guardian.co.uk

Space, the final frontier ... and California's latest source of low-carbon electricity

- US company plans to put solar panels into orbit
- Firm says radio waves will transmit power to earth

Suzanne Goldenberg, US environment correspondent
guardian.co.uk, Thursday 16 April 2009 21.00 BST

While the sun sets on earth, an orbiting solar farm could have a near-constant supply. Photograph: Corbis

It sounds like an idea drawn from the wilder shores of science fiction: a set of solar panels in outer space that would beam enough clean energy back to Earth to power half a million homes and could one day potentially help save the planet.

But a leading American power company is hoping to turn the stuff of speculative fiction into reality by supporting a project that would put solar panels into orbit.

Pacific Gas and Electric Company, which serves San Francisco and northern California, has agreed to buy electricity from a startup company claiming to have found a way to unlock the potential power supply in space.

The initial plan is for the firm Solaren Corp to provide some 200MW of electricity. Solaren, which is based in Manhattan Beach, California, says it will launch a satellite with an array of solar panels around 22,000 miles above the earth's equator using existing rocket technology, and then convert the power generated into radio-frequency transmissions. The radio waves would be beamed back down to antennae in Fresno, California and then converted into electricity and fed into the regular power grid, PG&E said.

Although spacecraft and satellites routinely use solar panels, the project marks the first serious attempt to take advantage of the powerful and near-constant supply of sunshine in space.

Though solar power advocates of solar power regularly extol its potential on land as solar panels become more efficient, it is a fraction of the energy resources thought to be available in space.

Orbiting solar farms are not new a new concept: Nasa and the Pentagon have been studying the technology since the 1960s. Critics argue that the major barrier is cost, because sending rockets carrying solar panels into space is so expensive.

The idea has also captured the imagination of screen writers, with Blofeld, the evil villain of James Bond movies, plotting to launch a giant death ray-emitting satellite into space that could hold the world to ransom.

But Solaren Corp, founded by a former spacecraft engineer, says it has developed a technology that would make it commercially viable within the next seven years.

The company had been in discussion with PG&E for 18 months before the company announced this week that it had agreed to buy 200 megawatts of electricity from Solaren starting in 2016. The deal has yet to be approved by California state government regulators and PG&E has not put any money into Solaren, but the promise alone has turned the notion of space based solar power from fantasy to reality.

Because sunshine in space is practically constant, apart from a few days around the spring and autumn equinoxes, the space-based solar panels could potentially produce a steady supply of electricity. The sunlight hitting the solar panels in space would be 10 times as powerful as the light coming to Earth via the atmosphere.

Solaren's founder, Gary Spirnak, did not give details of how the technology would work but said it was based on what is currently used by communications satellites, describing it as "very mature".

And there most definitely won't be any death rays, Spirnak joked, while not stroking a sinister white cat. He said the radio beam would pose no danger to people on the ground or even aircraft that fly through it. The satellites would project a large oval footprint on earth at the receiving point. They would also shut down automatically if the signal goes astray.

Daniel Kammen, professor in energy and resources at the University of California, Berkeley, said: "The ground rules are looking kind of promising ... it is doable. Whether it is doable at a reasonable cost, we just don't know."

Others have paved the way. In 2008, John Mankins, a former Nasa expert on space solar power, proved it was possible to transmit solar power as radio waves when he beamed a signal between two Hawaiian islands 90 miles apart.

But Spirnak will face a challenge raising funds for his project during a recession. He said he was seeking in the low billions of dollars in investment, under $5bn. But that is still much higher than the usual $100m (£67m) to $200m costs for projects in renewable energy.