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Data centres: the real costs and benefits

Every photo, message and AI answer runs through a data centre. As AI grows, these buildings are becoming some of the biggest users of electricity and water anywhere. This guide sets out what the evidence says about their environmental and socio-economic impacts, and what Thailand is doing about them.

415 TWh world data-centre electricity, 2024 (≈1.5%)	945 TWh IEA forecast for 2030	≈180 Mt CO ₂ a year today	19 m litres water a day, large site (max)
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Before and after: how big is this?

Electricity: the decade before AI

For most of the 2010s, data centres grew without using much more power. A study in *Science* found they used about 205 TWh in 2018, only about 6% more than in 2010, even though computing work grew about 550%, because each server became far more efficient. That was about 1% of the world's electricity.

AI changed this. Use roughly doubled to about 415 TWh by 2024 (1.5%), and the IEA expects about 945 TWh by 2030 (just under 3%).

Compared with things we know

Item	Electricity a year	Compared with Thailand
All of Thailand (2025)	≈ 205 TWh*	1×
World data centres, 2018 (before AI)	≈ 205 TWh	≈ 1×
World data centres, 2024	≈ 415 TWh	≈ 2×
World data centres, 2030 (IEA forecast)	≈ 945 TWh	≈ 4.5×
Thailand's planned data centres, 2.87 GW	≈ 20 TWh**	≈ 10% of today's use
One 100 MW data centre	≈ 0.7 TWh**	as much as ≈ 220,000 Thais use in total

* Our calculation: 3,134 kWh per person in 2025 (LowCarbonPower) × about 66 million people. ** Our estimate, assuming the sites run at 80% of capacity all year; real use depends on how full they are.

Water

A large data centre can use up to about 19 million litres a day, similar to a town of 50,000 people. Bangkok uses roughly 4–5 billion litres a day, so one such site would equal about 0.4–0.5% of the whole city's supply, drawn from one location, every day, much of it evaporated rather than returned.

Before AI, most data centres were smaller, often 10–50 MW, and many used air cooling. AI chips run far hotter and are packed more densely, which is why water-based cooling has become common again.

Environmental impacts

Electricity and emissions

The IEA estimates data centres used about 415 TWh in 2024, about 1.5% of the world's electricity, growing about 12% a year over the past five years. In its base case this reaches about 945 TWh by 2030, just under 3% of world demand. AI is the main driver: its specialised chips draw far more power than ordinary servers.

Inside a modern data centre the servers take about 60% of the electricity; cooling takes about 7% in the most efficient large sites and more than 30% in older or less efficient ones; storage and networking take most of the rest.

About 30% of data-centre electricity still comes from coal. The IEA puts their emissions at about 180 million tonnes of CO₂ today, rising to about 300 million tonnes by 2035. That is still under 1% of world emissions (41.6 billion tonnes in 2024), but very fast demand growth can keep older fossil plants running longer and use up clean power that would otherwise replace them.

Water

Much of the heat is removed by evaporative cooling: water absorbs heat and evaporates, so it does not come back. The Lincoln Institute reports that a large data centre can need up to 5 million US gallons a day (about 19 million litres), roughly what a town of 50,000 people uses.

There is also hidden water use. About half of the electricity used by US data centres comes from fossil-fuel plants, which boil water to drive their turbines. Operators face a trade-off: closed-loop or air cooling saves water but uses more electricity; evaporative cooling saves electricity but uses more water.

Air pollution and health

Data centres keep large banks of diesel generators for power cuts and test them regularly. A study by researchers at Caltech and UC Riverside estimates that, in the United States, air pollution linked to AI data centres and the power plants that feed them could cause about 1,300 premature deaths and up to US\$20 billion in health costs a year by 2030. Diesel backup generators emit 200–600 times more nitrogen dioxide than gas power plants per unit of power; in Northern Virginia alone their pollution is estimated to cost US\$190–260 million a year in public health.

