

Re: SPSs and the candidates

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From: Christopher M. Jones (*christopher.m.jones_at_gmail.com*)

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Bill Bogen wrote:

> "Christopher M. Jones" <*christopher.m.jones@gmail.com*> wrote in message
news:<*AfWdnbdneMrCZhncRVn-ow@comcast.com*>...

>>Current energy usage world-wide runs at around 400 EtaJoules

>>per year, or an average of roughly 13 teraWatts continuously.

>>Even at 100% conversion efficiency of the ~1400 W/m² of

>>insolation at Earth this corresponds to over 9,000 km² of

>>area in solar power systems. This is a lower bound, a more

>>realistic estimate would be at least a factor of 4 larger

>>due to inefficiencies in each step of the process.

>

> So, using a factor of 4, we need 36,000 km² of solar panels or of

> mirrors reflecting into heat engines. By an amazing coincidence, this

> is almost exactly the amount of aluminum foil made in Europe in 2003.

> So if we can make 4% as much as that in space (as well as heat engine

> parts, microwave components, etc) using lunar materials, then in 25

> years we could provide all the Earth's current energy needs.

This is not an encouraging statistic. It indicates how far we have to go not how easy it will be. It indicates that we need to be able to make solar panels and related systems nearly as abundantly as we make aluminum foil today in order for SPS to be feasible with today's, let alone tomorrow's, energy needs. Worse yet, according to some we need to make factories in space or on the Moon which can process local materials and make PV arrays as cheap and abundantly as we make foil. The last time I checked PV arrays were just slightly more complex and costly to manufacture than foil.

>>Even very low estimates of the mass of SPS systems and of the

>>launch costs yield values of tens of thousands of tonnes of

>>material put into orbit at a cost of hundreds of billions

>>of dollars.

>

> "hundred billion dollars" / "ten thousand tonnes" = \$10,000/kg

> You consider this to be a "very low estimate of launch costs"? Good

> grief, how would you launch the materials, on the Shuttle? Any person

- > *seriously considering SPS on a large scale assumes the use of lunar or*
- > *asteroidal material, with much lower launch costs.*

My apologies, those estimates are not necessarily linked. I used slightly more realistic estimates of the mass to determine launch costs, while keeping the lower mass estimate. I used a launch cost of less than \$1,000/kg to determine the cost and did not include development or manufacturing costs. For what it's worth, the Shuttle's cost is more like \$20k/kg (note: kg vs. lb). The cost of a Soyuz launch is roughly \$5k/kg.

- >>*This ain't gonna happen overnight.*
- >
- > *True. What source of power would?*

None. That's the point. SPS is not an instant panacea. Nothing is an instant panacea for power production.