Claims

1. A gas recovery system for plant cultivation, the gas recovery system comprising:

a generator for generating heat energy and flue gas from natural gas supplied thereto;

a temperature conditioning system in thermal communication with the generator for receiving heat energy generated from the generator for one of chilling and heating water for conveyance to a downstream facility; and

a bioreactor for receiving the flue gas from the generator for cultivating plants therefrom, the flue gas comprising carbon dioxide (CO2), the bioreactor being for cultivating algae which consumes the carbon dioxide in the flue gas being provided thereto and for fixating the carbon dioxide in the flue gas with the algae for generating biomass therefrom, the bioreactor comprising at least one of a tray assembly, a flocculation and flotation system and a centrifuge for harvesting the algae being cultivated; and

a dryer for receiving the flue gas from the generator for dewatering the algae being harvested into dry algae powder.

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2. The gas recovery system as in claim 1, the generator being one of a lean burn natural gas generator and a combined heat and power (CHP) generator.

3. The gas recovery system as in claim 1, the generator being further for generating electrical energy from the heat energy being generated thereby for provision to at least one of an energy storage system and an energy consuming system.

4. The gas recovery system as in claim 3, the energy storage system being at least one of a battery array and a capacitor array for storing electrical energy.

5. The gas recovery system as in claim 3, the energy storage system being at least one of a water reservoir and a water pipe network for storing heat energy.

6. The gas recovery system as in claim 1, the temperature conditioning system being one of an adsorption chiller, a boiler and a hydronic boiler chiller.

~~7. The gas recovery system as in claim 1, the bioreactor being for cultivating algae which consumes the carbon dioxide in the flue gas being provided thereto.~~

~~8. The gas recovery system as in claim 7, the bioreactor further for fixating the carbon dioxide in the flue gas with the algae for generating biomass therefrom.~~

~~9. The gas recovery system as in claim 7, the bioreactor comprising at least one of a tray assembly, a flocculation and flotation system and a centrifuge for harvesting the algae being cultivated.~~

~~10. The gas recovery system as in claim 9, further comprising:~~

~~a dryer for receiving the flue gas from the generator for dewatering the algae being harvested into dry algae powder.~~

~~11~~7. The gas recovery system as in claim 1, further comprising a storage system for storing and supplying the natural gas to the generator.

~~12~~8. The gas recovery system as in claim 1, further comprising:

a gas conditioning system interfacing the generator and the bioreactor for filtering and cooling flue gas being provided from the generator to the bioreactor.

~~13~~9. The gas recovery system as in claim 1, the downstream facility being one of a refrigeration facility and a HVAC system.

10~~4~~. A gas recovery method for plant cultivation, the gas recovery method comprising:

generating heat energy and flue gas by a generator from natural gas supplied thereto;

providing heat energy generated from the generator to a temperature conditioning system in thermal communication with the generator for one of chilling and heating water for conveyance to a downstream facility; ~~and~~

providing the flue gas from the generator to a bioreactor for cultivating plants therefrom, the flue gas comprising carbon dioxide (CO2);

cultivating algae by the bioreactor, the cultivated algae consuming the carbon dioxide in the flue gas being provided thereto, and fixating the carbon dioxide in the flue gas for generating biomass therefrom;

harvesting the algae being cultivated using at least one of a tray assembly, a flocculation and flotation system and a centrifuge for harvesting the algae being cultivated; and

dewatering the algae being harvested into dry algae powder by a dryer using the flue gas received from the generator.

115. The gas recovery method as in claim 104, further comprising:

generating electrical energy from the heat energy being generated thereby for provision to at least one of an energy storage system and an energy consuming system, the generator being one of a lean burn natural gas generator and a combined heat and power (CHP) generator.

126. The gas recovery method as in claim 115, the energy storage system being at least one of a battery array, a capacitor array, a water reservoir and a water pipe network for storing at least one of heat energy and electrical energy, and the temperature conditioning system being one of an adsorption chiller, a boiler and a hydronic boiler chiller.

~~17. The gas recovery method as in claim 14, further comprising:~~

~~cultivating algae by the bioreactor, the cultivated algae consuming the carbon dioxide in the flue gas being provided thereto, and fixating the carbon dioxide in the flue gas for generating biomass therefrom;~~

~~harvesting the algae being cultivated using at least one of a tray assembly, a flocculation and flotation system and a centrifuge for harvesting the algae being cultivated; and~~

~~dewatering the algae being harvested into dry algae powder by a dryer using the flue gas received from the generator.~~

138. The gas recovery method as in claim 104, the downstream facility being one of a refrigeration facility and a HVAC system.

1439. The gas recovery method as in claim 104, further comprising:

filtering and cooling flue gas being provided from the generator to the bioreactor using a gas conditioning system interfacing the generator and the bioreactor.