Energy Neutral Transportation

Walk barefoot on sun-baked asphalt to get an idea of how much energy is available from sunshine. Is it possible to harness the sunshine hitting roads to power a transportation network?

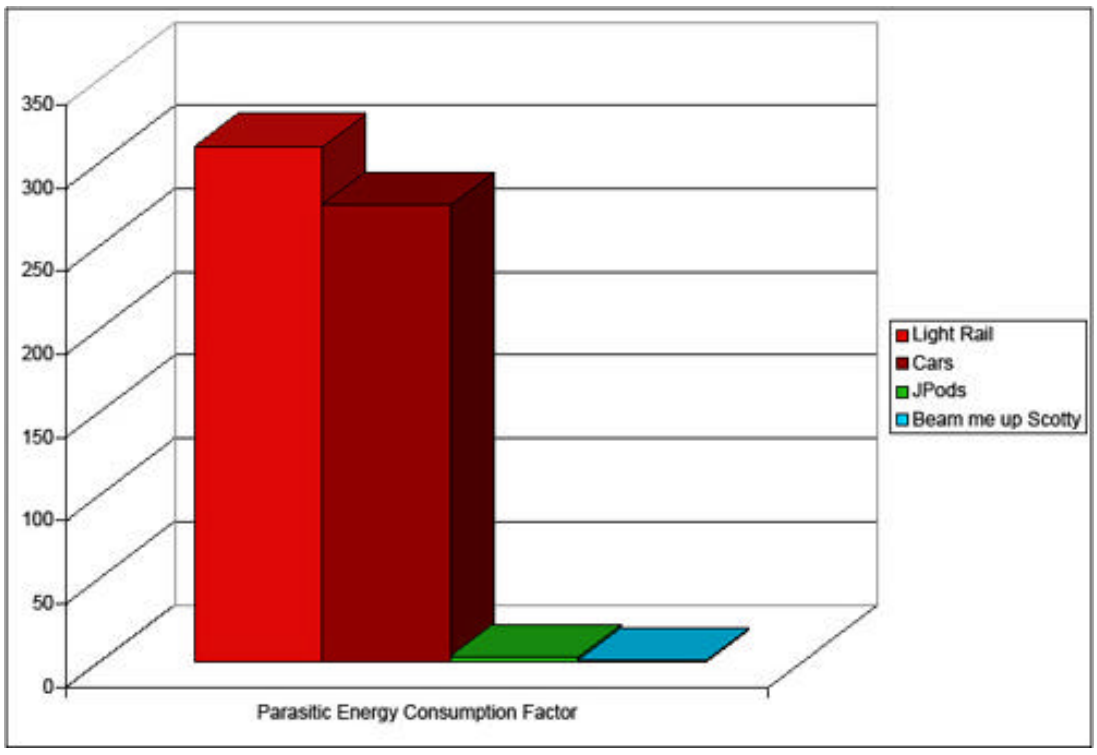
The answer is ***yes***. But that transportation network must be a lot more efficient than current cars and trains. Properly designed, the distributed nature of the transportation infrastructure can collect and use the distributed power of the sun to be energy neutral.

Drive Parasitic Mass towards Zero

Parasitic Mass is the mass which we pay to move that is not cargo or passengers. Currently we are creating congestion and consuming energy *moving a ton to move a person*. We need to strive towards *moving only the person*.

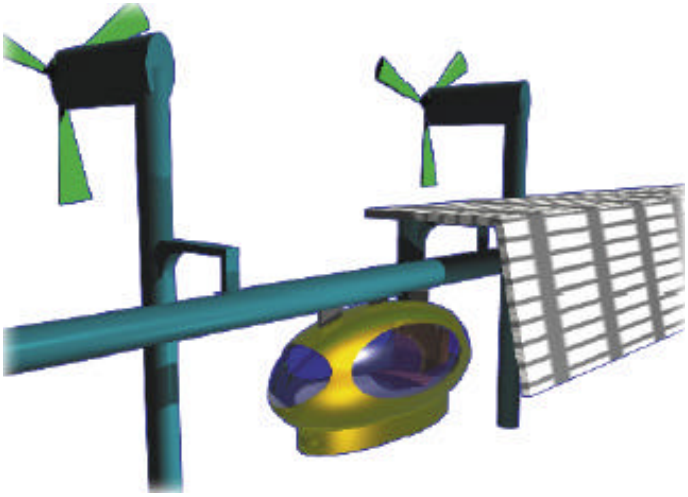
Further, the number of stops and starts, instances of consuming electric power to build kinetic energy, needs to be driven towards one. "Beam me up Scotty" would be perfect use of energy. You move only what you want to move and move it from origin to destination in a single action. We do not have the physics for this but the idea is right. A metric for it is PEC, Parasitic Energy Consumption.

PEC is the moving mass divided by the mass you wish to move, times the number of stops and starts, applications of kinetic energy. "Beam me up" scores a perfect 1. Cars in a typical commute have a PEC of 275, 1 ton of vehicle moving a 200 lb person with 25 stops-starts. Light Rail has a PEC of 310, 3 tons of vehicle per 200 lb passenger with 10 stops-starts.



A PEC of 3.25 is possible. JPods are ultra-light computer controlled vehicles suspended from rails that move people and cargo non-stop from origin to destination. A 450 lb vehicle moves a 200 lb person from point of origin to point of destination.

Mounting solar collectors 2 meters wide per running meter of rail (6.56 feet per running foot) of rail makes an energy neutral transportation network.



Here is the math:

- JPods use 6 kW max driving a fully loaded JPod at 50 kmh (30 mph).
- Typically travel 2 seconds apart (26.8 meters, 88 feet,).
- Solar collectors 2 meters wide (6.56 feet)
- 7.5 kW under full sun (26.8 x 2 x 0.14 kw/sq meter; 88 x 6.56 x 13 w/sq ft).

When the system requires more energy than the solar collectors produce, power will be drawn from the grid. If the system is consuming less power than the solar power production, the excess power can be exported to the grid and be taken as a credit for power used or a profit if it is net gain.

It is like taking solar race cars, decreasing their weight, giving them a rail with perfect rolling conditions, increasing the solar collection capacity and making them spacious enough for 4 people or a pallet of cargo.

Known Technology

The University of Michigan solar car won first place during the 2,500-mile/4,000 kilometer North American Solar Challenge, Wednesday, July 27, 2005. Michigan made the trip in 53 hours, 59 minutes, 43 seconds and set a record by averaging a speed of 46.2 mph with a 2 m x 6 m solar panel in the world's longest solar car race from Austin, Texas to Calgary, Alberta, Canada..