

Enabling Datacenters Through Power-to-Compute Integration



- ➔ Driven by the **rapid growth of AI workloads**, datacenters are becoming critical infrastructure for the digital future.
- ➔ The **energy-intensive nature of AI** is making access to power the main constraint on new datacenter developments.
- ➔ **Integrated power and datacenter campuses**, enabled by Power-to-X expertise, offer a solution for next-gen digital infrastructure.

What are datacenters?

Datacenters are:

- ✓ Critical infrastructure that powers the internet, apps, and AI
- ✓ Purpose-built facilities to host servers, power, and cooling systems
- ✓ Part of the physical backbone of AI and cloud storage services

They are not:

- ✗ Only for saving and storing files
- ✗ Regular office buildings or warehouses with computers
- ✗ Something abstract that is “online” or “up in the air”

Main components of datacenter

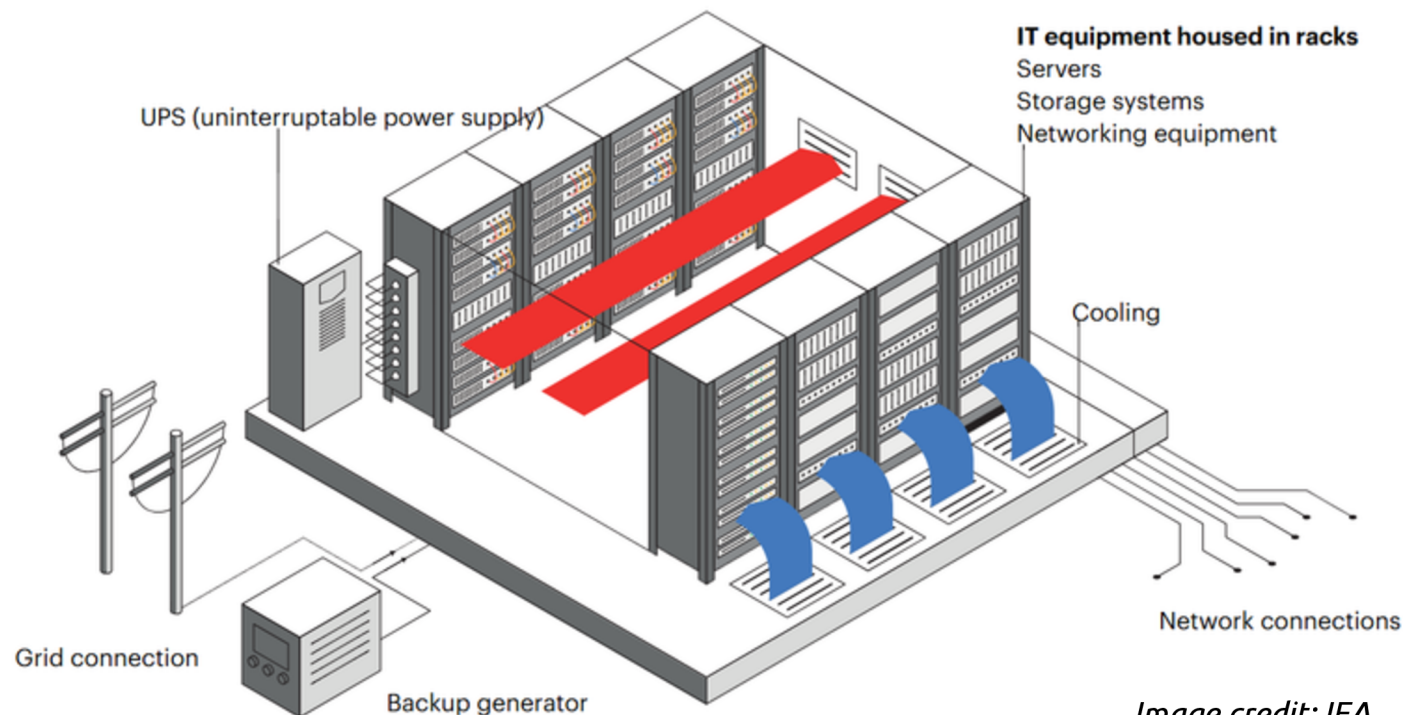
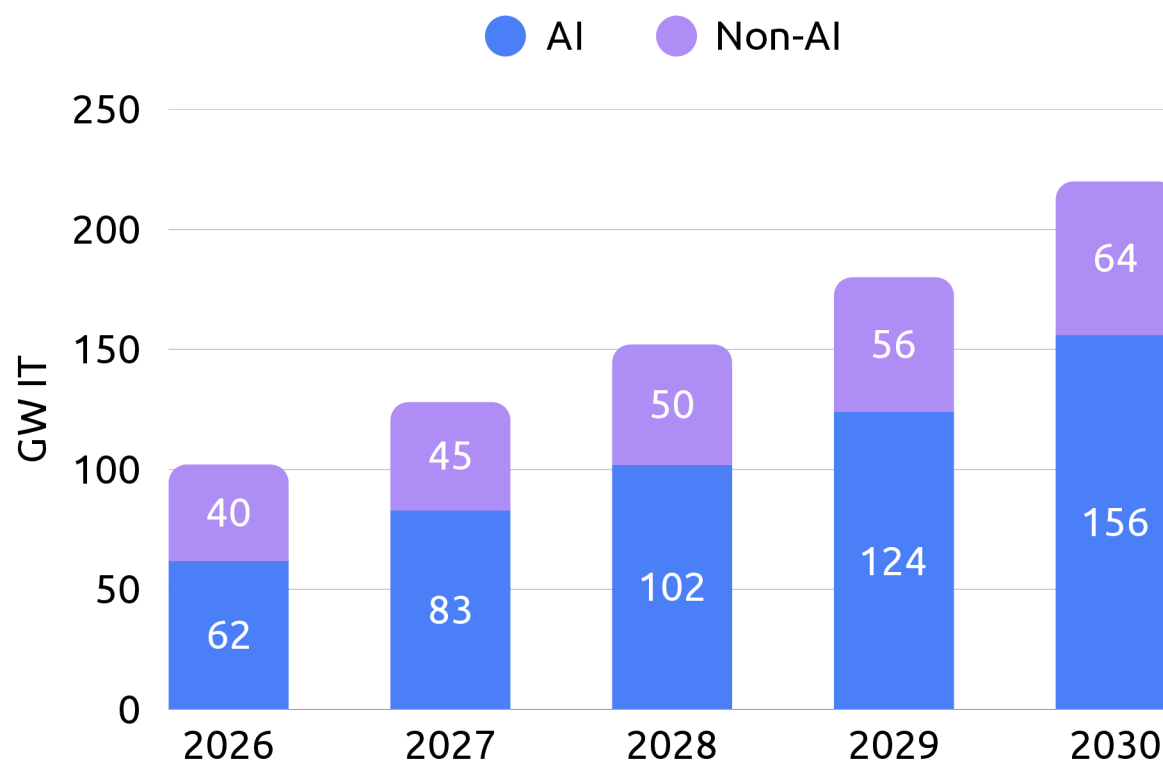


