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PERSPECTIVES

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Meeting AI's Energy Demand Sustainably

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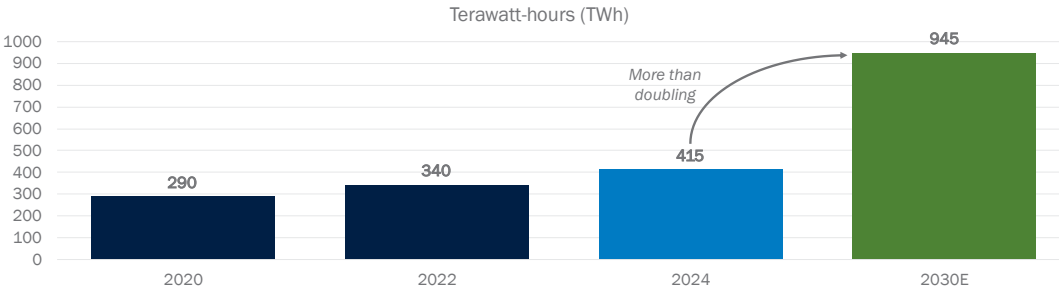
The power demands of artificial intelligence are frequently framed as a threat to the world's climate ambitions. In our view, that framing misses the point. The real question is whether AI's energy needs can be met in a way that is sustainable in the fullest sense of the word: reliable enough to run around the clock, affordable enough to avoid a political backlash, and clean enough to reduce emissions intensity. The stakes for addressing these three challenges have made it a top priority for more and more countries around the world. And we believe the capital needed to do so represents one of the broadest investment opportunities in decades.

A Demand Shock Two Decades in the Making

For roughly twenty years, electricity demand in the developed world barely moved. Efficiency gains in appliances and lighting, the offshoring of heavy industry, and the sluggish pace of electrification of industry all contributed to this dynamic. In some markets, surplus capacity even forced generation assets into early retirement, including nuclear plants that would be considered strategic today.

That era has ended. The International Energy Agency projects that global data center electricity consumption will more than double by 2030, from around 415 terawatt-hours in 2024 to approximately 945 terawatt-hours.[1] The driver is the intensity of compute inside modern facilities. Ten years ago, a 30-megawatt data center was considered large. Today, 100-200 megawatts is normal for AI data centers, and hyperscalers plan campuses measured in gigawatts, with a single gigawatt roughly equivalent to the power consumed by a million homes. McKinsey estimates the US alone will need around 18 gigawatts of additional capacity to serve data centers by 2030, close to three times the current power demand of New York City, while estimates from Goldman Sachs and Morgan Stanley forecast up to 100 gigawatts needed over this same time period.[2]

Exhibit 1: Global data center electricity consumption



Source: IEA, Energy and AI (2025). 2030 is an IEA base-case projection.

1 Source: IEA, Energy and AI, 2025.

2 Source: McKinsey & Company, Investing in the rising data center economy, January 2023; How data centers and the energy sector can sate AI's hunger for power, 2024.

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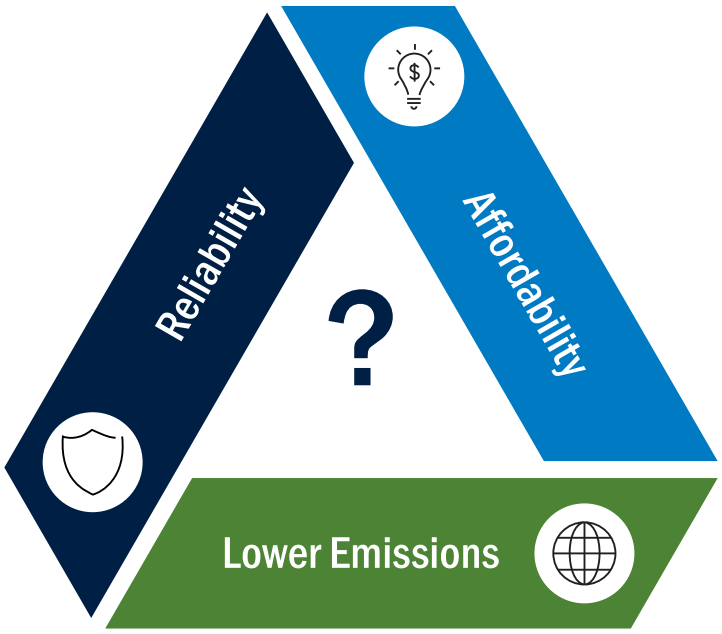
Efficiency gains at the chip level will not make this go away. Each new generation of processors delivers more compute per watt, yet total demand keeps rising because cheaper compute stimulates more usage, a dynamic that economists have recognized since the nineteenth century as Jevons paradox. The latest reasoning models, which reflect and revise their answers before responding, consume materially more power per query than their predecessors. As they become the standard, we expect them to accelerate demand rather than temper it.

