Preview of the 9th APEC Energy Outlook on Data Centre Electricity Demand

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Outline

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Data centres are essential to powering the digital economy

- The rapid deployment of AI is expected to cause a sharp increase in electricity demand in many economies.
- This surge creates new challenges for energy infrastructure and planning, as economies must balance:
  - Immediate and fast-growing demand;
  - Regionally concentrated load increases;
  - Commitments to low-carbon energy supply

Image source: Google

Growth and Investments in Selected Economies

Projections (non-exhaustive)

- **Korea:** Data centre electricity demand projected to reach **30 TWh by 2038**, accounting for **5.5% of total demand**, a **265% increase** from current levels.
- **Malaysia:** Preparing for a **3–5× expansion** in data centre capacity.
- **Singapore:** Projects a **35% increase** in data centre capacity.
- **Thailand:** Data centres expected to consume **2.5% of national electricity demand by 2030**.

Policies and Investments (non-exhaustive)

- **Indonesia: Tencent** to invest **US $500 million** in data centre development.
- **Korea:** Government announced a **US $70 billion** initiative for **AI and data centre investment** (April 2025).
- **Korea: Canada Pension Plan Investment Board** and **Pacific Asset Management Company** to invest **US $711 million** in data centres
- **Malaysia: Amazon** to invest **US $6.2 billion** for a new cloud region.
- **Thailand: TikTok** to spend **US $3.76 billion** on a new data centre, operational by **2026**

Preview of the 9th APEC Energy Demand and Supply Outlook

The Reference scenario (REF)

Economy-specific pathways based on **historical trends**, recent developments, and APERC's assumptions about the continuation of those trends in each APEC economy, while acknowledging technical restraints. REF offers a **baseline to compare with TGT projections**

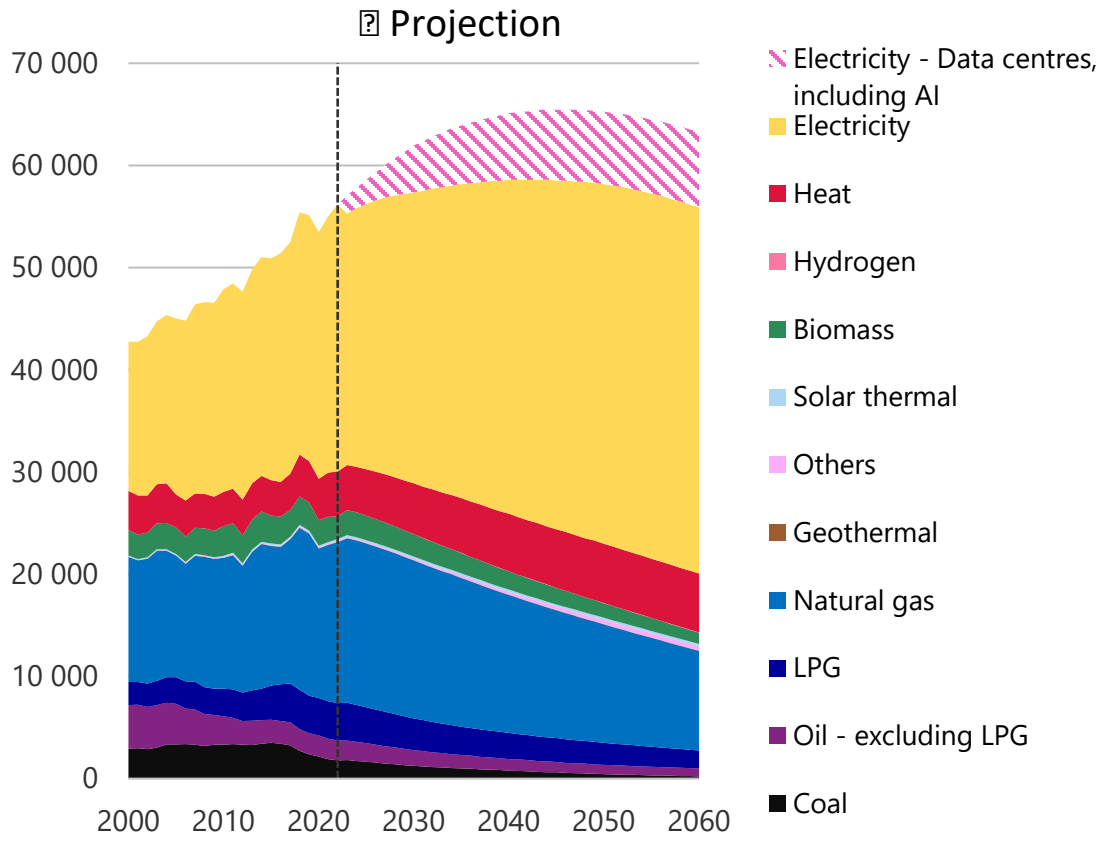
The Target scenario (TGT)

