

The 21st century ~~gold~~ rush

energy

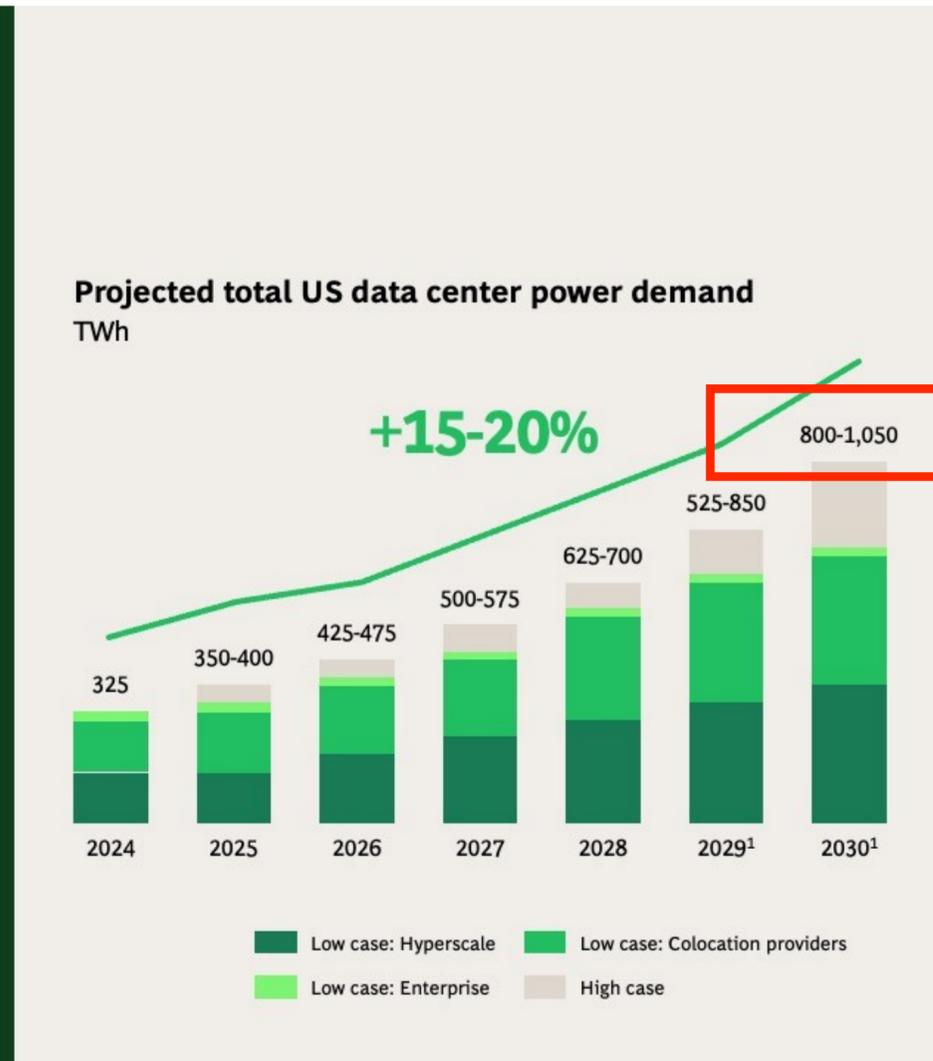
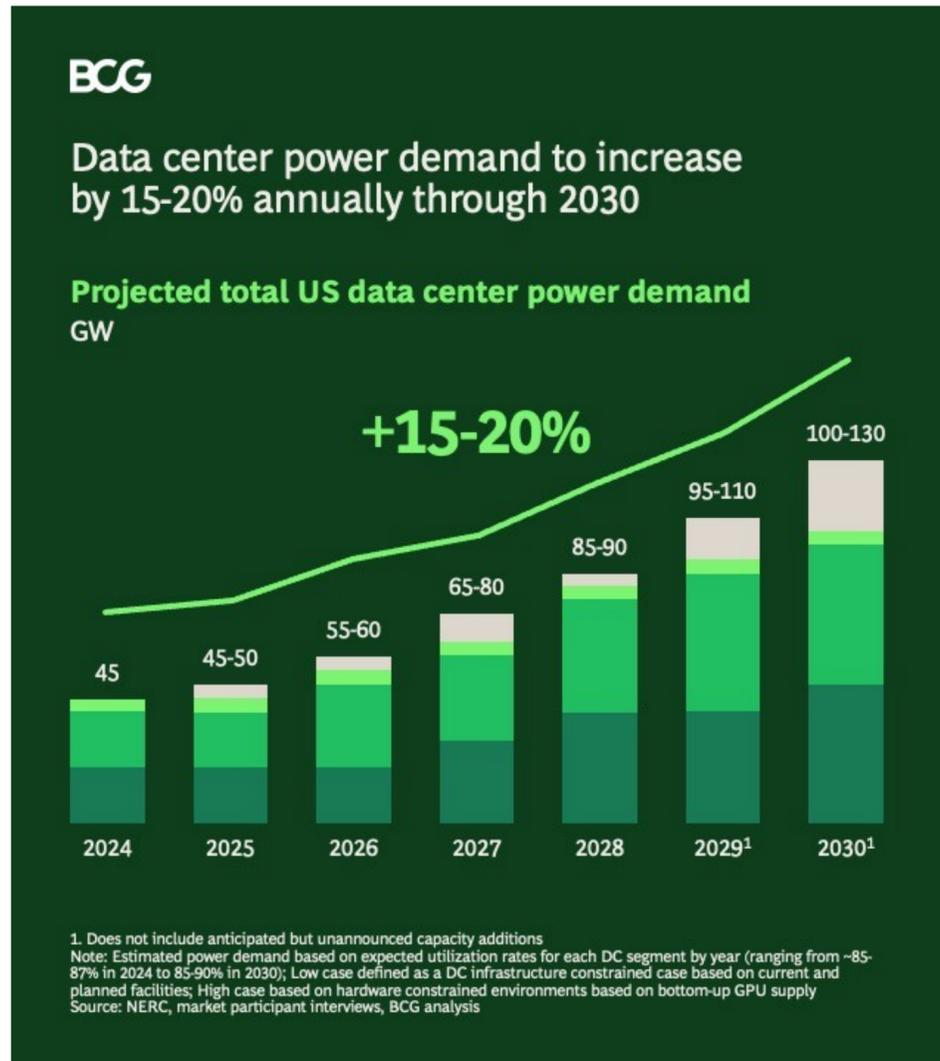
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**Attending this panel in personal capacity. These are individual views and do not represent Microsoft.*

