procurement plan; and

a maintenance plan correction determination unit configured to determine a correction of the maintenance plan on the basis of the operation data record.

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

the fuel procurement plan determination unit determines a fuel usable in the fuel combustion plant among the plurality of types of fuel included in the candidate fuel information on the basis of the candidate fuel information and the device information and calculates the fuel procurement plan on the basis of the candidate fuel information of the fuel determined to be usable, the device information, and the operation plan.

8. A plant operation assistance device that determines a fuel procurement plan which is a plan related to procurement of a plurality of types of fuel used in a fuel combustion plant, the device comprising:

a device information storage unit configured to store device information related to devices that constitute the fuel combustion plant;

a plant operation plan acquisition unit configured to acquire an operation plan which is a plan related to operation of the fuel combustion plant operated by a plant operator;

a candidate fuel information acquisition unit configured to acquire candidate fuel information including at least one of a fuel property, an available amount, and a fuel cost of each of the plurality of types of fuel provided from a plurality of fuel suppliers;

a constituent device information acquisition unit configured to acquire the device information of the at least one of devices that constitute the fuel combustion plant from the device information storage unit; and

a fuel procurement plan determination unit configured to determine the fuel procurement plan capable of realizing the operation plan by determining a procurement amount in each prescribed period, of each of the plurality of types of fuel supplied from each of the plurality of fuel suppliers on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices, wherein

the fuel procurement plan determination unit determines the fuel procurement plan on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices using a learning model created by machine-learning a relationship between a past used fuel used in the past in the fuel combustion plant and a past operation record obtained by operating the fuel combustion plant using the past used fuel.

9. The plant operation assistance device according to any one of claims 1 to 8, wherein the candidate fuel information includes information on the fuel cost.

10. The plant operation assistance device according to any one of claims 1 to 9, wherein the candidate fuel information includes information on the available amount.

11. The plant operation assistance device according to any one of claims 1 to 10, wherein

the candidate fuel information includes information on the fuel property.

12. The plant operation assistance device according to any one of claims 1 to 11, wherein the plurality of types of fuel includes biomass.

13. A plant operation assistance method of determining by a computer a fuel procurement plan which is a plan related to procurement of a plurality of types of fuel used in a fuel combustion plant, a processing unit of the computer executing:

a plant operation plan acquisition step of acquiring an operation plan which is a plan related to operation of the fuel combustion plant operated by a plant operator;

a candidate fuel information acquisition step of acquiring candidate fuel information including at least one of a fuel property, an available amount, and a fuel cost of each of the plurality of types of fuel provided from a plurality of fuel suppliers;

a constituent device information acquisition step of acquiring device information of at least one device that constitutes the fuel combustion plant; and

a fuel procurement plan determination step of determining the fuel procurement plan capable of realizing the operation plan by determining a procurement amount in each prescribed period, of each of the plurality of types of fuel supplied from each of the plurality of fuel suppliers on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices,

the processing unit of the computer further executing a fuel procurement plan feedback step of transmitting at least part of information of the fuel procurement plan to at least one of the plurality of fuel suppliers.

14. A plant operation assistance method of determining by a computer a fuel procurement plan which is a plan related to procurement of a plurality of types of fuel used in a fuel combustion plant, a processing unit of the computer executing:

a plant operation plan acquisition step of acquiring an operation plan which is a plan

related to operation of the fuel combustion plant operated by a plant operator;

a candidate fuel information acquisition step of acquiring candidate fuel information including at least one of a fuel property, an available amount, and a fuel cost of each of the plurality of types of fuel provided from a plurality of fuel suppliers;

a constituent device information acquisition step of acquiring device information of at least one device that constitutes the fuel combustion plant; and

a fuel procurement plan determination step of determining the fuel procurement plan capable of realizing the operation plan by determining a procurement amount in each prescribed period, of each of the plurality of types of fuel supplied from each of the plurality of fuel suppliers on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices,

the processing unit of the computer further executing:

a fuel use record acquisition step of acquiring a fuel use record obtained when the fuel combustion plant is operated according to the fuel procurement plan, the fuel use record including a combustion performance or a fuel use amount of at least one of the plurality of types of fuel; and

a fuel use record feedback step of transmitting at least part of information of the fuel use record to at least one of the fuel suppliers.

15. A plant operation assistance method of determining by a computer a fuel procurement plan which is a plan related to procurement of a plurality of types of fuel used in a fuel combustion plant, a processing unit of the computer executing:

a plant operation plan acquisition step of acquiring an operation plan which is a plan related to operation of the fuel combustion plant operated by a plant operator;

a candidate fuel information acquisition step of acquiring candidate fuel information including at least one of a fuel property, an available amount, and a fuel cost of each of the plurality of types of fuel provided from a plurality of fuel suppliers;

a constituent device information acquisition step of acquiring device information of at

least one device that constitutes the fuel combustion plant; and

a fuel procurement plan determination step of determining the fuel procurement plan capable of realizing the operation plan by determining a procurement amount in each prescribed period, of each of the plurality of types of fuel supplied from each of the plurality of fuel suppliers on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices, wherein

the fuel procurement plan determination step includes determining the fuel procurement plan on the basis of the candidate fuel information, the operation plan, and the device information of the at least one of devices using a learning model created by machine-learning a relationship between a past used fuel used in the past in the fuel combustion plant and a past operation record obtained by operating the fuel combustion plant using the past used fuel.