CLAIMS

1. A point-of-sale fuel dispensing system comprising:

a market fuel storage tank;

a pump assembly comprising:

a customer interface for retail payment and fuel grade selection; and

a nozzle configured to provide selective fluid coupling to a fuel supply port of a vehicle that is situated adjacent the pump assembly;

fuel conduit cooperative with the pump assembly and the market fuel storage tank to provide selective fluid communication between the pump assembly and the market fuel storage tank;

a separation unit configured to selectively receive and convert at least a portion of a market fuel into an octane-rich fuel component and a cetane-rich fuel component;

a plurality of enriched fuel product tanks disposed fluidly intermediate the separation unit and the pump assembly, the plurality of enriched fuel product tanks comprising:

a first enriched fuel product tank for selectively receiving and containing the octane-rich fuel component; and

a second enriched fuel product tank for selectively receiving and containing the cetane-rich fuel component; and

a controller cooperative with at least one of the market fuel storage tank, pump assembly, fuel conduit, separation unit and first and second enriched fuel product tanks to direct the flow of at least a portion of at least one of the octane-rich fuel component and the cetane-rich fuel component contained within a respective one of the first and second product tanks through the nozzle based on user input at the customer interface for both retail payment and fuel grade selection for the vehicle, wherein the directed flow does not exceed a fuel storage capacity of the vehicle.

2. The point-of-sale fuel dispensing system of claim 1, wherein the separation unit is selected from the group consisting of a membrane-based separation unit, an extractive-based separation unit, a volatility-based separation unit and combinations thereof.

3. The point-of-sale fuel dispensing system of claim 2, wherein the separation unit comprises a plurality of sub-units comprising a membrane-based sub-unit and an extractive-based sub-unit.

4. The point-of-sale fuel dispensing system of claim 3, wherein the membrane-based sub-unit is configured to provide at least a majority of the cetane-rich fuel component and the extractive-based sub-unit is configured to provide at least a majority of the octane-rich fuel component.

5. The point-of-sale fuel dispensing system of claim 1, further comprising a fuel pressurizing device cooperative with at least one of the market fuel storage tank, pump assembly and the fuel conduit in order to provide an increase in pressure to a market fuel that is contained within at least one of the market fuel storage tank, pump assembly and fuel conduit.

6. The point-of-sale fuel dispensing system of claim 5, wherein the fuel pressurizing device comprises a pump that is adapted to receive electric power from a renewable energy source.

7. The point-of-sale fuel dispensing system of claim 6, wherein the renewable energy source cooperates with the pump to deliver solar energy to at least one photovoltaic cell that is electrically coupled to an electric motor that is rotationally coupled to an impeller within the pump.

8. The point-of-sale fuel dispensing system of claim 6, wherein the renewable energy source cooperates with the pump to deliver wind energy to an electric motor that is rotationally coupled to an impeller within the pump.

9. The point-of-sale fuel dispensing system of claim 6, wherein the renewable energy source cooperates with the pump to deliver geothermal energy to at least one

solar cell that is electrically coupled to an electric motor that is rotationally coupled to an impeller within the pump.

10. The point-of-sale fuel dispensing system of claim 6, wherein the renewable energy source cooperates with the pump to deliver hydroelectric energy to power an electric motor that is rotationally coupled to an impeller within the pump.

11. The point-of-sale fuel dispensing system of claim 6, wherein the renewable energy source cooperates with the pump to deliver biomass energy to power an electric motor that is rotationally coupled to an impeller within the pump.

12. The point-of-sale fuel dispensing system of claim 6, wherein the fuel pressurizing device comprises a pump that is powered by a non-renewable energy source.

13. The point-of-sale fuel dispensing system of claim 12, wherein the non-renewable energy source cooperates with the pump to deliver energy produced by the operation of an internal combustion engine that is rotationally coupled to an impeller within the pump.

14. The point-of-sale fuel dispensing system of claim 12, wherein the non-renewable energy source cooperates with the pump to deliver electrical energy produced by the operation of an electric power generating station where electric current delivered from the electric power generating station operates an electric motor that is rotationally coupled to an impeller within the pump.

15. The point-of-sale fuel dispensing system of claim 12, further comprising a battery electrically coupled to at least one of the fuel pressurizing device and an energy source such that electrical energy in excess of that needed for operation of the fuel pressurizing device may be stored in the battery.

16. The point-of-sale fuel dispensing system of claim 1, wherein the fuel conduit

and pump assembly are configured to deliver no more than about fifteen gallons of fuel per minute to the vehicle.

17. The point-of-sale fuel dispensing system of claim 1, further comprising a plurality of sensors cooperative with the controller such that operational parameters associated with the fuel dispensing system that are acquired by the plurality of sensors are acted upon by the controller to provide additional operational control of the fuel dispensing system.

18. The point-of-sale fuel dispensing system of claim 1, further comprising:

a supply of an octane booster in selective fluid communication with the first and second enriched fuel product tanks through the fuel conduit; and

a supply of a cetane booster in selective fluid communication with the first and second enriched fuel product tanks through the fuel conduit.

19. The point-of-sale fuel dispensing system of claim 18, further comprising a mixer fluidly disposed between a respective one of (a) the supply of an octane booster and the supply of a cetane booster and (b) the first and second enriched fuel product tanks through the fuel conduit.

20. The point-of-sale fuel dispensing system of claim 19, wherein the supply of an octane booster comprise selected from the group consisting of an oxygenate and an aromatic.

21. The point-of-sale fuel dispensing system of claim 19, further comprising an additional market fuel storage tank such that a second market fuel contained within the additional market fuel storage tank may be selectively blended with at least one of the octane-rich fuel component and the cetane-rich fuel component prior to the blended fuel being conveyed through the pump assembly.

22. The point-of-sale fuel dispensing system of claim 21, further comprising a network of selective separator units configured to perform at least one of oxygenate

separation and aromatics separation of the market fuel being conveyed from at least one of the market fuel storage tanks prior to delivery to the pump assembly.

23. A system for retail point-of-sale fuel dispensing, the system comprising:

a pump assembly comprising:

a customer interface for retail payment and fuel grade selection; and

a nozzle configured to provide selective fluid coupling to a fuel supply port of a vehicle that is situated adjacent the pump assembly;

fuel conduit configured to convey at least a portion of fuel contained within a market fuel storage tank to at least the pump assembly;

a separation unit configured to selectively receive and convert at least a portion of the fuel into an octane-rich fuel component and a cetane-rich fuel component; and

a plurality of enriched fuel product tanks disposed fluidly intermediate the separation unit and the pump assembly, the plurality of enriched fuel product tanks comprising:

a first enriched fuel product tank for selectively receiving and containing the octane-rich fuel component; and

a second enriched fuel product tank for selectively receiving and containing the cetane-rich fuel component.

24. The system of claim 23, further comprising:

a plurality of sensors configured to acquire operational parameters associated with the pump assembly; and

a controller cooperative with the plurality of sensors and at least one of the fuel conduit, separation unit and first and second enriched fuel product tanks to direct the flow of at least a portion of at least one of the octane-rich fuel component and the cetane-rich fuel component contained within a respective one of the first and second product tanks through the nozzle based on user input at the customer interface for both retail payment and fuel grade selection for the vehicle, wherein the directed flow does not exceed a fuel storage capacity of the vehicle.