CLAIMS:

1. A method for performing reforming, comprising: reacting a fuel mixture comprising a fuel stream, an oxygen-containing stream comprising 15 vol% or less N_2 relative to a volume of the oxygen-containing stream, and a recycle stream under combustion conditions comprising a combustion pressure of 0.7 MPa-g or more in a combustion zone within a reactor to form a flue gas and to heat one or more surfaces in a reaction zone to a regenerated surface temperature of 600°C or more, the reaction zone comprising a catalyst composition, the fuel mixture comprising 0.1 vol% or more O_2 and 20 vol% or more CO_2 relative to a volume of the fuel mixture; separating the flue gas to form at least a CO_2-containing stream comprising a second pressure of 0.7 MPa-g or more and the recycle stream; and exposing a hydrocarbon-containing stream to the catalyst composition in the reaction zone at the regenerated surface temperature under reforming conditions to form a reforming product stream comprising H_2 and CO, a direction of flow for the hydrocarbon-containing stream within the reaction zone being reversed relative to a direction of flow for the fuel mixture.

2. The method of claim 1, wherein the combustion conditions comprise a combustion pressure of 1.4 MPa-g or more; or wherein the second pressure is 1.4 MPa-g or more; or a combination thereof.

3. The method of any of the above claims, wherein the combustion conditions comprise a combustion pressure of 3.4 MPa-g or more; or wherein the second pressure is 3.4 MPa-g or more; or a combination thereof.

4. The method of any of the above claims, further comprising compressing the flue gas prior to separating the flue gas to form at least the CO_2-containing stream and the recycle stream.

5. The method of any of the above claims, further comprising: exposing the reforming product stream to water gas shift reaction conditions to form a shifted synthesis gas product stream; and separating the shifted synthesis gas product stream to form a H_2-containing stream and a stream comprising CO_2, the shifted synthesis gas stream optionally comprising a molar ratio of H_2 to CO of less than 10.

6. The method of claim 5, wherein the shifted synthesis gas product stream is separated by pressure swing adsorption, wherein the stream comprising CO_2 comprises a tail gas comprising 5.0 vol% or more of CO relative to a volume of the stream comprising CO_2, and wherein the fuel mixture comprises at least a portion of the stream comprising CO_2.

7. The method of any of the above claims, a) wherein at least one of the recycle stream and the fuel stream comprises 15 vol% or less of N_2; or b) wherein the method further comprises separating air in an air separation unit to form the oxygen-containing stream; or c) a combination of a) and b).

8. The method of any of the above claims, wherein the fuel stream, the oxygen-containing stream, and the recycle stream are combined to form the fuel mixture prior to entering the reactor, or wherein the fuel stream, the oxygen-containing stream, and the recycle stream are combined to form the fuel mixture prior to entering the combustion zone, or a combination thereof.

9. The method of any of the above claims, wherein the recycle stream comprises 25 vol% or more CO_2.

10. The method of any of the above claims, wherein the fuel mixture comprises 2.0 vol% or more of CO.

11. The method of any of the above claims, wherein the regenerated surface temperature is 800°C or more.

12. The method of any of the above claims, further comprising separating the CO_2-containing stream to form a stream containing water and a CO_2-enriched stream comprising a CO_2-content of 80 vol% or more; and compressing the CO_2-enriched stream to a pressure of 7.0 MPa-g or more relative to a pressure of the CO_2-enriched stream.

13. The method of any of the above claims, wherein the combustion conditions comprise a laminar flame speed of 100 cm/s or less.