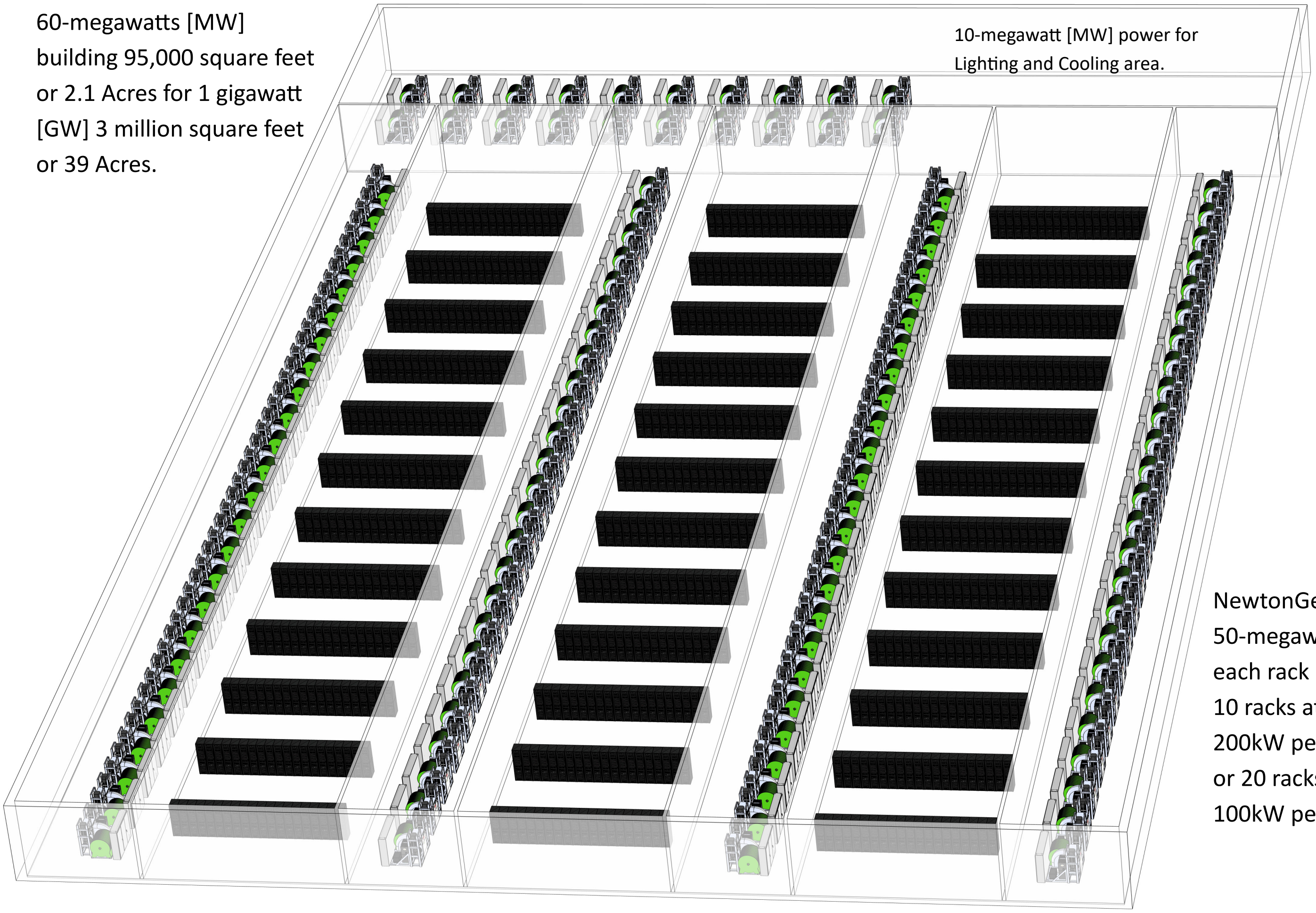
NewtonGen
New science sustainable energy

Cooling Needs No Water. Find all your power, cooling and data center server racks under a single roof.

