Artificial intelligence energy problems

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But if we use rising electricity demand as a catalyst to lean harder into renewable energy and other low-carbon power sources, and push AI to get more efficient, doing more with less energy,...

Within years, large AI systems are likely to need as much energy as entire nations. And it"s not just energy. Generative AI systems need enormous amounts of fresh water to cool their processors...

Powering artificial intelligence models takes a lot of energy. A new analysis demonstrates just how big the problem could become. Every online interaction relies on a scaffolding of...

Generative artificial intelligence uses massive amounts of energy for computation and data storage and millions of gallons of water to cool the equipment at data centers. Now, legislators and regulators -- in the U.S. and the EU -- are starting to demand accountability.

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Tech companies keep finding new ways to bring AI into every facet of our lives. AI has taken over my search engine results, and new virtual assistants from Google and OpenAI announced last week are bringing the world eerily close to the 2013 film Her (in more ways than one).

As AI has become more integrated into our world, I"ve gotten a lot of questions about the technology"s rising electricity demand. You may have seen the headlines proclaiming that AI uses as much electricity as small countries, that it"ll usher in a fossil-fuel resurgence, and that it"s already challenging the grid.

Using AI for certain tasks can come with a significant energy price tag. With some powerful AI models, generating an image can require as much energy as charging up your phone, as my colleague Melissa Heikkil? explained in a story from December. Create 1,000 images with a model like Stable Diffusion XL, and you"ve produced as much carbon dioxide as driving just over four miles in a gas-powered car, according to the researchers Melissa spoke to.

But while generated images are splashy, there are plenty of AI tasks that don"t use as much energy. For example, creating images is thousands of times more energy-intensive than generating text. And using a smaller model that"s tailored to a specific task, rather than a massive, all-purpose generative model, can be dozens of times more efficient. In any case, generative AI models require energy, and we"re using them a lot.

Electricity consumption from data centers, AI, and cryptocurrency could reach double 2022 levels by 2026, according to projections from the International Energy Agency. Those technologies together made up roughly

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2% of global electricity demand in 2022. Note that these numbers aren"t just for AI--it"s tricky to nail down AI"s specific contribution, so keep that in mind when you see predictions about electricity demand from data centers.

There"s a wide range of uncertainty in the IEA"s projections, depending on factors like how quickly deployment increases and how efficient computing processes get. On the low end, the sector could require about 160 terawatt-hours of additional electricity by 2026. On the higher end, that number might be 590 TWh. As the report puts it, AI, data centers, and cryptocurrency together are likely adding "at least one Sweden or at most one Germany" to global electricity demand.

In total, the IEA projects, the world will add about 3,500 TWh of electricity demand over that same period--so while computing is certainly part of the demand crunch, it"s far from the whole story. Electric vehicles and the industrial sector will both be bigger sources of growth in electricity demand than data centers in the European Union, for example.

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