Electronic waste

AI hardware is replaced quickly as new chips arrive. A study in Nature Computational Science estimates large language models alone could produce 1.2–5 million tonnes of e-waste between 2023 and 2030, and up to about 2.5 million tonnes a year by 2030 in the aggressive scenario, against about 62 million tonnes of all e-waste worldwide in 2022. Chips, boards and batteries contain valuable and hazardous materials, so recycling matters.

Land, noise and heat

Large campuses take up a lot of land. Cooling towers run day and night, testing night-time noise limits of 50–55 dB(A) near homes, and waste heat adds to the urban heat-island effect, as reported for sites near Bangkok.

Socio-economic impacts

Investment and growth

Data centres bring very large investments. Thailand's Board of Investment approved 26 data-centre projects worth almost 500 billion baht in 2025, and applications passed 1 trillion baht by early 2026; reports also list 36 projects worth 728 billion baht before the BOI paused new data-centre promotion applications in April 2026, with 42 data centres already operating. Hyperscale sites also bring better telecoms and cloud services, and keep data closer to users.

Jobs

They create far fewer permanent jobs than their size suggests. A Brookings study of about 1,500 US facilities found roughly 100–200 extra jobs in a county that gets a large data centre, with data-processing employment up about 56% over a decade but no change in local wages, and home prices up 2–5%. In Thailand, TDRI estimates a 100 MW data centre creates about 50 direct jobs. Construction brings a temporary boost.

Electricity bills

Where many data centres arrive at once, everyone can pay for the extra power plants and lines. In the PJM grid in the eastern United States, the capacity price jumped from US\$28.92 to US\$269.92 per MW-day for 2025/26; the market monitor attributed 63% of the increase, about US\$9.3 billion, to data centres. Residential bills rose by about US\$16–21 a month in some areas. A Georgia Tech study found local electricity prices about 5% higher where data centres open.

In Thailand, data centres are reported to pay about 5–6 baht per unit against roughly 3–4 baht for homes, and a new “Category 9” user class has been proposed so that large data centres running on fossil-fuel power bear the true cost of imported LNG. How grid upgrades are paid for will decide whether households share the cost.

Tax breaks

Governments compete with incentives. In the US, 36 of 50 states offer data-centre tax breaks; states have given up billions in revenue, and at least 14 do not disclose how much. Some require jobs in return, such as Virginia's minimum of 50 jobs paying above 150% of the local average wage.

Water competition and local communities

Farming and fishing communities in Chonburi and Rayong fear for their water. In a Federation of Thai Industries survey of 160 executives, 68.8% named insufficient water supply as their top concern. Investigators have also found “phantom demand”: overlapping water-reservation contracts that make shortages look worse on paper.

How we consume information

Every scroll, video and AI answer is served from a data centre. In Thailand, 67.8 million people (94.7%) were online in late 2025, with 56.6 million social-media identities; LINE has about 56 million monthly users, and TikTok, Facebook and YouTube each reach about 47–57 million.

Video dominates. Ericsson reports that video is about 75% of all mobile data. The average smartphone used about 22 GB a month at the end of 2025 (about 23 GB in South-East Asia and Oceania), heading for about 42 GB

worldwide and 50 GB in our region by 2031. World mobile traffic is about 210 exabytes a month.

AI adds a new layer on top: instead of fetching a stored page, a chatbot or image tool computes a fresh answer each time, which takes far more energy per request than an ordinary search or message.

Small habits help: download over Wi-Fi rather than streaming the same video again, choose a lower resolution on small screens, turn off autoplay, and clear out cloud storage you no longer need.

What Thailand is doing

Rules being prepared

A four-pillar screening framework (energy security, water limits, environmental impact and domestic benefit) is being finalised by the BOI, the Office of National Water Resources and the NESDC.

Joint power and water mapping would limit new data centres to areas with proven surplus and keep new water-cooled sites out of vulnerable river basins; new projects must use closed-loop or liquid cooling.

A direct power-purchase pilot capped at 2,000 MW would let data centres buy renewable electricity directly; EGAT plans a 31-billion-baht transmission upgrade in the EEC.

The NESDC has proposed mandatory reporting of resource use, local-content rules, workforce training and a formal public-participation process.