60-megawatts [MW] building 95,000 square feet or 2.1 Acres for 1 gigawatt [GW] 3 million square feet or 39 Acres.



10-megawatt [MW] power for Lighting and Cooling area.

NewtonGen AI 50-megawatts, each rack line 10 racks at 200kW per rack or 20 racks at 100kW per rack.

60 megawatt [MW] 95,000 square feet or 2.1 Acres for 1 gigawatt [GW] 3 million square feet or 39 Acres.

Next-Generation Racks: Massive training clusters utilizing high-density arrays (like the NVIDIA GB200 NVL72) or 2026/2027 server designs can push power envelopes past (100 kW) to (200 kW) per rack.

Insulating against 100 dB of noise (the equivalent of a jackhammer or passing train) requires a "decoupled" construction method combining mass, absorption, and vibration isolation. A single layer of standard drywall will not be enough; you need a multi-layered barrier to reduce the volume to a safe, quiet level.

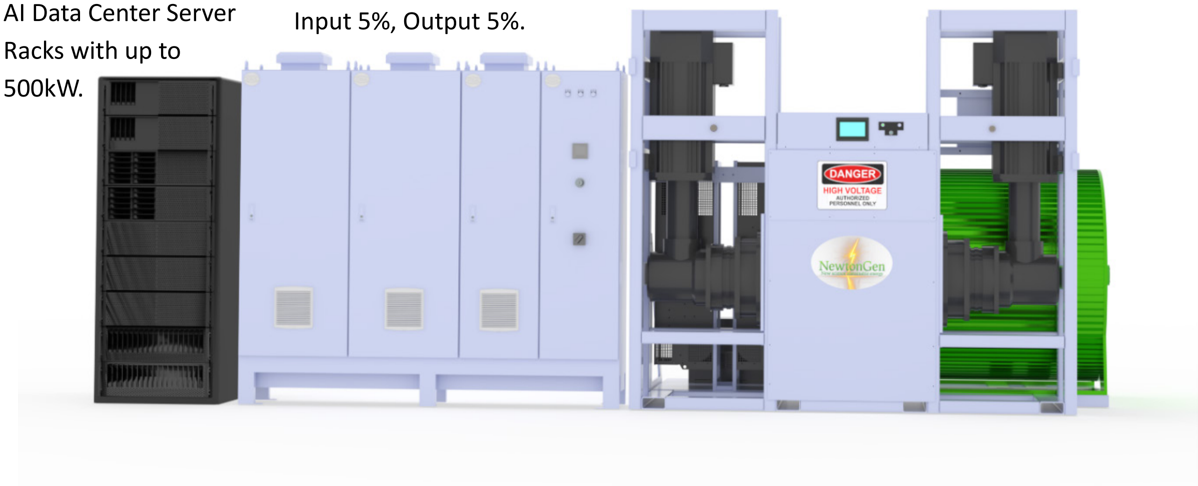
Patent Pending

Put the power where you need it and save big time!

NewtonGen AI 500kW is capable of powering AI Data Center Server Racks with up to 500kW.

Independiente electrical distribution with Integrated Regulator-Transformer Voltage Regulation Accuracy: Input 5%, Output 5%.

NewtonGen AI 500kW is a new science system for sustainable energy. That generates primary power for AI data centers.



AI Data Center NewtonGen Electrical System Size 1.3-Gigawatt (GW)