11 March 2026

Energy is the new gold

BCG Report, June 2024



1000 TWh
@ 8 cents/Kwh

80 billion USD

50% due to
transmission, distribution,
and storage

Power grids are aging, hard to upgrade, resorting to non-green strategies.
High CAPEX, lossy transmission and distribution (T&D)



AI deployments getting bottlenecked

AI data centers causing "distortions" in US power grid - Bloomberg

THE WALL STREET JOURNAL.

BUSINESS | ENERGY & OIL

America's Biggest Power Grid Operator Has an AI Problem—Too Many Data Centers

Dutch grid crisis exposes Europe's AI energy infrastructure gap

The price of progress: AI's growing strain on energy and infrastructure

Sustainability crisis behind smart tech

Satya Nadella (BG2):

"The biggest issue we are now having is not a compute glut, but it's power."

Sam Altman (Davos):

"Energy breakthrough is necessary for future artificial intelligence".

Jensen Huang (Bloomberg):

"The AI industry always needs more energy".

How do we deploy AI compute?

Unbottlenecked

More sustainably

Terrestrial options

Bring power to compute:
co-locating data centers with power

- Attractive for giga-scale campuses
- Can **pair** with renewables, gas, or hybrid systems
- **Social-license** and “community-first” positioning is becoming part of the siting strategy

Challenges:

- Not all sites can host both power and hyperscale compute
- **Permitting** and **political pushback**
- Local water and **land** constraints



This is the **lowest-friction near-term** option

Google, Adani to Build \$15B Clean Energy-Powered AI Hub in Visakhapatnam

Google to develop 'clean energy' colocated data center in Wilbarger County, Texas

