CLAIMS

What is claimed is:

1. A method of making a blended fuel composition comprising: blending a plastic pyrolysis oil with a blendstock fuel to produce a blended fuel composition, wherein the blended fuel composition comprises 1 vol% to 20 vol% of the plastic pyrolysis oil and 80 vol% to 99 vol% of the blendstock fuel, and wherein a combination of the plastic pyrolysis oil and the blendstock fuel is selected from the group consisting of:

i) a naphtha fraction of the plastic pyrolysis total liquid product and gasoline wherein the naphtha fraction of the plastic pyrolysis total liquid product is a hydrocarbon composition having an initial boiling point (ASTM D2887-19a using a 15-theoretical plate column and 5:1 flux ratio to obtain the distillation curve) of -6°C to 193°C and having a density in the range of from 0.70 g/mL to 0.75 g/mL;

ii) a distillate fraction of the plastic pyrolysis total liquid product and diesel, wherein the distillate fraction is a hydrocarbon composition having an initial boiling point (ASTM D2887-19a using a 15-theoretical plate column and 5:1 flux ratio to obtain the distillation curve) of 193ºC to 371ºC;

iii) the distillate fraction of the plastic pyrolysis total liquid product and a marine fuel, wherein the distillate fraction is a hydrocarbon composition having an initial boiling point (ASTM D2887-19a using a 15-theoretical plate column and 5:1 flux ratio to obtain the distillation curve) of 193ºC to 371ºC;

iv) a heavy pyrolysis fuel fraction of the plastic pyrolysis total liquid product and the marine fuel, wherein the heavy pyrolysis fuel fraction of the plastic pyrolysis total liquid product has a Calculated Carbon Aromaticity Index (CCAI) of 750 to 870 (as determined according to equation F.1 in ISO 8217:2012); and,

v) the plastic pyrolysis total liquid product and the marine fuel.

2. The method of claim 1, wherein the plastic pyrolysis oil is the plastic pyrolysis total liquid product, and wherein the plastic pyrolysis total liquid product has one or more of the following properties: (a) a density of 0.75 g/mL to 0.90 g/mL; (b) a sulfur content of 100 ppm or less; (c) a kinematic viscosity at 50°C of 1.0 mm^2/s to 3.0 mm^2/s; and (d) a kinematic viscosity at 100°C of 0.5 mm^2/s to 2.5 mm^2/s.

3. The method of claim 2, wherein the combination is the plastic pyrolysis total liquid product and the marine fuel, and wherein the blended fuel composition has one or more of the

following properties: (a) a density of 0.88 g/mL to 1.1 g/mL; (b) a sulfur content of 3 wt% or less; (c) a CCAI of 750 to 870; and (d) a kinematic viscosity at 50°C of 5 mm^2/s to 700 mm^2/s.

4. The method of claim 1, wherein the naphtha fraction of the plastic pyrolysis total liquid product has a sulfur content of 100 ppm or less.

5. The method of claim 4, wherein the combination is the naphtha fraction of the plastic pyrolysis total liquid product and the gasoline, and wherein the blended fuel composition has one or more of the following properties: (a) a density of 0.7 g/mL to 0.75 g/mL; and (b) a sulfur content of 100 ppm or less.

6. The method of claim 1, wherein the distillate fraction of the plastic pyrolysis oil is the plastic pyrolysis total liquid product, and wherein the distillate fraction has one or more of the following properties: (a) a density of 0.70 g/mL to 0.85 g/mL; (b) a sulfur content of 100 ppm or less; (c) a cetane index of 40 to 80; (d) a kinematic viscosity at 40°C of 0.75 mm^2/s to 4.5 mm^2/s; and (e) a kinematic viscosity at 100°C of 0.25 mm^2/s to 2.25 mm^2/s.

7. The method of claim 6, wherein the combination is the distillate fraction of the plastic pyrolysis total liquid product and the diesel, and wherein the blended fuel composition has one or more of the following properties: (a) a density of 0.8 g/mL to 0.87 g/mL; (b) a sulfur content of 0.002 wt% or less; (c) a cetane index of 40 to 60; and (d) a kinematic viscosity at 50°C of 1.5 mm^2/s to 4.0 mm^2/s.

