

CLAIMS

What is claimed is:

1. A solar panel system (“YK-Panel”) configured to convert sunlight to electrical energy, the YK-Panel comprising:
 - two or more YK-Modules, wherein each YK-Module of the two or more YK-Modules comprises:
 - a tray comprising a heat-conductive substrate; and
 - a solar cell assembly contained within the tray and comprising: (i) a solar cell, (ii) an encapsulant, and (iii) a transparent cover, wherein the solar cell is contained within the encapsulant, wherein a bottom surface of the encapsulant faces the tray and a top surface of the encapsulant faces the cover; and
 - a frame assembly attached to each tray of the two or more YK-Modules to provide structural support to the two or more YK-Modules,
 - wherein open space is defined between adjacent YK-Modules of the two or more YK-Modules.
2. The YK-Panel of claim 1, wherein the open space totals at least 10% of a total area of the YK-Panel.
3. The YK-Panel of claim 1, wherein the open space totals at least 20% of a total area of the YK-Panel.
4. The YK-Panel of claim 1, wherein the open space totals 10% to 30% of a total area of the YK-Panel.
5. The YK-Panel of any of claims 1–4, further comprising one or more interconnectors extending laterally from each tray of the two or more YK-Modules, the one or more interconnectors connecting adjacent trays of the two or more YK-Modules.

6. The YK-Panel of any of claims 1–5, wherein the frame comprises multiple ribs that interlock with each other and with the two or more YK-Modules.
7. The YK-Panel of claim 6, wherein the multiple ribs include tabs that extend through respective slots defined by each tray of two or more YK-Modules.
8. The YK-Panel of any of claims 1–7, wherein the two or more YK-Modules comprises twenty-four YK-Modules.
9. A solar farm system comprising a plurality of the YK-Panels of claim 1, wherein the two or more of the YK-Panels are elevated at least three meters above ground level.
10. The solar farm system of claim 9, wherein the two or more of the YK-Panels are elevated at least five meters above the ground level.
11. An assembly of one or more solar YK-Modules comprised of a heat-conductive substrate attached to a heat-conductive frame to form a YK-Panel;
 - wherein the heat-conductive substrate supports one or more solar cells capable of converting sunlight to electricity while isolated from UV radiation, humidity, and oxygen by an encapsulant;
 - wherein sunlight illuminated sides of the solar cells are covered by a transparent cover;
 - wherein the solar cells are separated from the substrate by an electrical insulator;
 - wherein the YK-Modules are attached to the frame such that each of the one or more YK-Modules is separated from adjacent YK-Modules by empty gaps; and
 - wherein the YK-Modules are electrically interconnected to form a circuit that can drive an external electrical load.
12. The assembly of claim 11, wherein the substrate is aluminum.
13. The assembly of claim 11, wherein the substrate is copper.
14. The assembly of claim 11, wherein the substrate is stainless steel.

15. The assembly of claim 11, wherein the substrate is a ceramic-filled polymer.
16. The assembly of claim 15, wherein the ceramic-filled polymer comprises aluminum nitride.
17. The assembly of claim 15, wherein the ceramic-filled polymer comprises boron nitride.
18. The assembly of claim 15, wherein the ceramic-filled polymer comprises polyester.
19. The assembly of claim 11, wherein the frame is aluminum.
20. The assembly of claim 11, wherein the frame is copper.
21. The assembly of claim 11, wherein the frame is stainless steel.
22. The assembly of claim 11, wherein the frame is a ceramic-filled polymer.
23. The assembly of claim 22, wherein the ceramic-filled polymer comprises aluminum nitride.
24. The assembly of claim 22, wherein the ceramic-filled polymer comprises boron nitride.
25. The assembly of claim 22, wherein the ceramic-filled polymer comprises polyester.
26. The assembly of claim 11, wherein the solar cell comprises crystal silicon.
27. The assembly of claim 11, wherein the solar cell comprises CdTe.
28. The assembly of claim 11, wherein the solar cell comprises perovskite.
29. The assembly of claim 11, wherein the encapsulant is ethyl vinyl acetate.
30. The assembly of claim 11, wherein the encapsulant is a silicone rubber.

31. The assembly of claim 11, wherein the cover is a solar glass.
32. The assembly of claim 11, wherein the cover is polycarbonate.
33. The assembly of claim 11, wherein the electrical insulator is fiberglass.
34. The assembly of claim 11, wherein the electrical insulator is a polyimide.
35. The assembly of claim 11, wherein the electrical insulator is a ceramic-filled polymer.
36. The assembly of claim 35, wherein the ceramic-filled polymer comprises aluminum nitride.
37. The assembly of claim 35, wherein the ceramic-filled polymer comprises boron nitride.
38. The assembly of claim 35, wherein the ceramic-filled polymer comprises polyester.
39. The assembly of claim 11, wherein the electrical insulator is nylon.
40. The assembly of claim 11, wherein the empty gaps permit the flow of air, rainwater, and sunlight in a direction substantially perpendicular to the plane of the YK-Panel.
41. A T-Type HelioTower comprising:
 - a single center support pole;
 - support brackets extending laterally from the center support pole; and
 - multiple YK-Modules according to claim 11 attached to the support brackets, wherein the multiple YK-Modules are disposed at multiple levels along the center support pole.