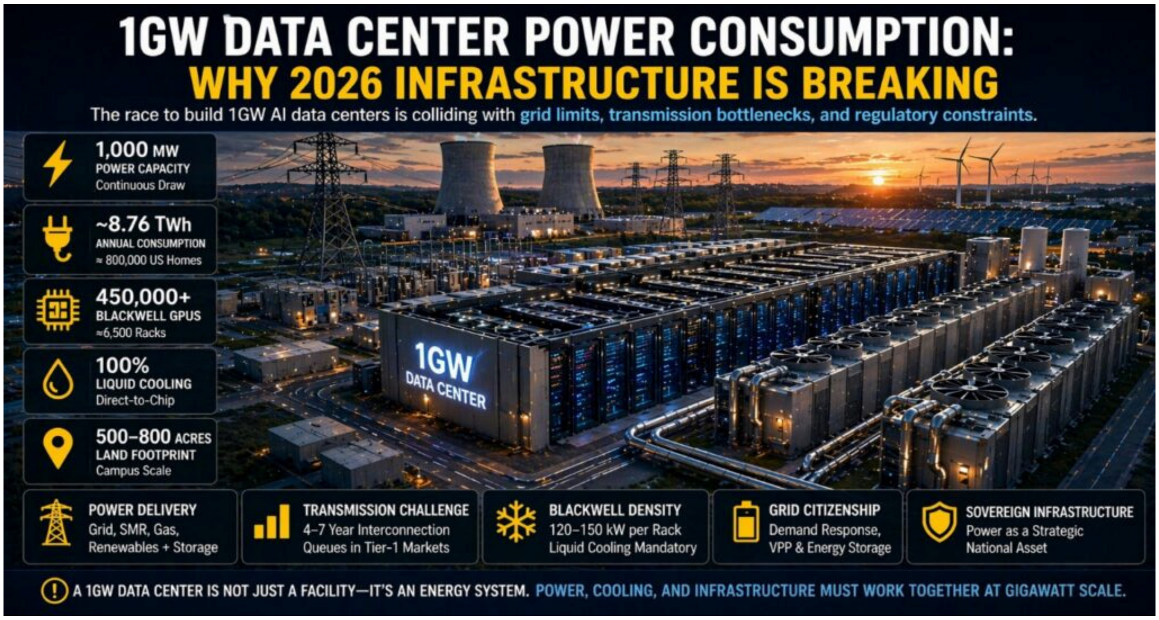
Project 1-Gigawatt (GW) AI data center

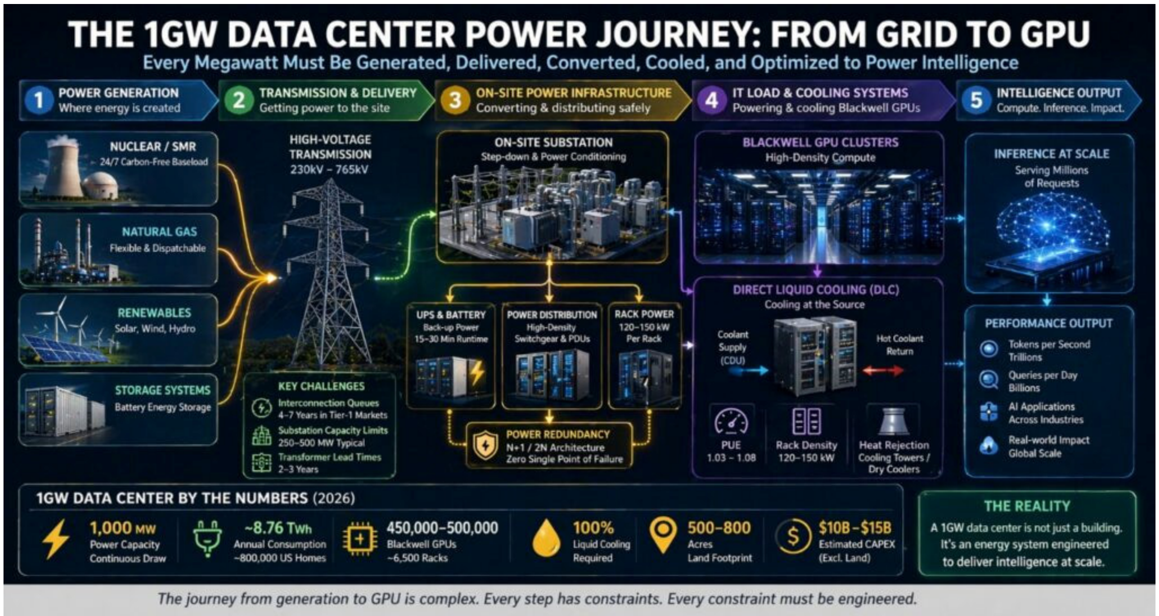
	List Price	Discounted Price	Units Needed for 1GW AI DATA CENTER	Total Cost	Unit Gross Profit	Total Gross Profit
NewtonGen AI 500kW	$950,000.00	$900,000.00	2600	$2,340,000,000.00	$740,000.00	$1,924,000,000.00
Independiente electrical distribution for each NewtonGen and CPU rack and Building and Cooling System cost.	$400,000.00	$375,000.00	2600	$975,000,000.00	$50,000.00	$130,000,000.00
Total Cost:				$3,315,000,000.00	Total Gross Profit:	$2,054,000,000.00