A **hypothetical pathway** where each economy **achieves its energy-related policy targets, assuming implementation** regardless of cost-effectiveness. When implementation details are lacking, assumptions are inferred from the targets themselves or emissions-related goals.

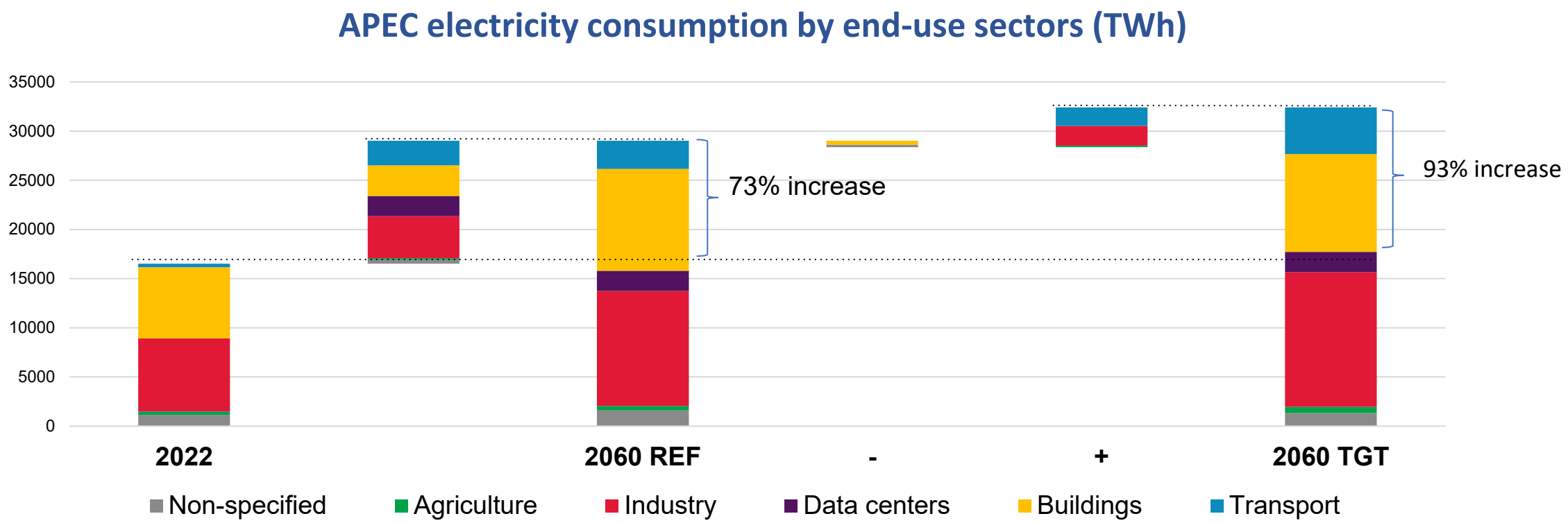
Introduction of data centres demand projections in the 9th Outlook

- Data centre energy demand is **modelled the same** in both **REF** and **TGT** scenarios.
- Treated as a **subsector within the buildings sector** in the model.
- **Projections** are based on **economy-specific indicators**, such as announced expansion plans and capacity.
- **Historical data** were **not separately identified** from total electricity demand before **2023**.
- **Potential constraints**, including hardware availability or grid capacity, are **not reflected** in the projections.

