CLAIMS

1. A power generation system comprising:

a liquefied natural gas (LNG) regasification unit configured to perform a regasification process to regasify LNG supplied from an LNG source to produce natural gas, the regasification process producing cold energy;

a gas turbine configured to combust the natural gas to output power, the combusting producing an exhaust gas;

a thermal storage unit comprising at least one phase change material configured to store heat obtained from the exhaust gas; and

a Stirling engine configured to output power, the Stirling engine having a hot end heated by the heat stored in the thermal storage unit and operating around a melting temperature of the at least one phase change material and a cold end cooled by the cold energy from the regasification process,

wherein a heat exchanger of the regasification unit is embedded with the cold end of the Stirling engine.

2. The power generation system of claim 1, wherein the thermal storage unit is embedded with the hot end of the Stirling engine.

3. A method of power generation, the method comprising the steps of:

(a) regasifiying LNG in a regasification process to produce natural gas, the regasification process producing cold energy;

(b) combusting the natural gas in a gas turbine to output power, the combusting producing an exhaust gas;

(c) storing heat obtained from the exhaust gas in at least one phase change material in a thermal storage unit; and

(d) heating a hot end of a Stirling engine with the heat stored in the thermal storage unit, the hot end of the Stirling engine operating around a melting temperature of the at least one phase change material, and cooling a cold end of the Stirling engine with cold energy from the regasification process

to output power with the Stirling engine, wherein a heat exchanger of a regasification unit performing step (a) is embedded with the cold end of the Stirling engine.

4. The method of claim 3, further comprising directly spraying the cold end of the Stirling engine with LNG.

5. The method of claim 3, wherein the thermal storage unit has a temperature ranging from 220 °C. to 600 °C.

6. The method of claim 3, wherein heating the hot end of the Stirling engine with the heat stored in the thermal storage unit comprises a thermal fluid loop heating the hot end with heat from the at least one phase change material.

7. The method of claim 3, wherein in step (d), the thermal storage unit is embedded with the hot end of the Stirling engine.

8. The power generation system of claim 1, wherein the thermal storage unit has a temperature ranging from 220 °C. to 600 °C.

9. The power generation system of claim 1, wherein the hot end of the Stirling engine is heated by a thermal fluid loop with heat from the at least one phase change material.