

Watt's Happening? #279

by Don Pettit

for Peace Energy Renewable Energy Cooperative

www.peaceenergy.ca ph 250-782-3882



More Amazing Solar Stuff



At the moment, this is considered to be the world's largest solar farm at 17 gigawatts. This is the Talatan Solar Park situated in China's Qinghai Province in the Talatan desert. It covers 600 square kilometers (60,000 hectares) and

features both regular PV and molten salt solar thermal technology to store heat and generate power after dark. The solar panels provide shade and reduce evaporation, allowing for widespread sheep grazing under the panels.

Excuse me if my enthusiasm for solar electricity is spilling over onto these pages, but really, it's amazing.

In my last column I outlined the remarkable growth in solar around the world (well, not so much in Canada) spurred by the fact that just a year or two ago it became the least expensive energy source in human history...and falling.

But many questions remain. Here are few that need answering.

DO WE HAVE ENOUGH LAND?

So are we going to cover the entire planet with solar panels to completely replace non-renewable energy sources?

No, of course not. Cover all the suitable roofs

and parking lots with solar, and we are well on our way, using no new land at all.

Studies for the US show that all of that country's energy could be supplied by covering 12 million hectares (30 million acres) with solar panels. They currently use 800,000 hectares (two million acres) for golf courses and 1.2 million hectares (three million acres) for airports.

So yes, we have lots of land around the world to power our needs with solar panels, especially when you add in all the hydro and wind power that already exists.

WHAT ABOUT LITHIUM?

Of course, the sun doesn't always shine, so we need to store that energy. With solar plus batteries, solar becomes that wonderful, around-the-clock base load

power that everyone wants.

The price of lithium batteries is plummeting right along with the price for solar panels, so solar plus storage has now become very cost effective. But where do we get all that lithium and other critical minerals, and what environmental price will we pay for that?

Overall the news is good: there will not be a massive expansion of mining in a low-carbon world, there will be less.

Yes, as we transition we will have to mine more copper, nickel, lithium, manganese and other minerals than we are now, and there will be a significant footprint to do that.

LET'S COMPARE

But let's compare that to what we are digging out of the ground right now for conventional energy.

Presently, the world is mining eight BILLION tonnes of coal EVERY YEAR, and about the same amount again of oil and gas.

China can produce about seven million tonnes of polysilicon (the basic ingredient of a solar panel) each year. That's enough to make about 3.5 terawatts of power when turned into solar panels (human civilization presently uses about 20 terawatts of power), and

they will go on making that power for decades.

(Please note: the sun dumps about 173,000 terawatts of electricity onto the Earth continuously. No shortage of solar energy on this planet!)

Sure, it is cheaper to build a coal or gas plant than a same-sized solar plant, but then you have

Moving to a
low carbon
world will
greatly reduce
mining, not
increase it.

to keep adding fuel and burning it, forever. Some 12 percent of the world's fossil fuels are used just to produce, refine and transport the fuels, something the sun and wind do for free.

Burn a tonne of coal, and you can generate about two megawatt hours of electricity. A tonne of solar panels over their quarter century lifespan will generate 1,000 megawatt hours of electricity: 500

times as much!

So, moving to a low carbon world with renewable energy will greatly reduce mining, not increase it.

WHAT ABOUT RECYCLING?

Lithium batteries are 95% recyclable, and that is already being done for profit in many places around the world. That is, lithium batteries can be recycled into more lithium batteries.

The Rocky Mountain Institute predicts that by 2050 we will have done all the mining we'd every need to do for battery minerals: we will just recycle them over and over again. The small 5% loss will be made up for in greater efficiency through the use of less material over time.

Solar panels? Even better! In 2004, one watt of solar PV needed about 16 grams of polysilicon. That has now dropped to 2 grams, with similar decreases in the use of silver, and improvements continue. It is predicted that by about 2035, when vast quantities of solar panels will need to be recycled, there will be enough recyclable materials in one panel to make about 10 new panels.

Now that's what I call recycling!