	At current US commercial electricity rates of $0.10 per kWh	Total Power 1.0-Gigawatt (GW)	Cost for each hour	Cost for 24hours	Payback "ROI" days	Payback "ROI" Years
NewtonGen Electrical System Size 1.3-Gigawatt (GW) Payback "ROI"	$0.10	1000000.00	$100,000.00	$2,400,000.00	1,381days	3.78yrs

Patent Pending

These designs cost billions, and then came the NewtonGen design!





A medium-sized data center can consume up to roughly 110 million gallons of water per year for cooling purposes, equivalent to the annual water usage of approximately 1,000 households. Larger data centers can each “drink” up to 5 million gallons per day, or about 1.8 billion annually, usage equivalent to a town of 10,000 to 50,000 people. Together, the nation’s 5,426 data centers consume billions of gallons of water annually. One report estimated that U.S. data centers consume 449 million gallons of water per day and 163.7 billion gallons annually (as of 2021). A 2016 report found that fewer than one-third of data center operators track water consumption. Water consumption is expected to continue increasing as data centers grow in number, size, and complexity. (Copied from online source)

Patent Pending

Operating costs are modest relative to capital outlays. Power is the largest, with a gigawatt-scale site consuming about $1.3 billion in electricity annually at $0.15 per kWh.

A 1 gigawatt (GW) artificial intelligence data center requires approximately **10 to 15 million square feet** of physical floorspace, spanning a campus of **500 to 800 acres**. To build at this scale, you need to understand the power footprint, infrastructure, and real estate layout. [1, 2, 3, 4, 5]

A 1-Gigawatt (GW) AI data center requires a dedicated power footprint ranging from a fraction of a square mile (for traditional plants) up to 20 square miles (for solar). The power plant's physical space depends entirely on the energy generation source: [1, 2, 3]

Space Required by Power Source (For 1 GW / 1,000 MW Output)

- **Nuclear Power:** ~36 million sq. ft. (\(1.3\) sq. miles or \(\approx 3.4\) sq. km). Nuclear is the densest energy source.
- **Natural Gas (Combined Cycle):** ~14 million to 28 million sq. ft. (\(0.5\) to \(1.0\) sq. miles).
- **Utility-Scale Solar:** \(150\) million to \(300\) million sq. ft. (\(3,500\) to \(7,000\) acres, or \(5.5\) to \(11\) sq. miles). [1, 2]

How This Translates to Data Center Space

A data center drawing 1 GW is a massive facility, often spanning over \(4\) million square feet of physical building space across multiple server halls and campuses. [1]

Because data centers require 24/7, uninterrupted baseload power to train frontier AI models, operators rarely build on-site solar farms of this size. Instead, they typically connect directly to the regional electric grid or partner with utility companies to secure power through: [1, 2, 3]

1. **On-Site Generation:** On-site gas turbines or small modular nuclear reactors (if permitted).
2. **Off-Site Power Purchase Agreements (PPAs):** Purchasing gigawatts of power from off-site regional grids, which pull from a mix of natural gas, nuclear, and renewable farms. [1, 2, 3]

Finding or building 1 GW of power generation is currently the biggest bottleneck in the AI sector. To explore energy infrastructure regulations, you can check resources like the U.S. Department of Energy.

- A 1,000-megawatt nuclear facility needs just over one square mile
- Intermittent wind and solar need much more area to generate the same power
- No U.S. wind or solar facility generates as much as the average nuclear plant

Wind farms require up to 360 times as much land area to produce the same amount of electricity as a nuclear energy facility, a Nuclear Energy Institute analysis has found. Solar photovoltaic (PV) facilities require up to 75 times the land area.

