

Watt's Happening? #171

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Why Solar?



Although most solar is put on roofs, ground-mount solar farms on low-grade agricultural land can make a lot of sense. Here, sheep are given food,

shade, shelter and water in return for low-carbon grounds keeping, a growing trend that mixes sustainable energy with sustainable agriculture.

It's solar time on planet Earth.

Less than a decade ago, respectable organizations like the International Energy Agency were predicting that global solar might reach 20 gigawatts by now. (a gigawatt is one billion watts). In fact, it exploded to 180 gigawatts by 2015, three times the power output of Britain, and has since almost doubled again.

No one could have imagined that half of all new electricity installed in the US each year would now be solar, but that's what's happened.

China invested \$150bn in renewables last year, as much as the US and EU combined.

While phasing out coal, China plans to install 200 GW of wind and 100 GW of solar by 2030, and talks of a long-term goal of 86 percent renewables by 2050. Amazingly, they will probably do it!

India has pledged to put "a solar panel on every roof", aiming to raise renewables to 40 percent of power output by 2030. That's a lot of solar.

Morocco is building the world's largest concentrated solar power plant (that's the plant with all the mirrors focused on a tower that generates electricity with steam). When completed this year, it will power one million homes.

Some 155 countries have committed, when taken together, to a reduction in fossil fuel demand by 30 to 40 percent over the next 20 years.

This will require a \$90 trillion investment in new renewable energy infrastructure, mostly solar and wind. Investors are gleeful, and money is moving into these new energies at unprecedented rates.

SOLAR IS CHEAP

Why? Price, of course.

Immense gains in manufacturing automation and solar panel efficiency have dropped the price for solar by some 80 percent over the last decade. The price has more or less bottomed out now, but each year a new generation of solar panels comes out, a bit more efficient than the last.

The price for solar has dropped so much that it has now become the least expensive energy source in history (followed by wind, a close second).

With no moving parts, ultra-low maintenance, zero emissions and free fuel falling from the sky every day, it's going to be hard to beat solar.

SOLAR IS VERSATILE

Solar is probably the most versatile energy source ever invented. Versatile meaning it can be scaled up and down hugely and still make economic sense.

That's because it's made from a large number of small, easily mass-produced generating units (solar panels) that can be handled by a single person, easily shipped (they're tough, not fragile) and quickly installed at any scale.

A single solar panel will happily aerate your dugout.

Five or six panels will power your cottage

all summer.

Thirty or forty panels on your roof or garage will power your entire house and charge your electric car.

Five hundred will eliminate the electrical bills for your curling rink for 50 years.

Five thousand will power a multi-megawatt factory or huge shopping centre.

One hundred thousand solar panels will power a modest sized city.

Where will they all be installed? Some are going up on under-utilized municipal land or very low-grade agricultural land, but mostly on roofs. Studies have been done: if we were to cover every roof in north America with existing solar technology, it would more than power the entire continent. Just solar.

And don't worry, solar panels are highly recyclable.

NEW SOLAR TECH

Needless to say there is lots of research going into new solar technology these days, trying to turn more of that sunlight into more energy per dollar invested.

But there are limits to what can be done. The theoretical scientific limit for sunlight conversion to electricity is about twice the efficiency of today's solar panels (about 20%), topping out at about 50% conversion efficiency.

So the solar array you put on your roof today to power your home and car may be half that size in 20 years, but that's about it. Any new innovation will take at least a decade to match the existing cost per watt, maybe much longer.

In other words, today's solar tech is pretty darn amazing, mature, clearly cost effective, widely available and in full global production.

Yep, we're goin' solar.

And that's a GOOD thing.

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