CLAIMS

What is claimed is:

1. A concentrator apparatus, comprising:

a light receiver; and

a light concentrator arranged for omnidirectional concentration of light toward a first focal point on the light receiver and a second focal point on the light receiver, wherein the light concentrator comprises:

an outer member and an inner member of the light concentrator adapted to receive thermal energy therethrough;

a first concentrating lens to induce the first focal point; and

a second concentrating lens to induce the second focal point;

wherein the first concentrating lens and the second concentrating lens are disposed in an annular space between the outer member and the inner member and are tuned to eliminate primary aberrations.

2. The concentrator apparatus of claim 1, wherein the first concentrating lens and the second concentrating lens are circumferentially spaced about the light receiver.

3. The concentrator apparatus of claim 1, wherein a first side of the first concentrating lens is closer to the first focal point than a second side of the first concentrating lens.

4. The concentrator apparatus of claim 3, wherein a first side of the second concentrating lens is closer to the second focal point than a second side of the second concentrating lens.

5. The concentrator apparatus of claim 1, wherein the outer member comprises a transparent material at least partially surrounding the light receiver.

6. The concentrator apparatus of claim 5, wherein the light receiver comprises a pipe defining a fluid pathway, the transparent material positioned along the fluid pathway.

7. The concentrator apparatus of claim 6, wherein the transparent material is associated with a plurality of refractive surfaces arranged about the pipe.

8. The concentrator apparatus of claim 7, wherein:

the transparent material defines at least one concentrating plane, the at least one concentrating plane including a midpoint; and

the plurality of refractive surfaces cooperate to induce the first focal point and the second point such that a focal axis of one or both of the first focal point or the second focal point forms a non-right angle with the at least one concentrating plane.

9. A concentrator apparatus, comprising:

a pipe defining a fluid pathway; and

an energy collection system associated with the pipe and configured to concentrate thermal energy received from a plurality of azimuths and altitudes on the pipe and to heat fluid of the fluid pathway, wherein the energy collection system comprises a first concentrating lens to induce the first focal point and a second concentrating lens to induce the second focal point, both the first concentrating lens and the second concentrating lens tuned to eliminate primary aberrations, wherein the first concentrating lens and the second concentrating lens are disposed in an annular space surrounding the pipe and the energy collection system is configured to rotate relative to the pipe.

10. The concentrator apparatus of claim 9, wherein the energy collection system comprises a transparent material including:

a light receiving surface of the transparent material;

a light exiting surface of the transparent material opposite the light receiving surface;

a plurality of refractive surfaces incorporated into at least one of the light receiving surface and the light exiting surface;

a first side joining the light receiving surface and the light exiting surface; and

a second side opposite to and aligned with the first side, the second side joining the light receiving surface and the light exiting surface.

11. The concentrator apparatus of claim 10, wherein:

the plurality of refractive surfaces directs light passing through the transparent material to a collective focal point; and

the first side of the transparent material is closer to the collective focal point than the second side of the transparent material.

12. The concentrator apparatus of claim 10, wherein the transparent material is at least semi-transparent.

13. The concentrator apparatus of claim 10, wherein at least a subset of the plurality of refractive surfaces includes progressively differing refractive angles from the first side of the transparent material to the second side of the transparent material.

14. The concentrator apparatus of claim 9, wherein the first concentrating lens and the second concentrating lens are adapted to concentrate the thermal energy received from the plurality of azimuths and altitudes on the pipe.

15. The concentrator apparatus of claim 14, further comprising a catch mechanism disposed about the portion opposite the pipe, the catch mechanism adapted to receive a mechanical input for moving the first concentrating lens relative to the second concentrating lens.

16. A system comprising:

a wind turbine; and

the concentrator apparatus of claim 9;

wherein the concentrator apparatus is connected to the wind turbine.

17. A system comprising:

a refrigeration truck; and

the concentrator apparatus of claim 9;

wherein the concentrator apparatus is connected to the refrigeration truck.

18. A system comprising:

a shipping container; and

the concentrator apparatus of claim 9;

wherein the concentrator apparatus is connected to the shipping container.

19. A method for supplying energy to a transfer medium, the method comprising:

conducting a fluid through a light receiver; and

transferring thermal energy to the fluid by:

concentrating light from a first direction to a first focal point on a light receiver with a light concentrator, the light concentrator comprising an outer member and an inner member adapted to receive thermal energy therethrough, a first concentrating lens to induce the first focal point, and a second concentrating lens to induce the second focal point, wherein the first concentrating lens and the second concentrating lens are disposed in an annular space between the outer member and the inner member and are tuned to eliminate primary aberrations; and

as the light transitions from the first direction to a second direction, concentrating the light from the second direction to a second focal point on the light receiver.

20. The method of claim 19, wherein the fluid comprises a heat transfer medium.

21. The method of claim 19, wherein the conducting comprises establishing a pressure gradient of the fluid through the light receiver using a pump.

22. The method of claim 19, further comprising collecting wind energy from an environment associated with the light receiver.

23. The method of claim 22, wherein the collecting comprises inducing movement of a first portion of an energy collection system using the wind energy.