## CLAIMS

1. A gas product manufacturing system, comprising:

at least one first waste source configured to provide a first waste product, the first waste product including at least one solvent and one or more of at least one inorganic material or at least one organic material;

at least one heated enclosed vessel including at least one vessel inlet in fluid communication with the first waste source, the at least one heated enclosed vessel configured to form a liquid phase and a vapor phase of the first waste product, the at least one heated enclosed vessel including at least one first vessel outlet positioned and equipped to output the liquid phase and at least one second vessel outlet positioned and equipped to output the vapor phase; and

at least one thermal processing system including at least one first processing inlet in fluid communication with the at least one first vessel outlet and at least one second processing inlet in fluid communication with the at least one second vessel outlet, the at least one thermal processing system configured to heat the liquid phase of the first waste product and the vapor phase of the first waste product to form at least one gas product.

2. The gas product manufacturing system of claim 1, wherein the at least one solvent of the first waste product includes water and the water forms at least 20% of the first waste product.

3. The gas product manufacturing system of claim 1, wherein the at least one heated enclosed vessel includes a reboiler, a flash vaporizer, or a steam generator.

4. The gas product manufacturing system of claim 1, wherein the at least one thermal processing system includes at least one heat exchanger, the at least one heat exchanger positioned and equipped to receive waste thermal energy from one or more components of the at least one thermal processing system and provide at least some of the waste thermal energy to the at least one heated enclosed vessel.

5. The gas product manufacturing system of claim 1, wherein the at least one thermal processing system includes a first gasifier, the first gasifier including the at least one first processing inlet.

6. The gas product manufacturing system of claim 5, wherein the first gasifier includes the at least one second processing inlet.

7. The gas product manufacturing system of claim 5, wherein the first gasifier is connected to a molten inorganic bath.

8. The gas product manufacturing system of claim 5, wherein the at least one thermal processing system includes a second gasifier, the second gasifier in fluid communication with the first gasifier.

9. The gas product manufacturing system of claim 5, wherein the first gasifier includes at least one thermal inlet for receiving the liquid phase of the first waste product and the vapor phase of the first waste product.

10. The gas product manufacturing system of claim 1, further comprising second waste source configured to provide a second waste product to the at least one thermal processing system, the second waste product being different than the first waste product.

11. A method to manufacture a gas product, the method comprising:

providing a first waste product from a first waste source to at least one heated enclosed vessel through at least one vessel inlet of the at least one heated enclosed vessel, the first waste product including at least one solvent and one or more of at least one inorganic material or at least one organic material;

heating the first waste product received by the at least one heated enclosed vessel to form a liquid phase and a vapor phase of the first waste product;

outputting the liquid phase and the vapor phase of the first waste product from the at least one heated enclosed vessel through at least one first vessel outlet and at least one second vessel outlet of the at least one heated enclosed vessel;

receiving the liquid phase and the vapor phase of the first waste product with at least one first thermal inlet and at least one second thermal inlet of at least one thermal processing system; and

heating the liquid phase and the vapor phase of the first waste product to form at

least one gas product.

12. The method of claim 11, wherein:

providing the first waste product from the first waste source to the at least one heated enclosed vessel includes providing the first waste product exhibiting an initial temperature to the heated enclosed vessel; and

outputting the liquid phase of the first waste product from the at least one heated enclosed vessel includes outputting the liquid phase at a final temperature that is greater than the initial temperature.

13. The method of claim 11, wherein:

the at least one thermal processing system includes a first gasifier including the at least one first thermal inlet;

receiving the liquid phase of the first waste product includes receiving the liquid phase at the at least one first thermal inlet of the first gasifier; and

heating the liquid phase of the first waste product includes heating the liquid phase of the first waste product at the first gasifier to form the at least one first gas product.

14. The method of claim 13, wherein the first gasifier includes the at least one second thermal inlet, and wherein:

receiving the vapor phase of the first waste product includes receiving the vapor phase of the first waste product at the at least one second thermal inlet of the first gasifier; and

heating the vapor phase of the first waste product includes heating the vapor phase of the first waste product at the first gasifier.

15. The method of claim 13, wherein:

the thermal processing system includes a second gasifier including the at least one second thermal inlet;

receiving the vapor phase of the first waste product includes receiving the vapor phase of the first waste product at the at least one second thermal inlet of the second gasifier; and

heating the vapor phase of the first waste product includes heating the vapor phase

of the first waste product at the second gasifier.