APEC Buildings electricity demand in TGT (PJ)



Strong growth in electricity consumption in APEC (preview)

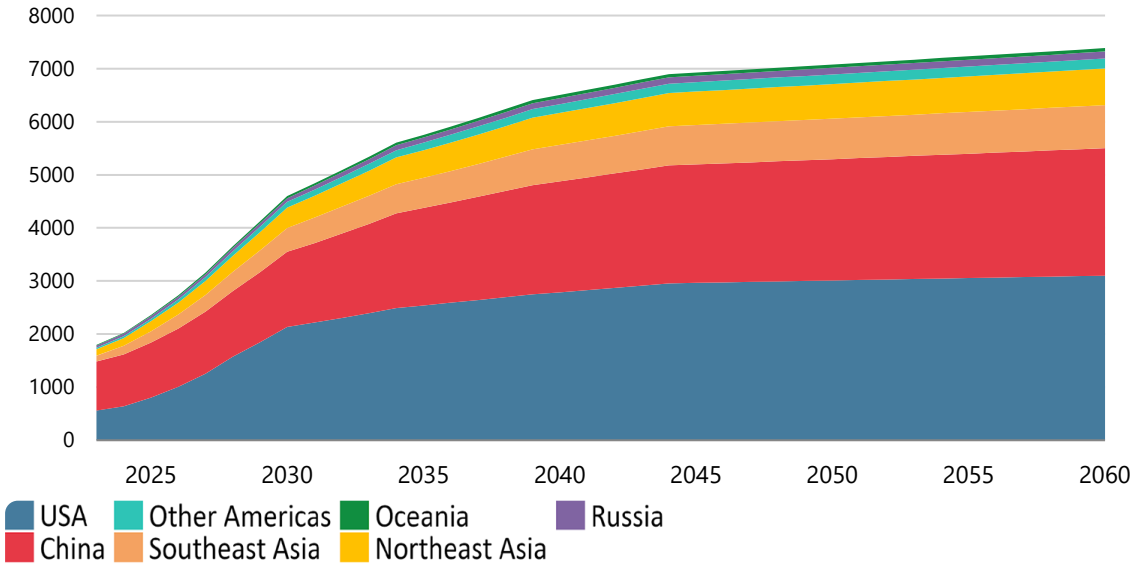


Sources: APEC statistics (EGEDA), APERC analysis

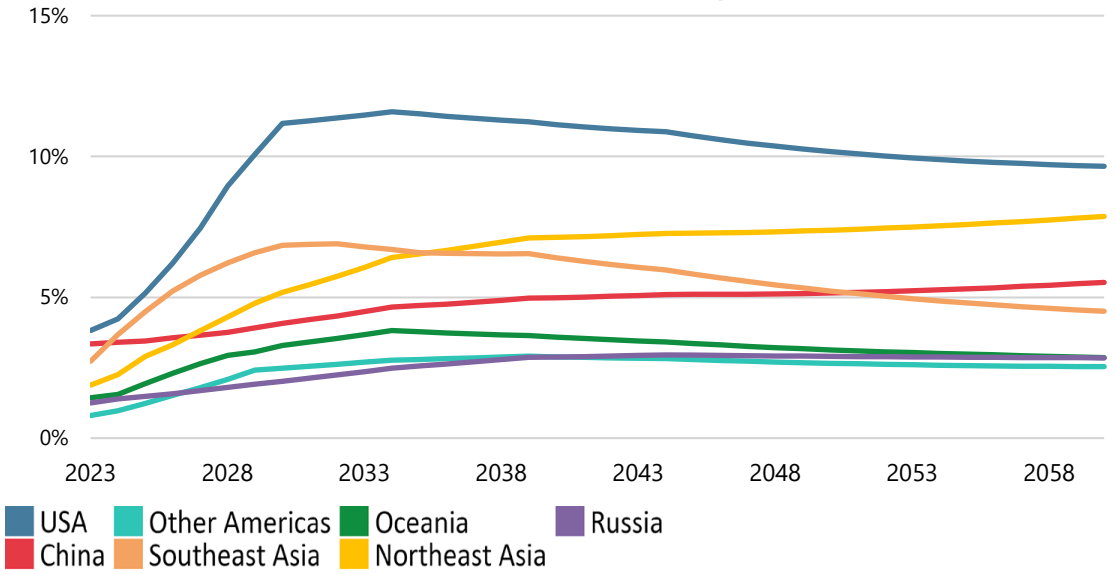
- Electricity demand in APEC grows by **73% in REF** and by **93% in TGT** by 2060.
- **Industry and data centres** together account for **about half** of this growth, which require a stable, 24/7 electricity supply.

Data centres drive significant electricity demand growth in most APEC subregions (preview)

Data centre electricity demand (PJ)

