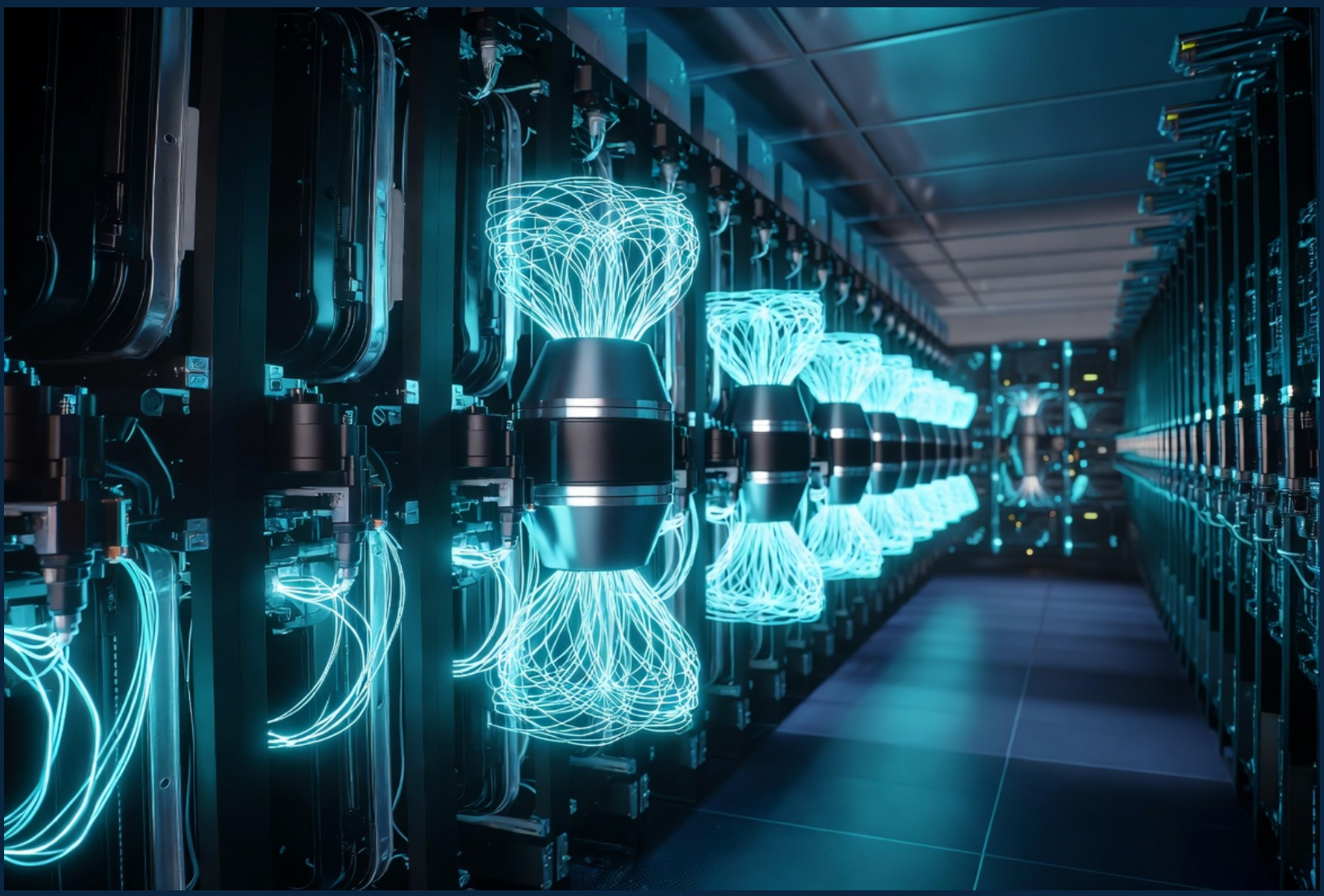


CIMES

Compressed Inverted Magnetic Energy Source

Magnetic Efficiency for the AI Data Center Era

A practical system that puts the patented CIMES motor
at the heart of data-center cooling and drive infrastructure