Set to be powered by onsite 'clean energy' developed by AES

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Terrestrial options

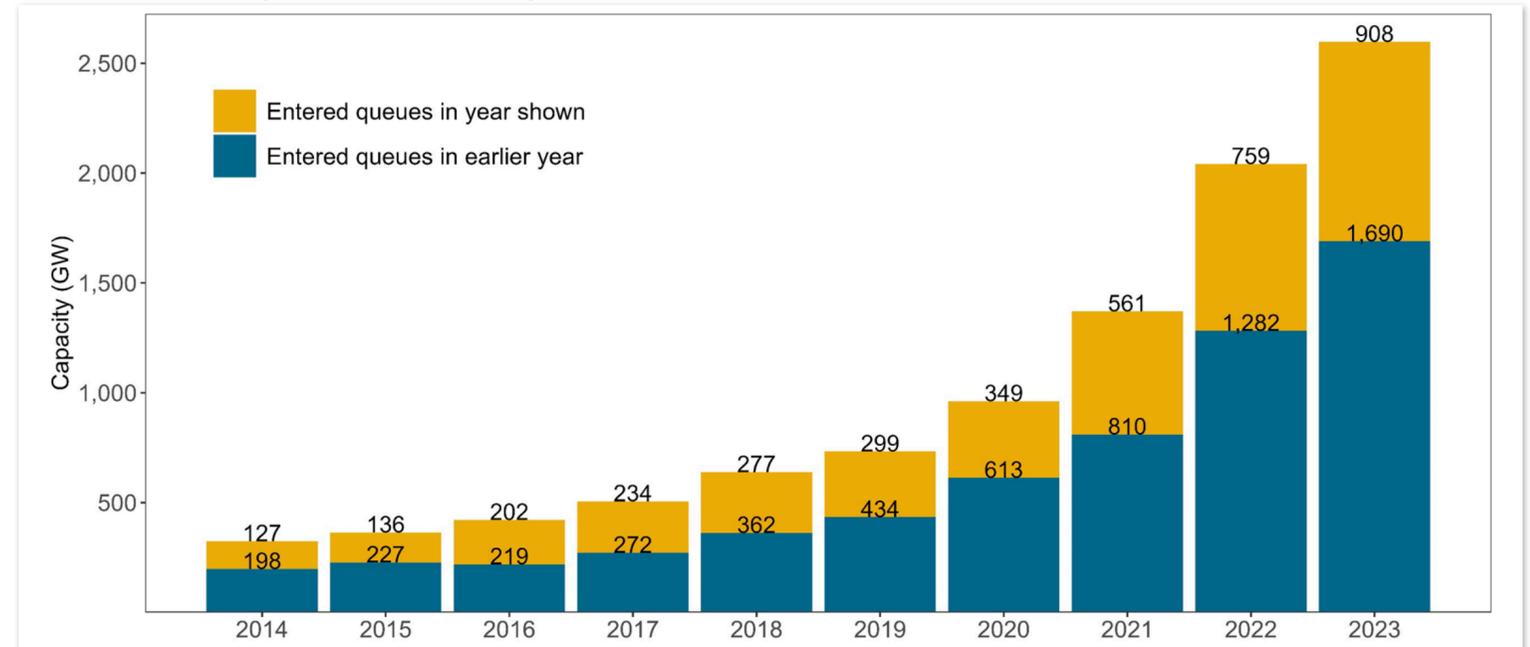
Geo-distributed modular data centers in renewable farms

- Use already-deployed but **curtailed** power, **interconnection queues**
- **Bring compute to available power** instead of always bringing power to compute
- Good match for distributed inference and flexible workloads

Challenges:

- **Intermittency**; lower utilization if badly orchestrated
- More **operational complexity**
- Network backhaul and remote maintenance

Berkeley Lab Report, 2024



Nvidia, Prologis, EPRI, InfraPartners target prefab data centers at substation sites

China Dives in on the World's First Wind-Powered Undersea Data Center

The \$226 million project uses ocean breezes and seawater to stay cool.



Terrestrial options

Innovations in nuclear energy; Small modular reactors (SMRs)

- Nuclear offers **24/7 firm low-carbon power**
- SMRs are meant to be **modular**, smaller-scale, and potentially easier to site
- Particularly attractive for large, **stable**, **high-availability** AI campuses

Challenges:

- High **CAPEX**
- **Nuclear waste** is hard to manage: US govt. currently stores waste across multiple sites
- **Risk** of accidents, public perception, regulations
- **Security concerns**: Both nuclear plants and data centers are critical infrastructure, colocating is risky
- Far away from urban centers



Why Microsoft made a deal to help restart Three Mile Island

A once-shuttered nuclear plant could soon return to the grid.

Google and Kairos Power Partner to Deploy 500 MW of Clean Electricity Generation

Amazon signs agreements for innovative nuclear energy projects to address growing energy demands