A 2015 report, “Land Requirements for Carbon-Free Technologies,” compared the land area that various types of electricity generation facilities would require to produce the same amount of electricity as a 1,000-megawatt nuclear power plant in a year. The results highlight the exemplary performance reliability of nuclear energy facilities as well as the very high energy density of nuclear fuel.

A nuclear energy facility has a small area footprint, requiring about 1.3 square miles per 1,000 megawatts of installed capacity. This figure is based on the median land area of the 59 nuclear plant sites in the United States. In addition, nuclear energy facilities have an average capacity factor of 90 percent, much higher than intermittent sources like wind and solar.

By contrast, wind farm capacity factors range from 32 to 47 percent, depending on differences in wind resources in a given area and improvements in turbine technology. Solar PV capacity factors also vary based on location and technology, from 17 to 28 percent.

Taking these factors into account, a wind farm would need an installed capacity between 1,900 megawatts and 2,800 MW to generate the same amount of electricity in a year as a 1,000-MW nuclear energy facility. Such a facility would require between 260 square miles and 360 square miles of land.

A solar PV facility must have an installed capacity of 3,300 MW and 5,400 MW to match a 1,000-MW nuclear facility’s output, requiring between 45 and 75 square miles.

For comparison, the District of Columbia’s total land area is 68 square miles. The island of Manhattan is 34 square miles, and New York City’s five boroughs (Manhattan, Brooklyn, Queens, Staten Island and the Bronx) take up 305 square miles.

No wind or solar facility currently operating in the United States is large enough to match the output of a 1,000-MW nuclear reactor. The country’s largest wind farm, Alta Wind Energy Center in California, has an installed capacity of 1,548 MW. The largest solar PV plants are the 550-MW Topaz Solar Farm and Desert Sunlight Solar Farm, both in California. Between six and 10 of these facilities would be needed to equal the annual output of the average nuclear reactor.

Nuclear plants produce waste while generating electricity, but it’s not glowing green goo like you see in some movies or *The Simpsons*.

What Is Used Fuel?

Used fuel is much different from what you might think.

- **When most people talk about nuclear waste, they’re referring to fuel that’s been used in a reactor once.** Most of the radioactivity associated with nuclear power remains contained in the fuel in which it was produced. Nuclear fuel is used to produce electricity for about five years. Then, it’s removed and safely stored until a permanent disposal site becomes available. Nuclear plants also produce low-level

- radioactive waste which is safely managed and routinely disposed of at various sites around the country.
- **It is a solid.** Nuclear fuel is solid when it goes in a reactor and solid when it comes out. It is arranged in fuel assemblies: sets of sealed metal tubes that hold ceramic uranium pellets. The radioactive byproducts of nuclear reactions remain inside the fuel. No green goo anywhere.
- **There is not that much of it.** All the used fuel created by fueling one person's entire life with nuclear can fit in a soda can.
- **It can still be used for energy.** Used fuel has only exhausted part of the potential energy in the uranium pellets after five years in a reactor. Some countries like France reprocess and recycle nuclear fuel, extracting elements still capable of generating energy for use in new fuel and encasing the radioactive byproducts in solid glass logs for permanent disposal. The United States currently does not, but some advanced reactor designs in development would be able to run on used fuel. Advancements in recycling may allow used fuel to become a valuable resource that enhances economic competitiveness of nuclear reactors and strengthens U.S. energy security.

Is Nuclear Waste Handled Safely?

- Absolutely. The nuclear industry handles used fuel safely and in compliance with the stringent requirements of the U.S. Nuclear Regulatory Commission, the U.S. Department of Energy, and the U.S. Environmental Protection Agency.
- The U.S. started discharging nuclear waste from the first of the current generation of commercial reactors back in the 1960s into pools. We then filled up the pools, and began developing dry cask storage technology that's been operational since the mid 1980s. These systems are licensed out to the 2060s. The Nuclear Regulatory Commission has said that they would be good for at least 100 years.

What Happens to Used Fuel?

