CLAIMS

What is claimed is:

1. A continuous process for converting waste plastic comprising:

(a) selecting waste plastics containing polyethylene and/or polypropylene;

(b) passing the waste plastics from (a) through a pyrolysis reactor to thermally crack at least a portion of the polyolefin waste and produce a pyrolyzed effluent;

(c) separating the pyrolyzed effluent into offgas, char and a pyrolysis oil comprising a naphtha/diesel fraction and a heavy fraction;

(d) passing the pyrolysis oil to a refinery FCC unit, with the volume flow of the pyrolysis oil to the FCC unit comprising up to but no more than 50 volume % of total hydrocarbon flow to the refinery FCC unit, wherein the pyrolysis oil is first passed to a FCC feed preheater unit before the refinery FCC unit, and wherein the FCC feed preheater comprises a bimetallic NiMo or CoMo catalyst;

(e) recovering a liquid petroleum gas C_4 olefin/paraffin mixture fraction comprising butanes and butenes from the FCC unit; and

(f) passing the liquid petroleum gas C_4 olefin/paraffin mixture fraction to an alkylation unit.

2. The process of claim 1, wherein a gasoline and heavy fraction is recovered from the refinery FCC unit.

3. The process of claim 1, wherein an alkylate gasoline fraction is recovered from the refinery alkylation unit.

4. The process of claim 2, wherein the gasoline recovered from the refinery FCC unit is combined with an alkylate gasoline fraction recovered from the alkylation unit.

5. The process of claim 1, wherein at least some contaminants are removed from the recovered pyrolysis oil of step (c) before the oil is passed to the FCC unit in (d).

6. The process of claim 1, wherein the waste plastics selected in (a) are from plastics classification group 2, 4, and/or 5.

7. The process of claim 4, wherein the amount of gasoline produced by the FCC and alkylation units is increased with recycled pyrolysis oil.

8. The process of claim 1, further comprising collecting a C_3 olefin/paraffin mixture fraction from the FCC unit and passing the fraction to a steam cracker for ethylene production.