CLAIMS

1. A process for treating a fines stream in a material recover facility (MRF), comprising:

    providing the fines stream comprising:

        breakable material comprising glass, ceramics, drywall, shingles, rocks and/or aggregates; and

        ductile material comprising plastics;

    providing a kinetic pulverizer comprising a pulverizing rotor assembly disposed within an interior chamber, wherein the pulverizing rotor assembly is configured to rotate to form vortices that subject the fines stream to self-collisions within the interior chamber;

    subjecting the fines streams to a one-pass kinetic pulverization stage wherein the fines stream is fed into the kinetic pulverizer to produce a pulverized material comprising a size-reduced fraction derived from the breakable material and an oversized fraction derived from the ductile material;

    withdrawing the pulverized material from the kinetic pulverizer; and

    subjecting the pulverized material to separation to produce a size-reduced stream and an oversized stream.

2. The process of claim 1, wherein the fines stream is one of: derived from municipal solid waste (MSW) or source separated recyclables, and a compost overs stream.

3. The process of claim 1 or 2, wherein the fines stream has a moisture content between 10% and 50% or between 15% and 40% upon entry into the kinetic pulverizer.

4. The process of any one of claims 1 to 3, wherein the fines stream is not subjected to a drying stage upstream of the kinetic pulverization stage.

5. The process of any one of claims 1 to 4, wherein at least one of:
- the kinetic pulverization stage effects water removal on the fines stream such that the water removal is between 5% and 8% in the kinetic pulverization stage; and

- the kinetic pulverization stage and the separation enable the size-reduced stream to have a moisture content that is 5% to 30% lower than that of the fines stream.

6. The process of any one of claims 1 to 5, wherein the kinetic pulverization stage effects pathogen reduction on the fines stream via air stripping.

7. The process of any one of claims 1 to 6, further comprising incorporating a friable additive into the fines stream such that the friable additive is size reduced and is homogenized with the breakable material to form part of the size-reduced fraction.

8. The process of any one of claims 1 to 7, wherein the separation stage comprises screening.

9. The process of claim 8, wherein the screening is performed using a trommel screen and/or a vibrating screen.

10. The process of any one of claims 1 to 9, further comprising:

    monitoring at least one feed parameter of the fines stream and/or output parameter of the pulverized material, the oversized stream and/or the size-reduced stream; and

    adjusting the one-pass kinetic pulverization stage based on the feed parameter and/or the output parameter.

11. The process of claim 10, wherein at least one of:
- the at least one feed parameter comprises feed rate of the fines stream and/or composition of the fines stream;

- the at least one output parameter comprises size properties of the sized-reduced fraction in the pulverized stream, composition of the pulverized stream, flow rate of the oversized stream, flow rate of the sized-reduced stream, composition of the oversized stream, and/or composition of the sized-reduced stream; and

- the adjusting of the one-pass kinetic pulverization stage comprises at least one of:
    adjusting the rotation speed; and

    adjusting the infeed rate of the fines stream.

12. The process of any one of claims 1 to 11, wherein the fines stream is substantially composed of material having a maximum size of 2 or 4 inches.

13. The process of any one of claims 1 to 12, wherein the fines stream comprises between 40% and 60% glass, and the size-reduced stream is composed of over 95%, 96%, 97%, 98% or 99% glass.

14. The process of any one of claims 1 to 12, wherein the fines stream comprises between 50% and 70% organics, and the size-reduced stream is composed substantially of organics with at most 0.5-2% visible contaminants with a size above 4mm.

15. The process of any one of claims 1 to 12, wherein the fines stream comprises compost overs and wherein the size-reduced stream is composed substantially of organics with at most 0.5-2% visible contaminants with a size above 4mm.

16. The process of any one of claims 1 to 12, further comprising at least one of:
- subjecting the fines stream to magnetic separation to remove ferrous metal therefrom and produce a metal depleted feed stream that is fed to the one-pass kinetic pulverization stage; and

- subjecting the pulverized material to a dust collection stage to recover a dust fraction therefrom and produce a dust reduced pulverized stream that is fed to the separation to produce the size-reduced stream and the oversized stream.

17. The process of claim 16, wherein the dust collection stage comprises:

a dust collector coupled with respect to an outlet of the one-pass kinetic pulverization stage or with respect to a solids transport device configured for transporting the pulverized material away from the one-pass kinetic pulverization stage; and

a dust recovery unit coupled to the dust collector and configured to cause separation of the dust and transport of the dust fraction from the dust collector to a storage vessel.

18. The process of claim 17, wherein at least one of:
- the dust collector comprises a settling chamber;

- the dust recovery unit comprises a baghouse that is in fluid communication via ducting with the settling chamber;

- the dust recovery unit comprises a cyclone that is in fluid communication via ducting with the settling chamber;

- the solids transport device comprises a conveyor; and

- the dust collector surrounds the solids transport device along a majority of a length thereof.

19. A system comprising:

a kinetic pulverizer configured to receive and process a fines stream comprising a breakable material and a ductile material to produce a pulverized material comprising a size-reduced fraction derived from the breakable material and an oversized fraction derived from the ductile material, wherein the kinetic pulverizer comprises a pulverizing rotor assembly disposed within an interior chamber that is configured to rotate to form vortices that subject the fines stream to self-collisions within the interior chamber;

a pulverizer conveyor configured to transport the pulverized material downstream; and

a screen operatively coupled to the pulverizer conveyor and configured to receive the pulverized stream and produce a sized-reduced stream comprising the breakable material and an oversized stream comprising the ductile material.

20. The system of claim 19, further comprising at least one of:

a monitoring unit configured for monitoring at least one feed parameter of the fines stream and/or output parameter of the pulverized material, the oversized stream and/or the size-reduced stream and

a control unit coupled to the monitoring unit and configured for adjusting the kinetic pulverizer based on the feed parameter and/or the output parameter;

a magnetic separator to remove ferrous metal from the fines stream and produce a metal depleted feed stream that is fed to the kinetic pulverizer; and

a dust collection unit configured to recover a dust fraction from the pulverized material and produce a dust reduced pulverized stream that is fed to the screen.