- When cool enough that it no longer needs to be stored underwater—typically for 2 to 5 years after removal from the reactor—used fuel is transferred and stored in large steel-reinforced concrete containers (the dry cask storage systems described above) which are designed for long term storage until a site is available for permanent disposal. They’re safe enough to walk up to and touch.
- The final step in the process is permanent disposal deep underground in a facility known as a geologic repository. The science behind disposal is well established, and repositories are being developed around the globe. Finland’s repository is licensed, constructed, and in the final testing phase.

- Sweden has approved a site and has a facility under construction. Canada and Switzerland have selected sites and are in the licensing process. Seven other nations are actively seeking sites.
- In the United States a potential site at Yucca Mountain, Nevada was found to meet NRC's and EPA's stringent safety and environmental regulations. Nevertheless, the project was opposed in Nevada and subsequently defunded by Congress. Work at that site has been on hold for over a decade while the nation considers alternatives. Wherever the US locates a repository, NEI's used fuel policy principles describe the essential elements of an effective program to bring it to completion.
- Consolidated interim storage sites also have been proposed so that used fuel can be more efficiently managed until a disposal site becomes available. And recycling centers may also be developed to extract useful components of the used fuel to produce more energy before disposing of the radioactive byproducts.
- Future siting decisions should be made with support and collaboration from tribal, state, and local governments, resulting in widely accepted locations for used fuel management facilities.

NEI's new policy principles for used fuel outline a path to the U.S. having a durable, safe, environmentally sustainable, and well-run used fuel management and disposal system. To learn more about NEI's policy principles, click here.

The capital cost for the power distribution system of a 1 Gigawatt (GW) AI data center ranges from **$6 billion to $9 billion**. This makes up 40–45% of the total facility construction CapEx. In total, building and fully equipping a 1 GW AI facility is estimated to cost between $35 billion and $50+ billion. [1, 2, 3, 4]

The power distribution and electrical infrastructure can be broken down into these primary systems and associated costs:

- **Equipment:** Main step-down substations, high-voltage (HV) switchyards, and transmission line interconnections (e.g., connecting to a 500kV or 230kV grid).
- **Details:** Because a 1 GW data center pulls the equivalent power of a small city, on-site dedicated substations are required to handle the massive incoming voltage. [1, 2]

2. Intermediate Distribution Infrastructure ($1.5B – $2.5B)

- **Equipment:** Medium-voltage (MV) switchgear (often 34.5kV), step-down transformers, and enclosed distribution centers across the campus.
- **Details:** This infrastructure steps down the massive incoming grid voltage to a manageable level (e.g., 480V or lower) for the facility's internal power routing.

3. Backup Power & Conditioning ($2B – $3B)

- **Equipment:** Rotary and static Uninterruptible Power Supplies (UPS), massive lithium-ion battery arrays, and diesel or natural gas backup generators.
- **Details:** Due to the density of AI workloads (where a single server rack can draw up to 140kW+), UPS and battery backup systems must be highly robust to prevent catastrophic data loss during grid fluctuations. [1, 2, 3]

4. In-Rack & End-of-Row Distribution ($1.5B – $2B)

- **Equipment:** Power Distribution Units (PDUs), Remote Power Panels (RPPs), Busways, and high-voltage (e.g., 480V to 800V) in-rack power designs.
- **Details:** High-efficiency, high-voltage in-rack distribution is critical to minimizing energy loss as power reaches the individual AI accelerator chips (like Nvidia's GB200s). [1, 2, 3, 4]

Primary Cost Drivers

- **AI Density:** Racks running intense AI models need substantial power. Designing the facility to route this power continuously while supporting advanced liquid cooling systems increases electrical costs by 50–100% compared to traditional cloud data centers.
- **Redundancy Tiers:** Moving up to Uptime Institute Tier IV redundancy, which requires fully fault-tolerant electrical paths, can add an additional 15–25% to the electrical budget. [1, 2, 4]

Note: The cost of the actual IT hardware (GPUs, servers, networking) is excluded from these figures, which accounts for the vast majority of the overall $35B+ data center investment