8. The method of claim 6, wherein the combination is the distillate fraction of the plastic pyrolysis total liquid product and the marine fuel, and wherein the blended fuel composition has one or more of the following properties: (a) a density of 0.88 g/mL to 1.1 g/mL; (b) a sulfur content of 3 wt% or less; (c) a CCAI of 750 to 870; and (d) a kinematic viscosity at 50°C of 5 mm^2/s to 700 mm^2/s.

9. The method of claim 1, wherein the heavy pyrolysis fuel fraction of the plastic pyrolysis oil is the plastic pyrolysis total liquid product, and wherein the heavy pyrolysis fuel fraction has one or more of the following properties: (a) a density of 0.70 g/mL to 0.90 g/mL; (b) a sulfur content of 150 ppm or less; (c) a CCAI of 750 to 870; and (d) a kinematic viscosity at 50°C of 3 mm^2/s to 20 mm^2/s.

10. The method of claim 9, wherein the combination is the heavy pyrolysis fuel fraction of the plastic pyrolysis total liquid product and the marine fuel, and wherein the blended fuel composition has one or more of the following properties: (a) a density of 0.88 g/mL to 1.1 g/mL; (b) a sulfur content of 3 wt% or less; (c) a CCAI of 750 to 870; and (d) a kinematic viscosity at 50°C of 5 mm^2/s to 700 mm^2/s.

11. A blended fuel composition comprising: 1 vol% to 20 vol% of a plastic pyrolysis oil and 80 vol% to 99 vol% of the blendstock fuel, and wherein a combination of the plastic pyrolysis oil and the blendstock fuel is selected from the group consisting of:

i) a naphtha fraction of the plastic pyrolysis total liquid product and gasoline, wherein the naphtha fraction of the plastic pyrolysis total liquid product is a hydrocarbon composition having an initial boiling point (ASTM D2887-19a using a 15-theoretical plate column and 5:1 flux ratio to obtain the distillation curve) of -6ºC to 193ºC and having a density in the range of from 0.70 g/mL to 0.75 g/mL;

ii) a distillate fraction of the plastic pyrolysis total liquid product and diesel, wherein the distillate fraction is a hydrocarbon composition having an initial boiling point (ASTM D2887-19a using a 15-theoretical plate column and 5:1 flux ratio to obtain the distillation curve) of 193ºC to 371ºC;

iii) the distillate fraction of the plastic pyrolysis total liquid product and a marine fuel, wherein the distillate fraction is a hydrocarbon composition having an initial boiling point (ASTM D2887-19a using a 15-theoretical plate column and 5:1 flux ratio to obtain the distillation curve) of 193ºC to 371ºC;

iv) a heavy pyrolysis fuel fraction of the plastic pyrolysis total liquid product and the marine fuel, wherein the heavy pyrolysis fuel fraction of the plastic pyrolysis total liquid product has a Calculated Carbon Aromaticity Index (CCAI) of 750 to 870 (as determined according to equation F.1 in ISO 8217:2012); and

v) the plastic pyrolysis total liquid product and the marine fuel.

12. The blended fuel composition of claim 11, wherein the plastic pyrolysis oil is the plastic pyrolysis total liquid product, and wherein the plastic pyrolysis total liquid product has one or more of the following properties: (a) a density of 0.75 g/mL to 0.90 g/mL; (b) a sulfur content of 100 ppm or less; (c) a kinematic viscosity at 50°C of 1.0 mm^2/s to 3.0 mm^2/s; and (d) a kinematic viscosity at 100°C of 0.5 mm^2/s to 2.5 mm^2/s.

13. The blended fuel composition of claim 12, wherein the combination is the plastic pyrolysis total liquid product and the marine fuel, and wherein the blended fuel composition has one or more of the following properties: (a) a density of 0.88 g/mL to 1.1 g/mL; (b) a sulfur content of 3 wt% or less; (c) a CCAI of 750 to 870; and (d) a kinematic viscosity at 50°C of 5 mm^2/s to 700 mm^2/s.

14. The blended fuel composition of claim 11, wherein the naphtha fraction of the plastic pyrolysis total liquid product has a sulfur content of 100 ppm or less.

15. The blended fuel composition of claim 11, wherein the combination is the naphtha fraction of the plastic pyrolysis total liquid product and the gasoline, and wherein the blended fuel composition has one or more of the following properties: (a) a density of 0.7 g/mL to 0.75 g/mL; and (b) a sulfur content of 100 ppm or less.