CLAIMS:

1. A refrigeration system for a selected space, comprising:

a regeneration heat exchanger containing a volume of heat transfer fluid;

a cargo heat exchanger disposed at the selected space, the cargo heat exchanger fluidly connected to the regeneration heat exchanger to circulate the volume of heat transfer fluid therethrough, the selected space conditioned to a selected cargo temperature via thermal energy exchange between the heat transfer fluid and a flow of air at the selected space;

a fuel line extending through the regeneration heat exchanger and toward an engine, the fuel line directing a flow of fuel to the engine to power the engine, the flow of fuel regenerated via thermal energy exchange with the heat transfer fluid at the regeneration heat exchanger, the heat transfer fluid reaching a selected heat transfer fluid temperature via thermal exchange with the flow of fuel; and

a refrigerant circuit including:

a refrigerant heat exchanger disposed in the regeneration heat exchanger; and

a compressor fluidly connected to the refrigerant heat exchanger to circulate a flow of refrigerant through the refrigerant heat exchanger, the engine coupled to the compressor to drive the compressor, the heat transfer fluid reaching the selected heat transfer fluid temperature via thermal exchange with the flow of fuel and/or the flow of refrigerant.

2. The refrigeration system of Claim 1, wherein the refrigerant circuit is configured to be switchable into a reversed operation to increase a temperature of the heat transfer fluid.

3. The refrigeration system of Claim 1 or Claim 2, wherein the flow of fuel is one of liquefied natural gas or compressed natural gas.

4. The refrigeration system of any of Claims 1-3, wherein the heat transfer fluid is glycol.

5. The refrigeration system of any of Claims 1-4, further comprising one or more regulators disposed at the fuel line in the regeneration heat exchanger.

6. The refrigeration system of Claim 5, wherein thermal energy exchange between the heat transfer fluid and the one or more regulators at the regeneration heat exchanger prevents the temperature of the one or more regulators from falling below an operable regulator temperature.

7. The refrigeration system of any of Claims 1-5, further comprising one or more sensors at the regeneration heat exchanger to detect presence of the flow of fuel in the heat transfer fluid.

8. The refrigeration system of Claim 7, further comprising a fuel separator operably connected to the regeneration heat exchanger to separate the flow of fuel from the heat transfer fluid.

9. The refrigeration system of any of Claims 1-8, further comprising a fuel line heat exchanger disposed along the fuel line at the regeneration heat exchanger to aid in the thermal energy exchange between the flow of fuel and the heat transfer fluid.

10. The refrigeration system of any of Claims 1-9, wherein the selected space is a refrigerated cargo container.

11. A method of maintaining a selected space at a selected temperature comprising:

directing a flow of fuel through a regeneration heat exchanger and toward an engine, the regeneration heat exchanger containing a volume of heat transfer fluid;

regenerating the flow of fuel via thermal energy exchange with the heat transfer fluid, the heat transfer fluid conditioned to a selected fluid temperature;

directing at least a portion of the heat transfer fluid to a cargo heat exchanger disposed at the selected space;

exchanging thermal energy between the heat transfer fluid and a flow of supply air at the cargo heat exchanger to condition the supply air to a selected air temperature;

conveying the heat transfer fluid to the regeneration heat exchanger;

powering a compressor of a refrigerant circuit via the engine;

flowing a flow of refrigerant through the compressor to a refrigerant heat exchanger disposed at the regeneration heat exchanger; and

transferring thermal energy between the flow of refrigerant and the heat transfer fluid at the regeneration heat exchanger, conditioning the heat transfer fluid to the selected fluid temperature via the thermal energy exchange with the flow of refrigerant and/or the flow of fuel.

12. The method of Claim 11, wherein operation of the refrigerant circuit is reversed to increase a temperature of the heat transfer fluid.

13. The method of Claim 11 or Claim 12, wherein the flow of fuel is one of liquefied natural gas or compressed natural gas.

14. The method of any of Claims 11-13 further comprising flowing the flow of fuel through one or more regulators disposed at the fuel line in the regeneration heat exchanger.

15. The method of Claim 14, further comprising exchanging thermal energy between the heat transfer fluid and the one or more regulators at the regeneration heat exchanger to prevent the temperature of the one or more regulators from falling below an operable regulator temperature.

16. The method of any of Claims 11-15, further comprising directing the flow of fuel through a fuel line heat exchanger disposed along the fuel line at the regeneration heat exchanger to aid in the thermal energy exchange between the flow of fuel and the heat transfer fluid.

17. The method of any of Claims 11-16, wherein the selected space is a refrigerated cargo container.