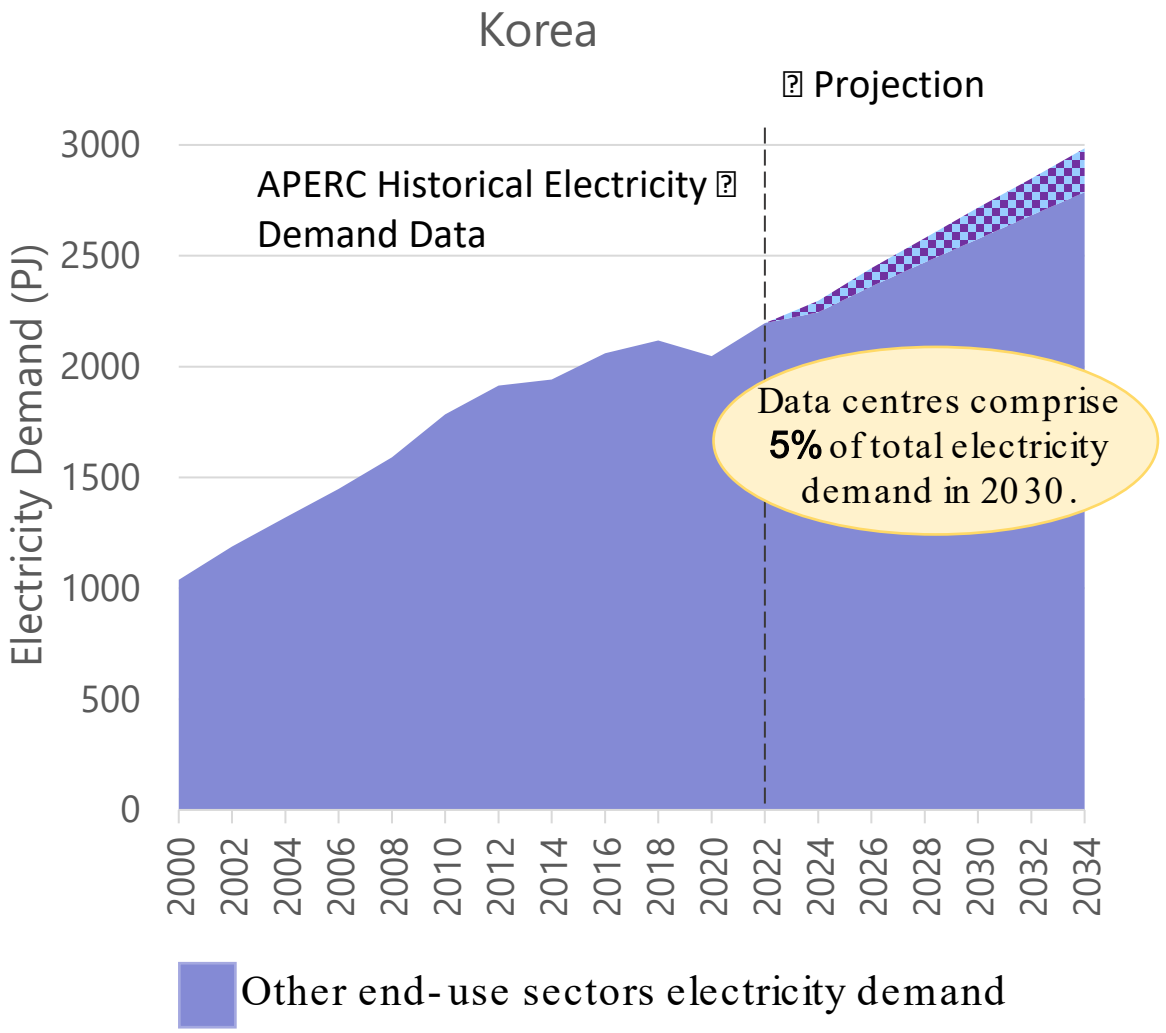


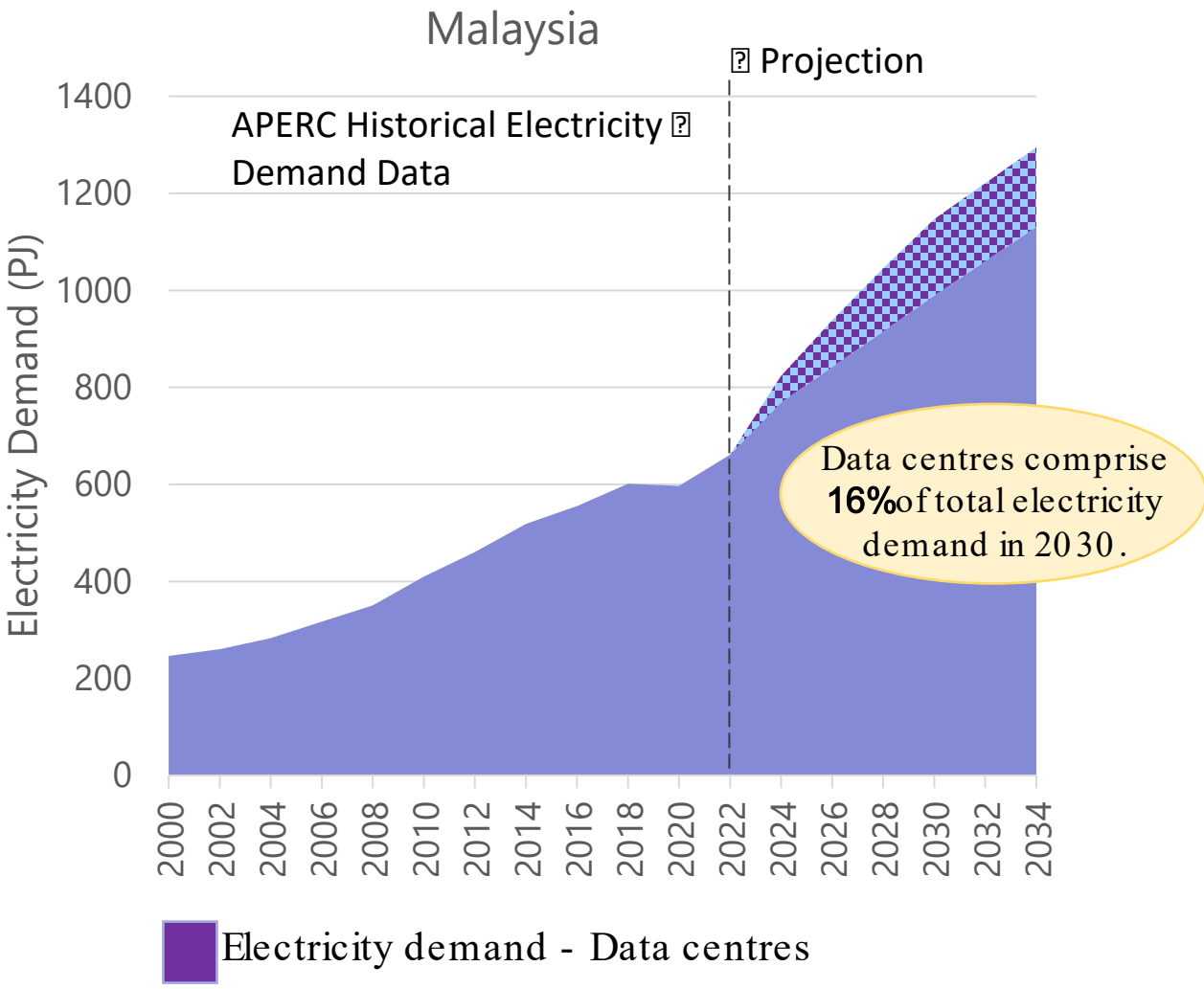
Data centre electricity demand (% of total electricity demand)



