Claims

~~What is claimed is:~~

1. A method for operating an engine, comprising:

providing a combustion chamber of the engine with a fuel;

starting the engine using the fuel;

starting a reformer, wherein the reformer is configured to reform at least some of the fuel;

transitioning from the provision of fuel to the combustion chamber to a provision of reformed fuel; ~~and~~

providing only reformed fuel to the combustion chamber; and

venting an excess of reformed fuel produced by the reformer, during the transitioning.

2. The method of claim 1, wherein the combustion chamber is a pre-combustion chamber.

3. The method of claim 1, wherein the transitioning is performed after the reformer has reached a catalytic auto-ignition temperature.

4. The method of claim 1, wherein the engine is an internal combustion engine.

5. The method of claim 1, wherein the fuel is natural gas.

6. The method of claim 1, wherein the reformer is a catalytic partial oxidation (CPOX) reformer.

7. A method for operating an engine, comprising:

operating a reformer to reform a fuel;

supplying a first portion of the reformed fuel to a combustion chamber of the engine during engine operation;

venting a second portion of the reformed fuel at a venting location; wherein the first portion and the second portion are supplied to the respective combustion chamber and the venting location at a first ratio;

changing an engine operating condition; and

supplying the first portion and the second portion to the respective combustion chamber and venting location at a second ratio in response to the change in the engine operating condition.

8. The method of claim 7, wherein the combustion chamber is a pre-combustion chamber.

9. The method of claim 7, wherein the engine is an internal combustion engine.

10. The method of claim 7, wherein the fuel is natural gas.

11. The method of claim 7, wherein no reformed fuel is supplied to the venting location at or above a selected engine operating point.

12. The method of claim 11, wherein the selected engine operating point is a maximum power operating point.

13. The method of claim 7, wherein the reformer is a catalytic partial oxidation (CPOX) reformer.

~~14. An engine system, comprising:~~

~~an engine;~~

~~a compressor operative to pressurize an oxidant;~~

~~a reformer in fluid communication with the compressor and a source of fuel, wherein the reformer is configured to receive the oxidant and fuel received from the source of fuel, and to reform the fuel;~~

~~a cooler in fluid communication with the reformer and configured to reduce the temperature of the reformed fuel output by the reformer; and~~

~~a combustion chamber of the engine in fluid communication with the cooler, wherein the combustion chamber is configured to receive the cooled reformed fuel from the cooler.~~

~~15. The engine system of claim 14, wherein the reformer is a catalytic partial oxidation (CPOX) reformer.~~

~~16. The engine system of claim 14, wherein the combustion chamber is a pre-combustion chamber.~~

17. The engine system of claim 14, wherein the engine is a piston engine.

18. The engine system of claim 14, further comprising an engine air intake, wherein the compressor is configured to increase the pressure of the oxidant to above the pressure at the engine air intake.

19. The engine system of claim 14, further comprising an engine air intake and a valve in fluid communication between the reformer and the air intake, wherein the valve is configured to control an amount of flow of the reformed fuel to the combustion chamber by venting a portion of the reformed fuel to the air intake.

20. The engine system of claim 19, wherein the valve is configured to increase a vented amount of the reformed fuel in response to a decrease in engine power output; and wherein the valve is configured to decrease a vented amount of the reformed fuel in response to an increase in engine power output.

21. The engine system of claim 14, further comprising a valve configured to control an amount of fuel supplied to the reformer.

22. The engine system of claim 20, further comprising a temperature sensor configured to sense the temperature of the reformed fuel exiting the reformer, wherein

~~the valve is configured to control the amount of fuel supplied based on the temperature of the reformed fuel exiting the reformer.~~

~~23. The engine system of claim 14, further comprising a valve system configured to transition between 100% unreformed fuel and 0% reformed fuel supplied to the combustion chamber and 0% unreformed fuel and 100% reformed fuel supplied to the combustion chamber.~~

~~24. The engine system of claim 14, wherein the reformer includes a catalyst, further comprising a heating system configured to heat the catalyst to a catalytic auto-ignition temperature prior to, during or after startup of the engine.~~

~~25~~14. An engine system, comprising:

an engine;

a reformer configured to receive an oxidant and a fuel and to reform the fuel using the oxidant;

a combustion chamber of the engine in fluid communication with the reformer, wherein reformed fuel is received into the combustion chamber; and

a valve system configured to transition between 100% unreformed fuel and 0% reformed fuel supplied to the combustion chamber and 0% unreformed fuel and 100% reformed fuel supplied to the combustion chamber.

~~26~~15. An engine system, comprising:

an engine;

a reformer configured to receive an oxidant and a fuel and to reform the fuel using the oxidant;

a combustion chamber of the engine in fluid communication with the reformer, wherein reformed fuel is received into the combustion chamber;

an engine air intake; and

a valve in fluid communication between the reformer and the air intake, wherein the valve is configured to control an amount of flow of the reformed fuel to the combustion chamber by venting a portion of the reformed fuel.

~~27~~16. The engine system of claim ~~26~~15, wherein the valve is configured to increase a vented amount of the reformed fuel in response to a decrease in engine power output; and wherein the valve is configured to decrease a vented amount of the reformed fuel in response to an increase in engine power output.