What "Sustainable" Actually Requires

Sustainability, in this context, means more than emissions. A buildout of this scale can only be sustained if the power behind it is dependable, if the cost is politically and commercially tolerable, and if it at least does no harm to the global environmental footprint. Fall short on any one and the whole effort stalls. Clean but intermittent supply from solar and wind energy will not run a data center that requires up-time around the clock. A clean and reliable power supply for a data center that pushes household electricity bills sharply higher won't work for consumers or policymakers, with those in a growing number of US states already insisting they won't pay for data center growth, a reflection of the "not in my backyard" mentality.[3]

Hence the Energy Trilemma: the competing demands of reliability, affordability, and lower emissions. No single energy source satisfies all three. Nuclear is clean and dependable but capital-intensive and slow to build in most countries. Solar and wind are clean and, at times, remarkably cheap, but intermittent. Natural gas and coal are reliable and affordable but, particularly in coal's case, carry higher emissions. Any credible answer to AI's power needs must navigate all three constraints at once, because history shows that pushing hard on one side of the triangle while ignoring the others produces policy reversals, supply disruptions, and/or public backlash.

Exhibit 2: The Energy Trilemma – The elusive balance that societies seek



Importantly, the environmental pillar has not weakened just because the political weather has shifted in some countries. The largest AI power consumers are technology companies that have made net-zero commitments to their shareholders and the public at-large, backed by large balance sheets. Recently signed multi-decade power purchase agreements between hyperscalers and nuclear operators offer perhaps the clearest evidence of these intentions as these are binding contracts between some of the world's most cash-generative companies and providers of clean, round-the-clock power.

[3] Source: Yale University, The Politics of AI: Will Bipartisanship Last or Is Polarization Inevitable?

The Answer Is All of the Above

The sustainable path to meeting AI's electricity demand, in our view, runs through every credible energy source, with each contributing what it does best.

Nuclear offers the combination the hyperscalers most want: zero point-of-use emissions and dependable baseload power generation. Its constraints are speed and cost - large US plants take many years and cost tens of billions of dollars to build. Additionally, merchant nuclear plants available to sign multi-decade power supply contracts with hyperscalers account for a small fraction of domestic generation capacity, which is precisely why existing merchant nuclear assets have re-rated so significantly and why operating license extensions, nuclear plant restarts, and promoting new scalable technologies have moved from the fringe to the center of energy policy.

Natural gas offers a pragmatic bridge as its carbon intensity is half that of the coal it displaces.[4] It is dispatchable and can be built faster than nuclear. Although gas turbine order backlogs now stretch to the end of the decade, smaller, more modular behind-the-meter solutions have been increasingly called on to bridge not only the time to power but to provide excess supply and thereby address consumer electricity affordability. Coal still generates a substantial – and, in some regions, potentially growing – share of the world's electricity. Every coal-to-gas displacement makes for a real emissions reduction regardless of what may be a higher operational footprint by the gas supplier.

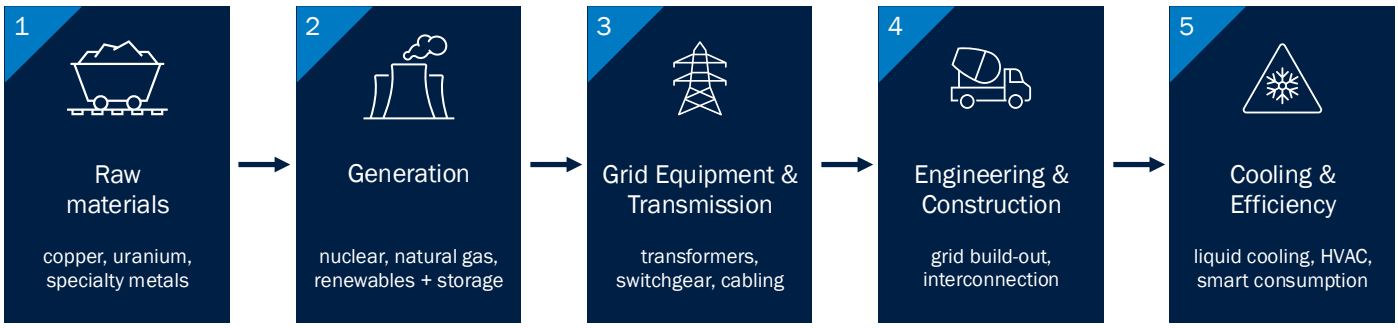
Renewables and battery storage remain the fastest capacity to deploy and offer an increasingly practical complement to baseload power. Economics can vary by region, and the inherent intermittency and consequent infrastructure improvements needed to compensate, means they answer part of the question rather than all of it.