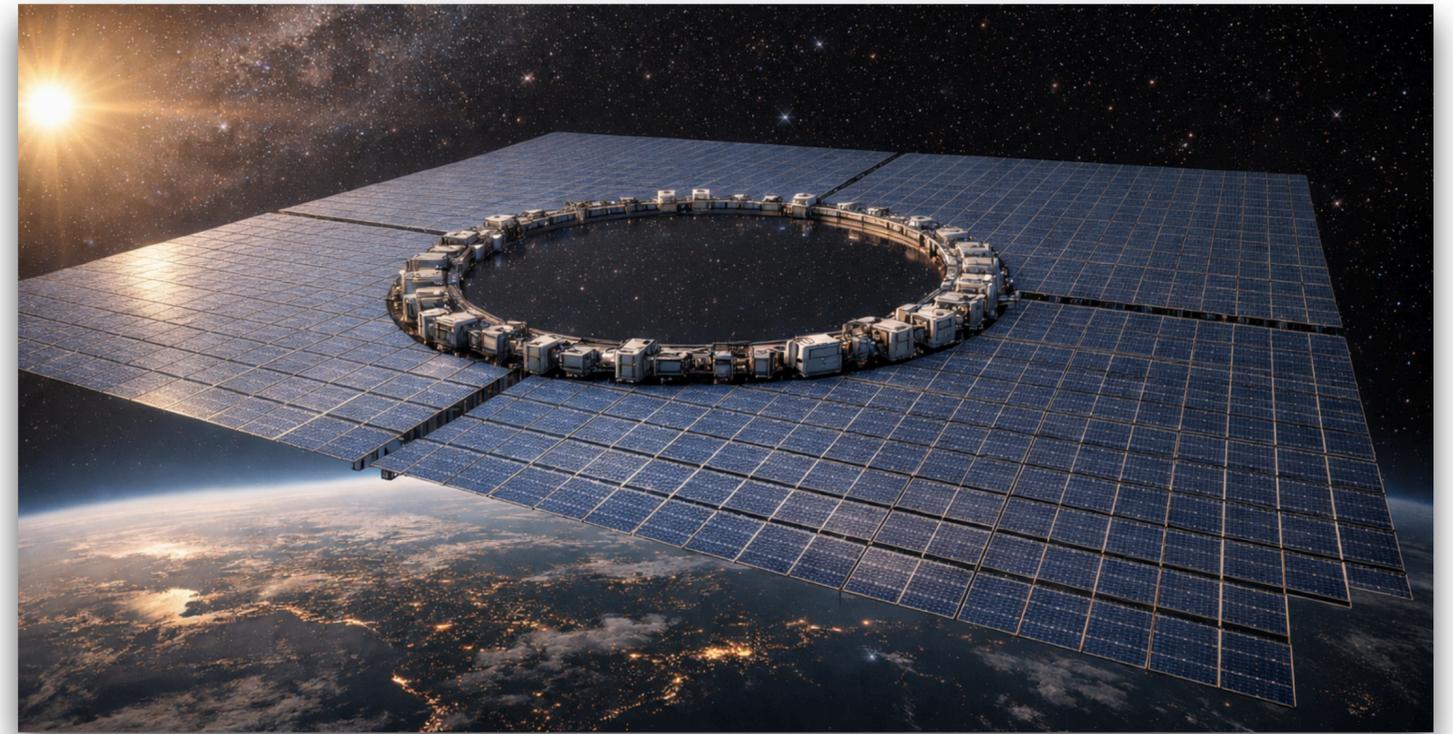
Space-based options

Centralized orbital data centers

- Abundant solar input; **sun-synchronous** deployment
- Liquid-cooled **compute shuttles**
- Containers to dock with the main structure for network, power, cooling
- Compelling for space-native workloads; data shuttles for **large model training**

Challenges:

- Additional **launch CAPEX**
- Users and data still on Earth; **costly data shuttles**
- **Maintenance hard**; debris could trigger Kessler syndrome
- No conduction/convection to the environment available; needs **innovation in radiative cooling**



TECH

‘Greetings, earthlings’: Nvidia-backed Starcloud trains first AI model in space as orbital data center race heats up

PUBLISHED WED, DEC 10 2025 9:05 AM EST | UPDATED FRI, JAN 9 2026 10:27 AM EST

Space-based options

Orbital connectivity
+ space-native compute ecosystem

- LEO **constellation** with onboard compute
- Good for Earth observation, defense, remote sensing, onboard filtering
- LEO satellite **AI inferencing**
- Up/downlink less of a bottleneck

Challenges:

- Large model **training hard over distributed compute** and inter-satellite links
- More PV and radiative cooling per satellite
- **Many moving parts**; risk of triggering Kessler syndrome; repairs impossible.
- Orbits getting crowded and **harder** to access.

SpaceX files for million satellite orbital AI data center megaconstellation

Musk co. claims hundreds of GW of compute in space

China plans space-based AI data centres, challenging Musk's SpaceX ambitions

Project Suncatcher is a moonshot exploring a new frontier: equipping solar-powered satellite constellations with TPUs and free-space optical links to one day scale machine learning compute in space.

 RAMON.SPACE

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Space-based options

space-based solar power beaming

- Collect solar energy in space and **beam to Earth via microwave or laser**
- Keeps the **compute on Earth** while moving the energy harvesting off Earth
- Conceptually attractive because it avoids putting full data-center infrastructure in orbit
- Baseline solar availability in space is attractive

Challenges:

- End-to-end **efficiency losses**
- **Pointing, safety, regulation, conversion** losses
- Large **receiving infrastructure** on Earth
- **Not yet cost competitive**

Solar panels in space 'could provide 80% of Europe's renewable energy by 2050'

New Study Updates NASA on Space-Based Solar Power

Japan plans first space solar power test. Can it beam energy from orbit?

Researchers envision a 'bright harvest' from space-based solar power

Developers say space-based solar will be cost-competitive with utility-scale PV. A new documentary showcases a Caltech team's efforts to supply the Earth with limitless energy from space.