Dan Buck from Chicago, IL • U.S. Patent 11,799,400 B2

simulationchallenge.com

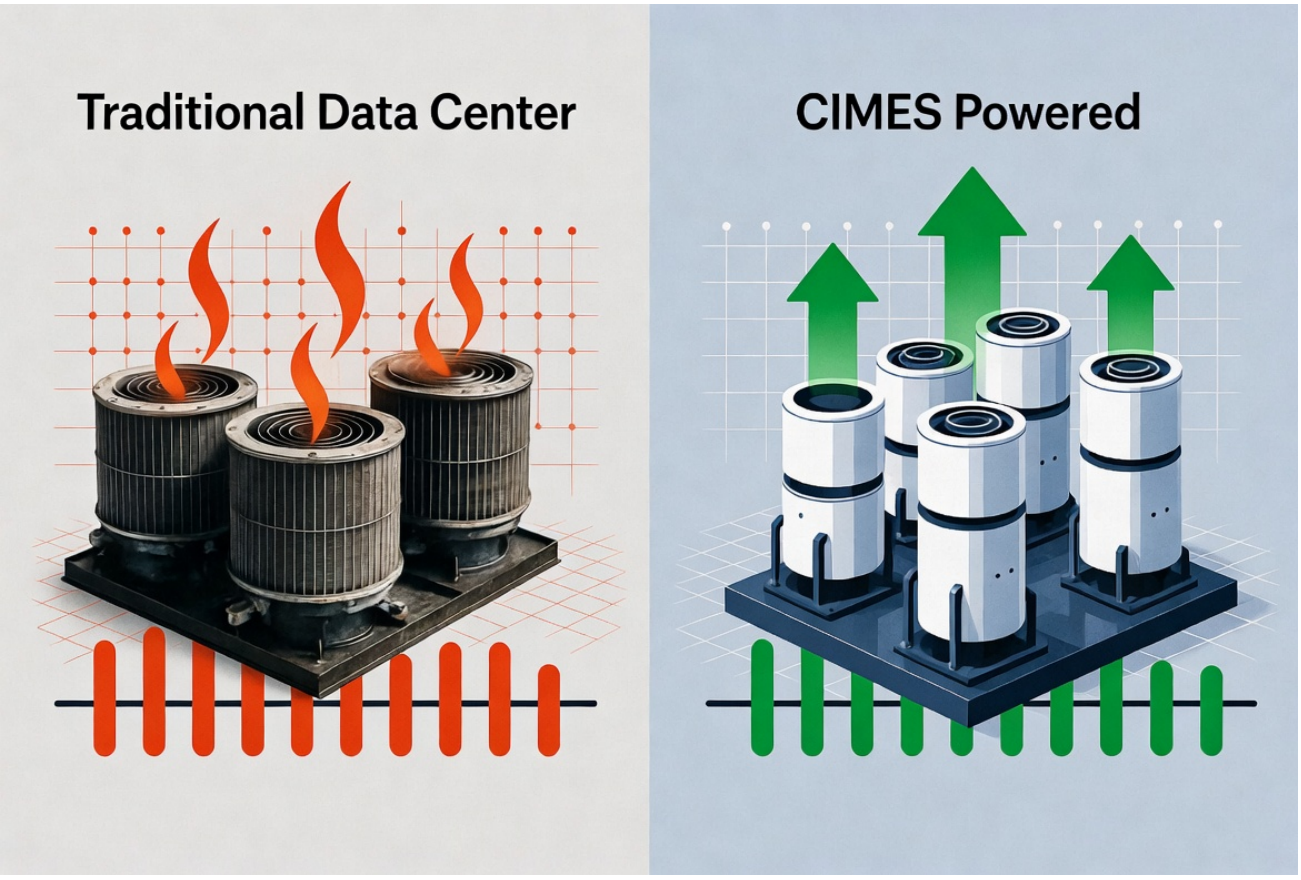
Data Centers Are Hungry.

Cooling is the silent giant.

Modern data centers already consume roughly 4% of U.S. electricity. With AI workloads, demand is climbing fast.

A large share of that energy does not go into computing — it goes into cooling the servers. In many facilities cooling accounts for 20–40% of total power. Even the best hyperscale operators still fight every tenth of a point on Power Usage Effectiveness (PUE).

Traditional motors that drive fans, pumps, and chillers carry copper losses, conversion losses, and mechanical friction. Part-load efficiency is often poor. There is room for a better electromechanical foundation.

