WHAT IS CLAIMED IS:

1. An energy storage system comprising:

a vacuum chamber;

a container located within the vacuum chamber;

a thermal energy storage medium located within the container;

a heater located within the vacuum chamber;

a heat receiver located within the vacuum chamber;

a first radiation shield that is movably reconfigurable between: (i) a first position that separates the heater from the container and (ii) a second position in which the heater is exposed to the container;

a second radiation shield that is movably reconfigurable between: (i) a first position that separates the heat receiver from the container and (ii) a second position in which the container is exposed to the heat receiver; and

a first thermal radiation reflector, wherein the heater is located between the first thermal radiation reflector and the container.

2. The energy storage system of claim 1, further comprising thermal radiation shielding located between an inner wall of the vacuum chamber and the container.

3. The energy storage system of claim 2, wherein the thermal radiation shielding is also located between the inner wall of the vacuum chamber and the heater.

4. The energy storage system of claim 2, wherein the thermal radiation shielding is also located between the inner wall of the vacuum chamber and the heat receiver.

5. The energy storage system of claim 2, wherein the thermal radiation shielding comprises multiple layers of sheet material that are spaced apart from each other.

6. The energy storage system of claim 1, further comprising a second thermal radiation reflector, wherein the heat receiver is located between the second thermal radiation reflector and the container.

7. The energy storage system of claim 1, further comprising one or more support members disposed between a bottom of the container and a bottom inner wall of the vacuum chamber, wherein the support members elevate and separate the container from the bottom inner wall of the vacuum chamber.

8. The energy storage system of claim 7, wherein each one of the one or more support members comprises multiple pieces of thermal insulating material in a stacked arrangement.

9. The energy storage system of claim 8, wherein the thermal insulating material comprises zirconia.

10. The energy storage system of claim 7, further comprising thermal radiation shielding located between an inner bottom wall of the vacuum chamber and the container.

11. The energy storage system of claim 1, wherein the thermal energy storage medium comprises silicon.

12. The energy storage system of claim 1, wherein the heater comprises a resistive heating element.

13. The energy storage system of claim 1, wherein the heater and the heat receiver are each spaced apart from the container.

14. The energy storage system of claim 1, further comprising a first actuator coupled to the first radiation shield and operative to move the first radiation shield between: (i) the first position that separates the heater from the container and (ii) the second position in which the heater is exposed to the container.

15. The energy storage system of claim 1, further comprising a second actuator coupled to the second radiation shield and operative to move the second radiation shield between: (i) the first position that separates the heat receiver from the

container and (ii) the second position in which the container is exposed to the heat receiver.

16. An energy storage system comprising:

a vacuum chamber;

a container located within the vacuum chamber;

a thermal energy storage medium located within an interior of the container;

a heater located within the vacuum chamber and spaced apart from the container;

a heat receiver located within the vacuum chamber and spaced apart from the container; and

a protrusion extending from an inner wall of the container and in contact with the thermal energy storage medium.

17. The energy storage system of claim 16, wherein the protrusion is a pyramid structure.

18. The energy storage system of claim 16, wherein a volume of the protrusion is at least 10% of a volume of the interior of the container.

19. The energy storage system of claim 16, further comprising multiple layers of thermal radiation shielding surrounding the container and within the vacuum chamber.

20. An energy storage system comprising:

a vacuum chamber;

a container located within the vacuum chamber;

a thermal energy storage medium located within the container;

a heater located within the vacuum chamber;

a heat receiver located within the vacuum chamber;

a first radiation shield that is movably reconfigurable between: (i) a first position that separates the heater from the container and (ii) a second position in which the heater is exposed to the container; and

a second radiation shield that is movably reconfigurable between: (i) a first position that separates the heat receiver from the container and (ii) a second position in which the container is exposed to the heat receiver,

wherein the heater and the heat receiver are each spaced apart from the container.

21. The energy storage system of claim 20, further comprising one or more support members disposed between a bottom of the container and a bottom inner wall of the vacuum chamber, wherein the support members elevate and separate the container from the bottom inner wall of the vacuum chamber.

22. The energy storage system of claim 21, wherein each one of the one or more support members comprises multiple pieces of thermal insulating material in a stacked arrangement.

23. The energy storage system of claim 20, wherein the thermal energy storage medium comprises silicon.