Image credit: IEA

AI is fueling datacenter growth

Global demand for datacenters is expected to double by 2030, mainly driven by the computing capacity for AI workloads.

Estimated global datacenter capacity demand

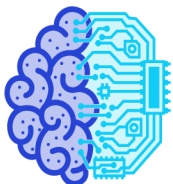


Source: McKinsey & Company



100+ GW of new datacenter capacity to be added between 2026-2030

70% of total datacenter capacity dedicated for AI workloads in 2030



Artificial intelligence (AI) workloads refer to computational power required to **develop, train, and run AI models**, compared to traditional IT tasks such as web hosting, enterprise database, email, and file storage.

Growing power consumption by AI datacenters

Datacenters' electricity consumption could double or more by 2030.

2024

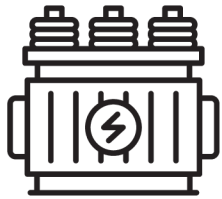
415 TWh

or 1.5% of global
electricity demand

2030

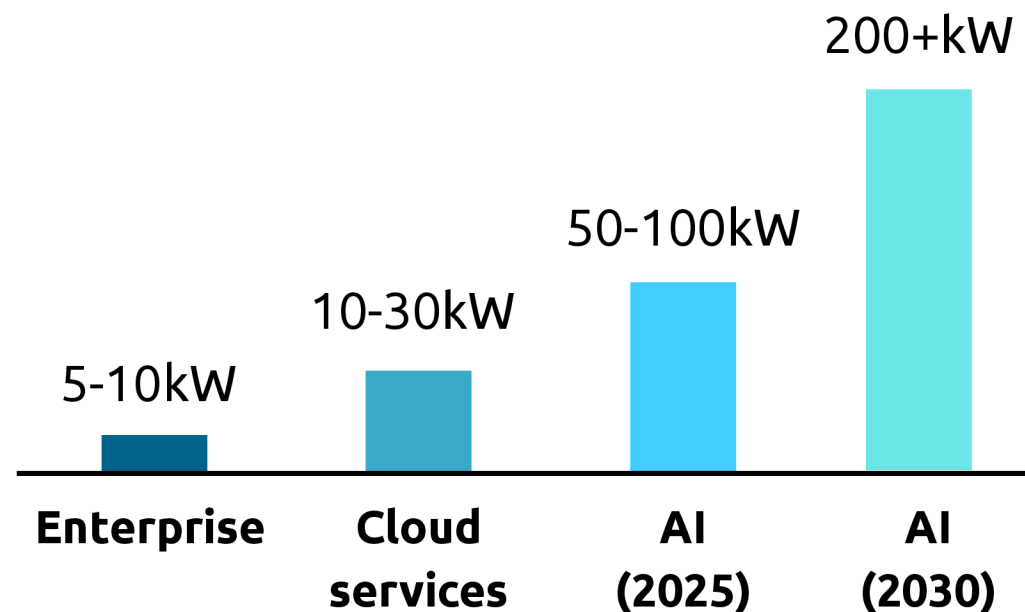
945 TWh

or 3% of global electricity demand
*(Equivalent to Japan's electricity
consumption)*

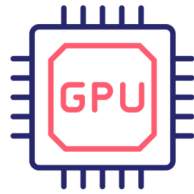


***This is mainly
due to the
power-intensive
nature of
AI datacenters***

Power consumption per rack in datacenters

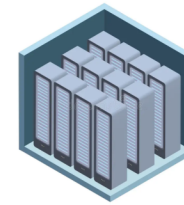


Why are AI datacenters so power-heavy?