What it means for homes and businesses

Data centres are part of a modern economy, and the question in Thailand is no longer whether to have them but on what terms. For households and businesses, three things are worth watching: whether grid-upgrade costs are passed on to ordinary users, whether water allocation protects farms and towns, and how quickly clean power is added.

Solar panels make electricity without burning fuel or using cooling water. Making some of your own daytime power on your roof is one way to be less exposed to whatever happens to grid prices, and every unit made on a roof is a unit the grid does not have to supply. Read our guide to Thailand's 50,000-baht solar subsidy (solaress.org/solar-subsidy-50000).

Further reading: books on AI, data centres and their impacts

1. **Atlas of AI** – Kate Crawford (Yale University Press, 2021). AI as an industry that extracts minerals, energy, labour and data – the classic starting point.
2. **Empire of AI** – Karen Hao (Penguin Press, May 2025). The rise of OpenAI, the data workers behind it and the resources it uses. The author corrected an overstated Chilean data-centre water figure in November 2025.
3. **Hyperscale: Ambition, Power and the Relentless Rise of Data Empires** – Paris Marx (Profile Books, 20 October 2026). The physical footprint of data centres and who bears the cost; longlisted for the FT Business Book of the Year 2026.
4. **A Prehistory of the Cloud** – Tung-Hui Hu (MIT Press, 2015). The cables, buildings and history hidden behind the word “cloud”.

5. **Cloud Empires** – Vili Lehdonvirta (MIT Press, 2022). How digital platforms came to act like governments.
6. **Power and Progress** – Daron Acemoglu & Simon Johnson (PublicAffairs, 2023). Who gains from new technology, from the Middle Ages to AI.
7. **Code Dependent** – Madhumita Murgia (Henry Holt / Picador, 2024). How AI already affects workers and ordinary people around the world.
8. **AI Snake Oil** – Arvind Narayanan & Sayash Kapoor (Princeton University Press, 2024). How to tell what AI can and cannot really do.
9. **The Coming Wave** – Mustafa Suleyman with Michael Bhaskar (Crown, 2023). An industry insider on the risks and governance of AI.
10. **The Datacenter as a Computer (3rd ed.)** – Luiz André Barroso, Urs Hölzle & Parthasarathy Ranganathan (Morgan & Claypool, 2018). The technical design of large data centres and why efficiency matters.
11. **The Shallows** – Nicholas Carr (W. W. Norton, 2010). What constant online reading does to attention and memory.
12. **Stolen Focus** – Johann Hari (Crown / Bloomsbury, 2022). Why attention is shrinking in the age of endless feeds.

Solar ESS is always happy to share up-to-date information and our first-hand experience. Figures are from the sources listed; where sources differ we give both. This page is updated as new evidence appears.

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3. Profile Books – Hyperscale by Paris Marx – <https://profilebooks.com/work/hyperscale/>
4. Wikipedia – Empire of AI (publication details and water-figure correction) – https://en.wikipedia.org/wiki/Empire_of_AI
5. Kate Crawford – Atlas of AI – <https://katecrawford.net/atlas>
6. LBNL / Science (Masanet et al., 28 Feb 2020) – Data centers successful in energy efficiency measures – <https://energyanalysis.lbl.gov/news/data-centers-successful-energy>
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9. IEA – Energy and AI: energy demand from AI – <https://www.iea.org/reports/energy-and-ai/energy-demand-from-ai>
10. Bangkok Post – AI surge to double data centre power demand by 2030 (IEA: 180 Mt CO₂ today, ~300 Mt by 2035; coal ~30%) – <https://bangkokpost.com/business/general/3000142/ai-surge-to-double-data-centre-power-demand-by-2030>
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14. Brookings – New evidence on data center employment effects (May 2026, updated Aug 2026) – <https://www.brookings.edu/articles/new-evidence-on-data-center-employment-effects/>
15. IEEFA – Projected data center growth spurs PJM capacity prices by factor of 10 (30 Jul 2025) – <https://ieefa.org/resources/projected-data-center-growth-spurs-pjm-capacity-prices-factor-10>
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<https://solaress.org/data-centre-impacts>