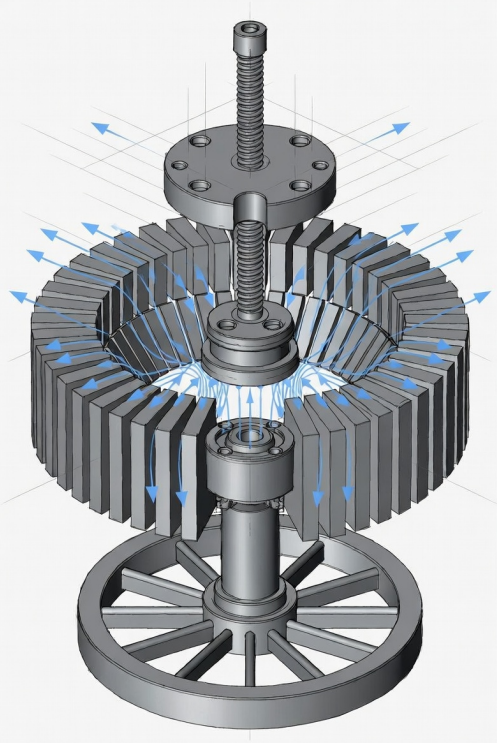


What is CIMES?

CIMES (Compressed Inverted Magnetic Energy Source) is a patented conical permanent-magnet rotary motor. Instead of using copper windings to create torque, it uses the powerful repulsion of like magnetic poles held under controlled axial compression.

A frustum-cone rotor sits inside a funnel-shaped stator. Both carry arrays of permanent magnets arranged so that like poles face each other. When the rotor is compressed axially toward the stator, the repulsive force grows dramatically and is directed into smooth, continuous rotational torque.

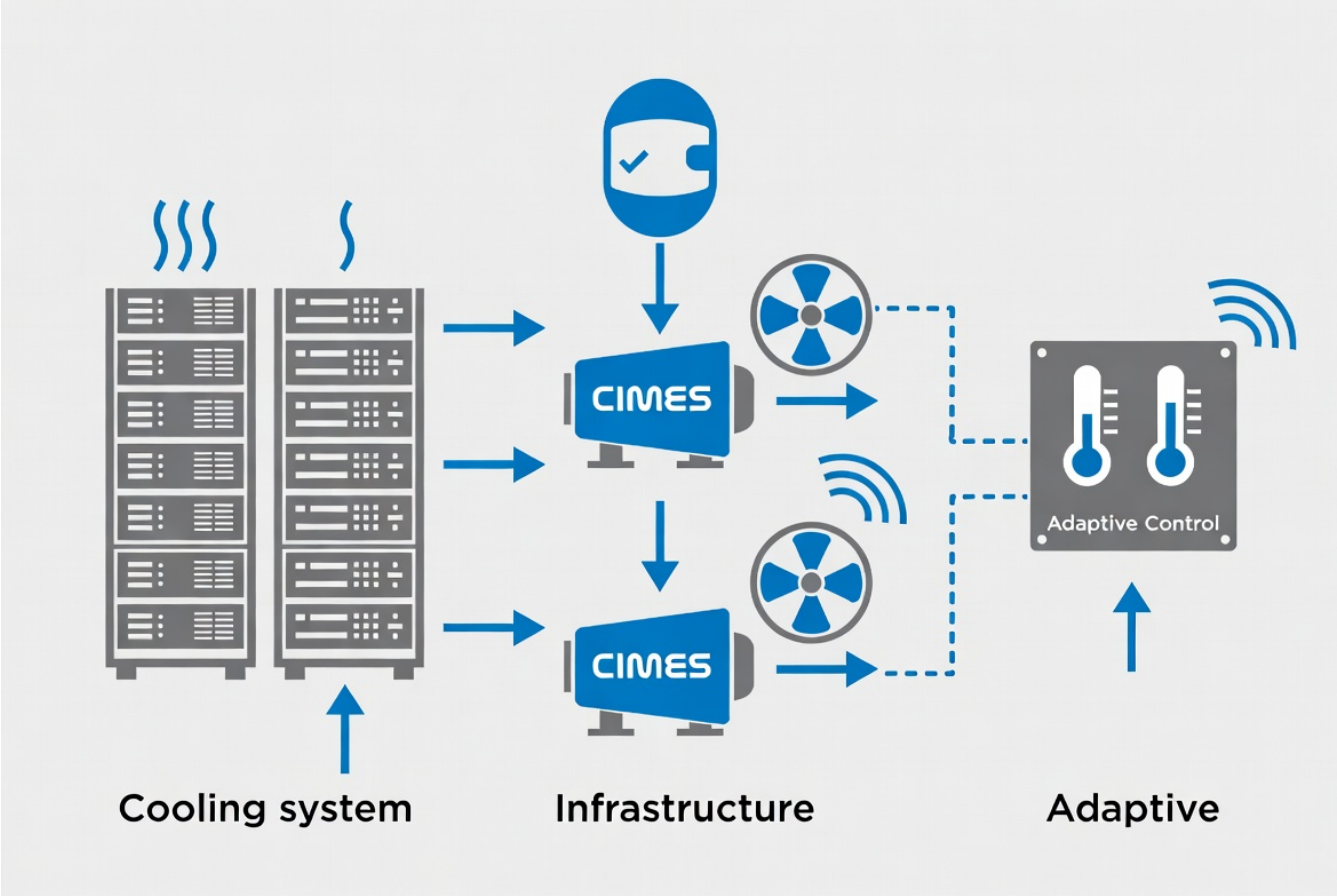
Compression itself becomes the throttle — precise, continuous, and free of the losses associated with traditional variable-frequency drives. A flywheel smooths output. Tip and vertex magnets reduce bearing loads. The result is a high-torque-density motor with a fundamentally different loss profile.