GPUs as the engine behind AI

- Graphics Processing Units (GPUs) are central to AI workloads.
- They are designed to process large amounts of data at very high speed.
- They also consume more energy than conventional chips.



More GPUs per rack to handle heavy computing

- When multiple GPUs are connected together in clusters, their computing power increases significantly.
- To maximize performance, datacenters pack many GPUs into a single server rack.



The Energy Challenge

- As the number of GPUs per rack increases, so does the electricity consumption.
- Power is required not only for the processing chips, but also for high-speed networking and cooling systems that keep the hardware from overheating.

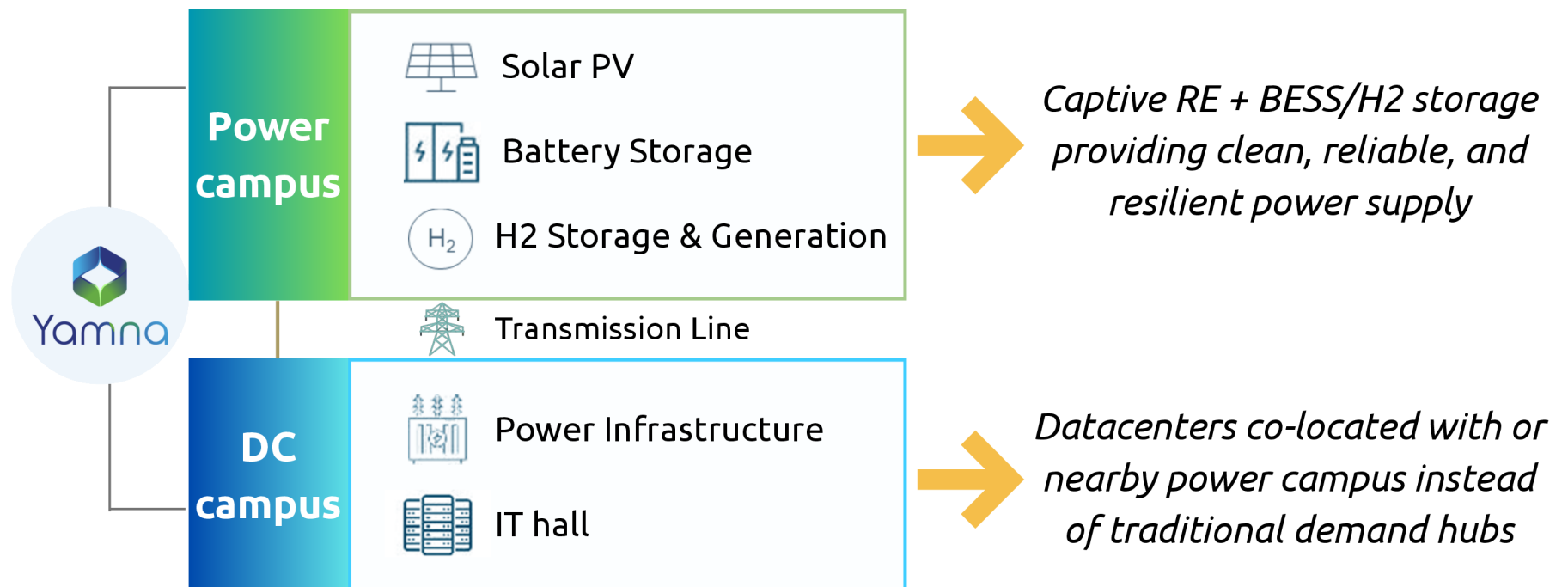
Rising power demand of AI datacenters is burdening limited grid capacity and causing long queues for grid connections



From renewable baseload to hyperscale compute

At Yamna, we align energy and digital assets from day one under a single platform, enabling faster and reliable deployment of datacenters.

Integrated Power + DC Campuses Model



Integration is no longer optional

- Power constraints mean energy solutions must be embedded within the project scope from the outset.

Energy expertise as a reliability enabler

- Capabilities in Power-to-X and H₂-based generation provide flexible and reliable power supply to digital infrastructure.

Datacenters increasingly follow power availability

- New developments are increasingly driven by access to energy, not proximity to traditional demand centers.



Yamna

**Yamna is a specialized Power-to-X platform
developing green molecules and digital
infrastructure projects worldwide**

Interested in partnering with us?

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