

## *Solar Sat Energy Benefits over Other Sources*

### *Advantages of other renewable power generation sources:*

- No carbon dioxide emissions

### *Shortcomings of other renewable power generation sources*

#### **Wind Turbines**

- Intermittent - requires expensive backup energy storage.
- Often far from major population areas) requiring extensive transmission grid-
- Existing transmission grids are not designed for intermittent loads.
- Most component manufacturing jobs are overseas because of lower wages.
- Component manufacturing jobs in America under constant overseas cost pressure.
- Large land requirements (approximately 25 square miles per 1000 megawatts)
- Cost per kilowatt (7-10 cents) requires government subsidy to be competitive.
- Large turbine longevity and maintenance costs on 20 year timescale unknown.
- Frequent landowner complaints of "visual pollution".
- Substantial mortality rate for bird populations.
- Substantial upfront capital costs required for each installation.

#### **Rooftop Solar**

- Intermittent - requires expensive backup energy storage.
- Most component manufacturing jobs are overseas because of lower wages.
- Component manufacturing jobs in America under constant overseas cost pressure.
- Cost per kilowatt (10-18 cents) requires government subsidies to be competitive.
- Substantial upfront capital costs required for each installation.

#### **Desert Solar Installations**

- Intermittent - requires expensive backup energy storage.
- Most component manufacturing jobs are overseas because of lower wages.
- Component manufacturing jobs in America under constant overseas cost pressure.
- Cost per kilowatt (10-18 cents) requires government subsidies to be competitive.
- Large land requirements (approximately 25 square miles per 1000 megawatts)
- Frequent landowner complaints of "visual pollution"
- Substantial upfront capital costs required for each installation.

#### **Geothermal**

- Very limited geographical locations.
- Usually far from populated areas.
- Cost per kilowatt (10-15 cents) requires government subsidy to be competitive.

- Underground water temperature cools within 1-2 decades, cutting efficiency.
- Very high maintenance costs because of chemicals in water.
- Substantial upfront capital costs required for each installation.

### ***Advantages of Fossil Fuel and Nuclear Power Generation***

- Constant, consistent supply of electricity.

### ***Shortcomings of Fossil Fuel and Nuclear Power Generation Coal***

- 7-8 year lead time for approval of new power plants.
- Unknown congressional carbon dioxide cuts required in near future.
- Tons of ash pollutants are produced from each megawatt generated.
- Tons of other pollutants, including carbon dioxide, are released into the atmosphere daily from each generating facility.
- Large amounts of "waste heat" released into the atmosphere hourly from each facility.
- Waste heat and pollutants generated from coal mining and transport to power plants.
- Thousands of acres environmentally damaged each year by coal mining and transport.
- Widespread pollution of water tables and surface water from mining.
- Volatile prices of coal lead to volatile electricity prices.
- Substantial upfront capital Costs required for each installation.

### ***Natural Gas***

- Pollutants "scrubbed" from burning gas must be collected and disposed of.
- Best scrubbing techniques still allow some pollutants to escape into the atmosphere.
- Large amounts of "waste heat" released into the atmosphere hourly from each facility.
- Unknown congressional carbon dioxide cuts required in near future.
- Major carbon dioxide emissions into the atmosphere.
- Gas mining and transport creates environmental damage far from the power plants.
- Volatile prices of natural gas lead to volatile electricity prices.
- Substantial upfront capital costs required for each installation.

### ***Nuclear***

- 7-10 year lead time for approval of new power plants.
- Regardless of best training efforts, fatalities from equipment failure are possible.
- Large amounts of "waste heat" released into the atmosphere hourly from each facility.
- Volatile prices and shortages of nuclear fuel will result from high demand.
- Terrorism threat high.
- Safe disposal of nuclear waste is highly unlikely in years ahead.
- Substantial upfront capital costs required for each installation.

## Advantages of Constant, 24/7 Solar Satellite Power over Fossil, Nuclear and Renewables

- No polluting particle emissions.
- No carbon dioxide emissions.
- No fuel disposal issues.
- No fluctuations in power costs because of fuel price changes.
- Receiving antennas can be placed near users, reducing loads on older power grids.
- Antennas can be placed near remote villages hundreds of miles from power plants or Power lines in China., India and Africa. Nearly 2 billion people live in these areas.
  
- Solar sat power in remote areas will let them purify their water, refrigerate medical and refrigerate crops before transport to market. (40% of the harvest from remote areas of India spoil before transport to markets.)
- Land requirements per kilowatt for receiving antennas are less than 10% of wind farms and desert solar installations.
- Land requirements per kilowatt are half that of nuclear or fossil fuel plants.
- Land under 20-foot high, net-like antennas can safely grow crops.
- 100% of launch rockets and satellites must be built by high wage U.S. workers.
- No overseas competition will exist for at least 20 years
- Antennas can be licensed for construction in overseas energy recipients like India, China or Africa to boost their economies.
- Very simple technician training for antenna installers and monitors.
- No fuel or transmission line terrorism opportunities.
- Receiving antennas are far less susceptible to weather or earthquakes or wind interruptions than power lines or power grids.
- Atmospheric heating from transmission beam should be less than 10% of heating from ground-based nuclear or fossil fuel power plants.\*\*
- Longevity of receiving antennas should be at least 25 years.

\*\* These advantages will be verified through our demonstrator program.

### *Disadvantages Of Constant. 24/7 Solar Satellite Power over Fossil,*

#### *Nuclear and Renewables*

Slow employment reductions worldwide in coal, natural gas and nuclear fuel mining and transport operations over several decades.

Slow employment reductions in fossil fuel and nuclear power plant manufacturing and staffing over several decades.

Current Launch Solid Fuel Rockets generate toxic gasses that can cause minimal damage to the environment. We are planning on replacing them with non-toxic liquid fueled rockets as soon as possible.