- Data centres and AI electricity demand in APEC **almost triples by 2030** and **quadruples by 2035**.
- The **share of data centre demand** rises rapidly across most APEC economies by the early 2030s.
- **Growth patterns of each economy vary** depending on scale, dominant AI applications, efficiency improvements, and policy measures.

Data centre energy demand varies across economies (preview)



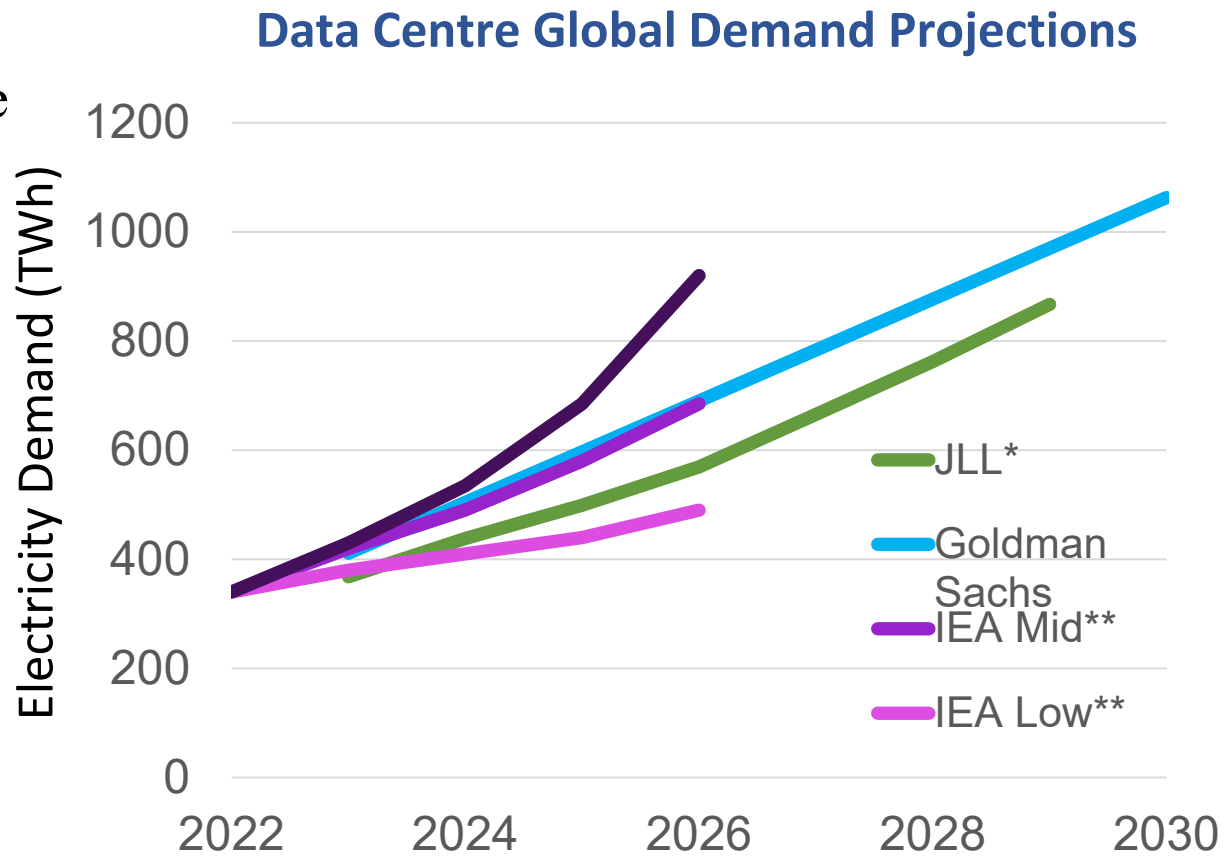


Opportunities: Data centres and AI expansion driving economic and energy innovation.

- **Economic opportunity**: Data centres are considered as strategic assets, creating jobs, attracting investment, and supporting economic development.
- **Investment catalyst**: Rising data-centre demand **stimulates new generation capacity**, grid upgrades, and broader power-sector investment.
- **Low-carbon transition**: **24/7 clean-energy commitments** from major tech companies are accelerating the **expansion of low-carbon generation.**
- **Operational innovation**: AI in energy applications can enhance **grid reliability** and **demand-side flexibility**, enabling continuous power supply for data centres.

Challenges: Uncertainties remain in long-term energy planning

- **Unpredictable projections**: The scale and pace of data-centre expansion, energy efficiency gains, and AI workloads make **future electricity demand highly uncertain**.
- **Clustered load stress**: Rapid, **localized growth** likely outpaces **grid infrastructure upgrades** and connection timelines, leading to **congestion and reliability risks**.
- **Clean-energy tension**: The **24/7 electricity demand** of data centres conflicts with the **intermittency of renewables**, while **nuclear and storage solutions** face **cost and deployment challenges**