CIMES principle: axial compression → magnetic repulsion → continuous torque

CIMES Adaptive Magnetic Cooling Nexus

We place scaled CIMES motors at every level of the cooling plant: large units for chilled-water pumps and cooling towers, mid-size units for CRAH/CRAC fans, and compact units for local or immersion coolant loops. Real-time compression control becomes the primary means of modulating torque and speed. A central orchestrator watches IT load, ambient conditions, and thermal setpoints, then sets the optimal compression for each drive — maximizing efficiency while protecting the magnets and meeting every SLA.



1. Drive Layer

CIMES motors sized for pumps, fans & coolant loops

2. Compression Control

Axial gap is the continuous, near-lossless throttle

3. Orchestration

AI-aware controller optimizes facility-wide energy use

Specific mechanisms that improve efficiency and resilience

- **Eliminate copper losses in the torque path**
  CIMES produces rotational force through controlled magnetic repulsion under axial compression. There are no copper windings generating the primary torque, so the classic I^2R heating and energy waste of conventional motors is removed from the drive train.
- **Lossless mechanical throttling instead of VFDs**
  Axial compression acts as a continuous, high-resolution throttle. Torque rises exponentially as the gap closes. This replaces much of the work normally done by variable-frequency drives and their associated conversion losses, especially at the partial loads typical of data-center cooling.
- **Near-zero mechanical friction under continuous duty**
  Tip and vertex magnets create axial lift that unloads the bearings. Combined with magnetic bearings, friction losses can approach zero — critical for motors that must run 24/7 for years without maintenance windows.
- **Kinetic buffering for cooling continuity**
  Each major CIMES unit includes a flywheel that both smooths residual torque ripple and stores rotational energy. During brief grid events or generator start-up, the flywheels keep pumps and fans spinning, protecting server inlet temperatures without oversized electrical UPS capacity.
- **Magnets cooled by the same loop they serve**
  Cooling channels built into the rotor and stator circulate the facility's chilled water or dielectric fluid. Magnets stay at optimal temperature, preserving field strength and preventing demagnetization under high continuous duty.
- **High torque density enables better packaging**
  The conical geometry and magnetic design deliver high torque in a compact package. This allows smaller footprint pumps and fans, higher flow at the same physical size, or easier retrofit into existing mechanical rooms and CRAH units.
- **Hierarchical control from rack to facility**
  Small CIMES units can drive local immersion or cold-plate pumps; medium units handle CRAH fans; large units drive primary chilled-water pumps and cooling towers. A central orchestrator modulates compression across all levels based on real-time IT load, ambient conditions, and thermal SLAs.

Ready for partnership and development

The core CIMES motor is protected by U.S. Patent 11,799,400 B2 and has been extensively simulated across torque, thermal, dynamic, and geometric campaigns. The system concepts outlined in this brochure build directly on that foundation.

Organizations interested in advancing CIMES for data-center applications are invited to explore collaboration in the following areas:

- Cooling system OEMs and mechanical contractors seeking higher-efficiency drives
- Hyperscale, colocation, and enterprise operators targeting lower PUE
- Motor and permanent-magnet manufacturers evaluating licensing opportunities
- Control and digital-twin teams developing adaptive compression algorithms
- Research groups validating performance under continuous high-duty thermal loads

Reference simulation data, CAD geometry, and technical packages are available through the open CIMES Simulation Challenge at simulationchallenge.com.

Technical resources & contact

Simulation data & challenge: simulationchallenge.com

U.S. Patent: 11,799,400 B2 — Compressed Inverted Magnetic Energy Source

Inventor: Dan Buck from Chicago, IL

Assignee: Buck Maynard Houston LLC

This brochure describes a system-level application of the CIMES invention.
All core motor claims remain protected under U.S. Patent 11,799,400 B2.