CLAIMS

1. An integrated system comprising:
a gas turbine system comprising a combustion chamber configured to combust one or more oxidants and one or more fuels in the presence of a compressed recycle stream, wherein the combustion chamber directs a first discharge stream to an expander to generate a gaseous exhaust stream and at least partially drive a main compressor;
an inlet compressor configured to compress the one or more oxidants to generate a compressed oxidant stream and direct the compressed oxidant stream to the combustion chamber; and
an exhaust gas recirculation system, wherein the main compressor compresses the gaseous exhaust stream and thereby generates the compressed recycle stream;
wherein a variable portion of the gaseous exhaust stream is diverted from the exhaust gas recirculation system and combined with the one or more oxidants to form a combined oxidant-exhaust stream that is directed to the combustion chamber, wherein the combined oxidant-exhaust stream has an oxygen component suitable to achieve substantially stoichiometric reaction conditions with the one or more fuels in the combustion chamber; and
wherein the combustion chamber is configured to separately receive the combined oxidant-exhaust stream, the one or more fuels and the compressed recycle stream to create reaction conditions in the combustion chamber that are stoichiometric or substantially stoichiometric.

2. The integrated system of claim 1, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is combined with the one or more oxidants upstream of the inlet compressor.

3. The integrated system of claim 1, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is combined with the compressed oxidants stream downstream of the inlet compressor before the compressed oxidants stream enters the combustion chamber.

4. The integrated system of claim 1, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is extracted from the main compressor and injected into the inlet compressor.

5. The integrated system of claim 4, wherein the main compressor comprises two or more stages and the gaseous exhaust stream is extracted from the main compressor between stages.

6. The integrated system of claim 4, wherein the inlet compressor comprises two or more stages and the gaseous exhaust stream is injected into the inlet compressor between stages.

7. The integrated system of claim 1, wherein the exhaust gas recirculation system comprises at least one cooling unit configured to receive and cool the gaseous exhaust stream and at least one blower configured to receive and increase the pressure of the gaseous exhaust stream before directing a cooled recycle gas to the main compressor.

8. The integrated system of claim 7, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is diverted from the gaseous exhaust stream flowing from the at least one blower to the at least one cooling unit.

9. The integrated system of claim 1, further comprising one or more ratio controllers configured to adjust the flow of the combined oxidant-exhaust stream and the one or more fuels into the combustion chamber to maintain a fixed ratio of oxidant to fuel.

10. The integrated system of claim 1, further comprising one or more cooling devices configured to cool the one or more oxidants before introduction to the inlet compressor to generate a cooled oxidant.

11. The integrated system of claim 10, further comprising a separator configured to receive the cooled oxidant from the one or more cooling devices and remove water droplets from the cooled oxidant before introduction to the inlet compressor.

12. The integrated system of claim 10, wherein the one or more cooling devices is a heat exchanger using a refrigerant as a cooling fluid.

13. A method of generating power, comprising:
compressing one or more oxidants in an inlet compressor to form a compressed oxidant stream;
combusting the compressed oxidant stream and at least one fuel in a combustion chamber in the presence of a compressed recycle exhaust gas, thereby generating a discharge stream;
expanding the discharge stream in an expander to at least partially drive a main compressor and generate a gaseous exhaust stream;
directing the gaseous exhaust stream to an exhaust gas recirculation system, wherein the main compressor compresses the gaseous exhaust stream and thereby generates a compressed recycle stream; and
diverting a variable portion of the gaseous exhaust stream from the exhaust gas recirculation system and combining a diverted portion of the exhaust gas with the one or more oxidants to form a combined oxidant-exhaust stream that is directed to the combustion chamber, wherein the combustion chamber is configured to separately receive the combined oxidant-exhaust stream, one or more fuels and the compressed recycle stream to create reaction conditions in the combustion chamber that are stoichiometric or substantially stoichiometric.

14. The method of claim 13, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is combined with the one or more oxidants upstream of the inlet compressor.

15. The method of claim 13, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is combined with the compressed oxidants downstream of the inlet compressor before the compressed oxidants enter the combustion chamber.

16. The method of claim 13, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is extracted from the main compressor and injected into the inlet compressor.

17. The method of claim 16, wherein the main compressor comprises two or more stages and the gaseous exhaust stream is extracted from the main compressor between stages.

18. The method of claim 16, wherein the inlet compressor comprises two or more stages and the gaseous exhaust stream is injected into the inlet compressor between stages.

19. The method of claim 13, wherein the exhaust gas recirculation system comprises at least one cooling unit and at least one blower, such that the gaseous exhaust stream is cooled in at the least one cooling unit and the pressure of the gaseous exhaust stream is increased in the at least one blower, thereby generating a cooled recycle gas directed to the main compressor.

20. The method of claim 19, wherein the variable portion of the gaseous exhaust stream diverted from the exhaust gas recirculation system is diverted from the gaseous exhaust stream flowing from the at least one blower to the at least one cooling unit.

21. The method of claim 13, further comprising adjusting the flow of the combined oxidant-exhaust stream and the one or more fuels into the combustion chamber to maintain a fixed ratio of oxidant to fuel.

22. The method of claim 21, wherein the flow of the oxidant-exhaust stream and the one or more fuels are adjusted by a ratio controller.

23. The method of claim 13, further comprising cooling the one or more oxidants before introduction to the inlet compressor to generate a cooled oxidant stream.

24. The method of claim 23, further comprising removing water droplets from the cooled oxidant stream before introduction to the inlet compressor.

25. The method of claim 23, wherein the one or more oxidants are cooled with a heat exchanger using a refrigerant as a cooling fluid.