Efficiency is the quiet workhorse. Every megawatt not consumed reduces emissions, frees up capacity for other users, and lowers costs simultaneously. As the IT rack densities within data centers climb past the limits of air cooling, liquid cooling and advanced thermal management have shifted from optional to essential, while smarter consumption technology helps grids absorb an increasingly variable supply mix.

Follow the Bottlenecks

Power generation is only the most visible part of the challenge. The grid buildout runs through a long physical value chain, and at each stage the binding constraint differs. Copper supply has tightened even as the data center wave has barely started, and the same can be said for uranium. Transformer and switchgear delivery times have stretched to multiple years. Transmission interconnection queues and permitting can add the better part of a decade in some regions. Skilled electricians and construction labor may prove the least discussed constraint of all.

Exhibit 3: Meeting AI's power demand requires the full value chain



Source: Jennison. For illustrative purposes only.

[4] Source: Thunder Said Energy.

These bottlenecks will surface and recede in turn - which is why we expect the buildout to be choppier than headline forecasts imply and why we are skeptical of approaches that concentrate on a single technology or a single point in the chain. The early winners were the obvious ones: existing clean-generation and the electrical equipment makers. As the complexity of the task becomes more apparent, we expect value to accrue to a much wider set of companies, many of them businesses that the market long regarded as mature and slow-growing but now face demand of a scale that warrants a fundamentally different valuation.

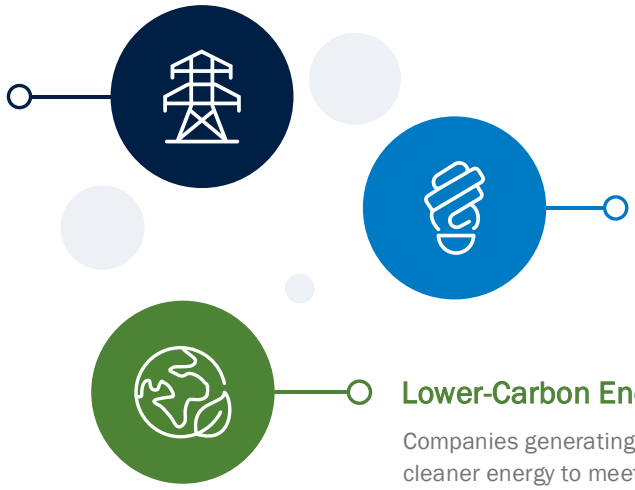
An Investment Philosophy Built for the Global Energy Trilemma

Over the next decade alone, countries around the world will spend hundreds of billions - if not trillions - of dollars on raw materials, equipment, and infrastructure as they race to tackle the global energy trilemma. Jennison's Global Power Solutions strategy seeks to harness the breadth of that enormous investment opportunity by applying a holistic approach to identifying and investing in the companies that are best positioned to meaningfully address this monumental and complex challenge.

Our comprehensive approach to investing in alleviating the global energy trilemma focuses on three structural themes — **electrification**, **energy efficiency**, and **lower carbon energy** — and spans the full value chain of solutions from copper and uranium to power generation assets and grid infrastructure to industrial equipment that consumes energy more efficiently. We use the term "lower carbon energy" rather than "clean energy" deliberately as we believe the most pragmatic supply response includes sources at different points on the carbon intensity spectrum, each with a genuine role to play.

Power is the foundational enabler of AI adoption: without reliable, affordable, and lower-carbon electricity, demand cannot be satisfied at-scale. The companies supplying AI's voracious power needs benefit from rising AI adoption regardless of which model prevails or which application reshapes which industry. That's why we believe investing in the power infrastructure value chain enabling AI is a more durable way to benefit from rising AI adoption than investing directly in the artificial intelligence companies themselves.

Exhibit 4: The Global Power Solutions Opportunity Set



Electrification

Companies powering the shift from fossil fuels to electricity across transport, buildings, and industry

- Grid operators & construction
- Electric vehicles & batteries
- Power equipment & automation
- Smart grid technology

Energy Efficiency

Optimizing output per energy input through processes, equipment, materials and technologies

- Smart HVAC/Sensors
- Advanced composites
- Automation software
- Power conversion

Lower-Carbon Energy

Companies generating and supplying cleaner energy to meet demand growth

- Natural gas & LNG
- Nuclear
- Solar & Wind
- Geothermal

Source: Jennison. For illustrative purposes only.

Conclusion

AI's growing energy demand is often framed as a trade-off between progress and sustainability. We see it differently: the demand growth is coming, and the key question is how effectively it can be met. Doing so sustainably means delivering power that is reliable, affordable, and cleaner, drawing on every link in the physical value chain from energy source to processor chip. For investors willing to look beyond a single fashionable segment, we believe the next decade offers an unusually broad opportunity set. The artificial intelligence economy is being built on power infrastructure, and that foundation is only beginning to take shape.

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