

Watt's Happening? #280

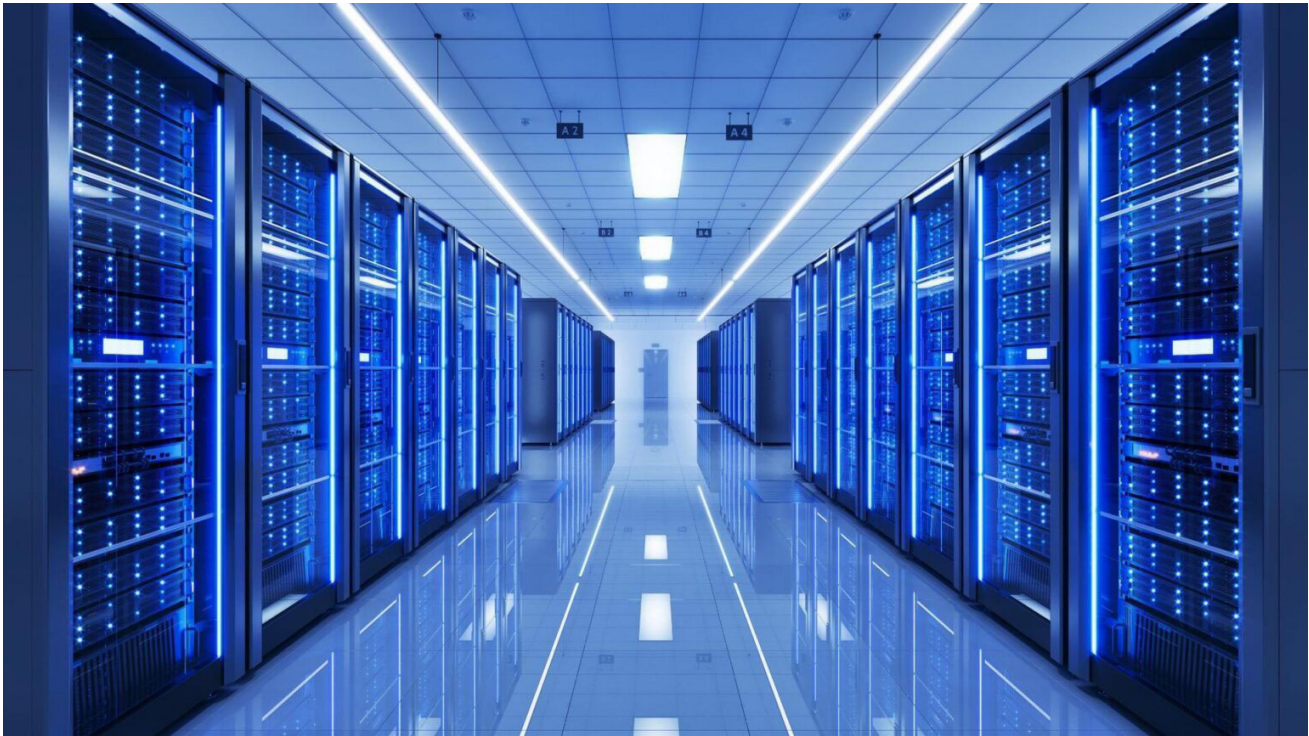
by Don Pettit

for Peace Energy Renewable Energy Cooperative

www.peaceenergy.ca ph 250-782-3882



Will AI Wreck Our Planet?



The power to run the world's expanding host of massive data centres has quickly moved from megawatts for each facility to gigawatts. How will this new host of energy consuming giants be powered?

Immense data centres sucking up water and fossil fuels, crashing the grid and taking power away from our everyday needs. Runaway carbon footprints destroying our entire climate change efforts, with no end in sight. And what are all these huge electronic monsters doing anyway? Is it worth it?

I can't even begin to answer the last two questions (who can?) but I can give you some information about how these immense new energy pits will likely be powered, and it's not all bad.

TOO LATE TO STOP

First, let's admit that there is probably no stopping AI. The genie is out of the bottle, and now we have to deal with it. It's crazy, it's outrageous, it's moving way too fast, it could be the stupidest thing we have ever done, but it is also the most powerful tool humankind has ever

devised. (That's what human beings do, right? Invent tools and use them, for better or for worse.)

SOLAR

There is no doubt that artificial intelligence will increase electricity demand, but it's nothing that clean energy can't keep up with.

The decline in battery prices has been incredible, like nothing anyone has ever seen before (unless perhaps we look at the incredible drop in the cost of solar panels!). Put the two together and you have the problem of solar intermittency solved. Solar plus batteries gives secure round-the-clock power, generated entirely on-site, not pulling from the grid at all, just what data centres need.

And solar plus batteries can be installed quickly, very quickly, the other thing that AI needs: speed.

And third: cost. Solar is now the cheapest energy source ever, and getting cheaper every day. Wind is right behind. Nothing can compare for cost.

So we can expect to see many of these AI data centres powered by solar, wind and batteries. For climate change, this is good news.

GEOHERMAL

Pump water down a 5 to 10 kilometer deep pipe, and up comes boiling hot water: a forever energy source that is powered by the heat of the molten core of the earth. That heat is easily turned into electricity with a simple steam turbine.

Geothermal energy is ideal base-load power, operating at a power capacity factor of 90%, as good or better than hydroelectric. That means it runs 24/7 and is generated on-site, avoiding strain on the existing grid.

And the big players are cashing in on geothermal for their data centres. Microsoft, Meta (Facebook) and Google are all funding new next generation geothermal plants for their data centres around the world.

While geothermal energy is beginning to power AI, AI is also powering geothermal advancement. Analyzing seismic, thermal and geological data to identify promising sites and improve drilling techniques is revolutionizing geothermal technology and rapidly

bringing it into the modern energy mix. (Interestingly, geothermal drilling is similar to the accurate horizontal drilling developed for gas fracking)

On-site, separate from the existing grid and very low carbon, geothermal for data centres is more good news.

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NATURAL GAS

There is of course a troubling trend to power these massive centres with abundant and cheap natural gas. This would be a catastrophe for climate change.

Our climate is changing faster and more severely than predicted. The rapid shift to renewables around the world shows promise of meeting this challenge, (as I have outlined in previous articles) but powering AI with fossils could overrun this hope.

With viable options like solar/wind/batteries, geothermal and other clean energy technologies readily available, that would truly be

a nasty turn in the wrong direction.

COOLING WITHOUT WATER

Computer chips generate heat. The simplest, and worst answer has been to cool data centres with massive amounts of water, much of which is released as steam, changing local climates and eating up clean water.

But let's remember that electricity can be used to cool as well as heat, that's how your refrigerator works. Industrial scale heat pump technology is under rapid development, and will soon cool data centers with unlimited renewable electricity instead of water.

DON'T GIVE UP

Digital technology energy efficiency will continue to improve, and ultimately renewable energy sources will be the most financially and environmentally sustainable options.

If you need to use AI, don't worry about its carbon footprint. Asking ChatGPT 100 questions uses about the same energy as streaming a 20-minute video or running an electric heater for one minute. For carbon, focus on your driving, flying and how you heat and cool your home.

Perhaps we can use AI to solve it's own problem and reap the amazing benefits it promises.