APERC Analysis of JLL, Goldman Sachs, and IEA data.

Not for public distribution.

*Jones Lang LaSalle Incorporated (US investment company).
**IEA data originally included electricity demand from cryptocurrencies. To ensure consistency across data sets, 2023 IEA electricity demand for cryptocurrencies (130 TWh) was subtracted from all years for IEA data. APERC-adjusted IEA values are displayed.

Key Takeaways

- **Rapid expansion**: APEC Electricity demand is projected to **grow rapidly**, primarily driven by **industrial electrification** and **data-centre growth**.
- **Diverse pathways**: Data-centre electricity use **nearly triples by 2030** and **quadruples by 2035**, but growth rates differ by economy depending on **efficiency and policy.**
- **High uncertainty**: The **scale and efficiency of AI deployment**, as well as **grid readiness**, remain uncertain, making long-term energy planning complex.
- **Concentrated impacts**: **Localized surges in demand** could strain grids and **conflict with clean-energy goals** where power capacity or transmission is limited.
- **Balancing priorities**: It is important to balance securing **fast and reliable power** for data centre competitiveness with the need to meet **clean energy goals and maintain grid stability.**
- **Cooperation needed**: Collaboration among **governments and industry** is essential to manage grid bottlenecks, scale clean energy, and secure sustainable data-centre growth.

Sources

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Thank you.

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