



트레이드 렌즈
TRADE LENS

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LENS INSIGHT / No.01

Research connecting technology and industry

AI Must Now Manage Heat

How Rising GPU Density Is Opening the Liquid-Cooling Market
and Opportunities for Korean Companies

From cooling performance to business profitability:
an analysis of qualification, deployment and operating evidence.

142 kW

GB300 NVL72 maximum rack
power

Specific reference
specification [1]

2.6 MW

LG Electronics CDU cooling
capacity

DSX Ready company
announcement [3]

10-21%

Potential total-energy savings

EDNA public summary;
conditional [4]

These figures have different units and scopes: rack power consumption, equipment heat-removal capacity and conditional energy-saving potential. They cannot be directly converted into one another or added.

01 / LENS INSIGHT

Cooling is a condition for computing

The question is not which cooling stock will rise, but who makes reliable operation possible.

Core view | Technology adoption is not the same as share-price appreciation

Introducing high-density AI racks also requires changes to cooling systems. Yet a stronger technical need does not, by itself, explain supplier profits or share prices. This report separates **product suitability** → **on-site validation** → **repeat orders** → **cash collection**.

Analytical lens	Evidence in the source material	Question still to answer
Cooling architecture	Liquid cooling in GB300 NVL72 and a specific reference power specification. [1]	Can the facility and its operating capabilities accommodate the design?
Commercialization	LG Electronics' CDU qualification announcement; LG CNS' construction and validation plans. [3] [5]	Do qualifications and plans translate into actual orders and revenue?
Economics	EDNA's potential energy savings and adoption barriers. [4]	Do savings offset additional investment, maintenance and operating risk?

From technology distinctions to business evidence

Direct-to-chip cooling (DTC) and immersion cooling are not the same product. Cooling chips directly and immersing servers in dielectric fluid require different equipment and maintenance practices. Circulating liquid is also different from consuming water: the final method of heat rejection matters. [\[2\]](#) [\[7\]](#) [\[8\]](#)



Diagram: TradeLens analytical framework; it does not indicate a company's progress or an investment rating.

How to read the report

Facts are supported by the cited sources; company plans describe steps not yet completed; analysis and assumptions are TradeLens interpretations. Price targets are outside the report's scope; missing market-size estimates are not invented. Revenue, margins and delivery terms absent from public materials remain unconfirmed.



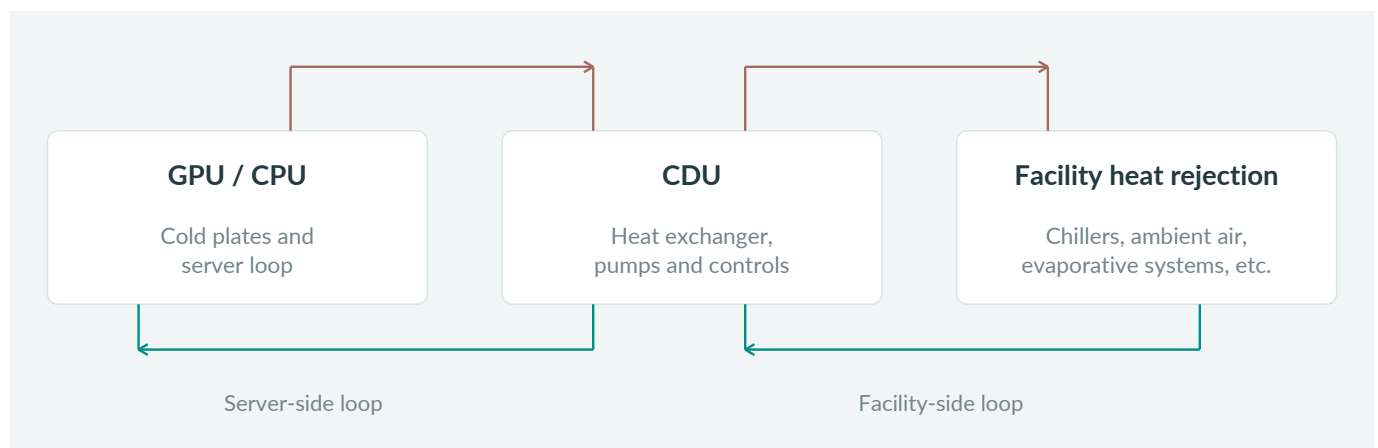
02 / THERMAL ARCHITECTURE

Heat does not disappear. It moves.

Following heat from the chip to outside the building reveals the equipment and operating capabilities required.

Direct-to-chip cooling collects heat at cold plates and transfers it to the facility through coolant and heat-exchange equipment. NVIDIA's system description combines liquid cooling for CPUs and GPUs with air cooling for surrounding components. The spread of liquid cooling does not imply the disappearance of facility HVAC. [2] [3]

The heat-transfer path in direct-to-chip cooling



Conceptual liquid-to-liquid CDU arrangement: the server and facility loops exchange heat without directly mixing their fluids. Actual designs vary with liquid-to-air options and facility temperatures. Redrawn by TradeLens from NVIDIA and LG descriptions; not a product engineering or site piping drawing. [2] [3]

The same 100 kW can require different flow rates

Assuming water has a specific heat of 4.18 kJ/(kg·K) and a density of 1 kg/L, the heat balance is $Q = \text{mass flow} \times \text{specific heat} \times \text{temperature difference}$. In a simple model transferring 100 kW of heat, a smaller temperature difference requires greater circulating flow.

Assumed inlet-outlet ΔT	5°C	10°C	15°C
Approximate flow (L/min)	287	144	96

Illustrative calculation: $100 \div (4.18 \times \Delta T) \times 60$. Pump head, pressure loss and heat-exchanger approach temperature are excluded. These are not equipment-selection values.

Analysis | Site conditions matter more than nameplate capacity

An equipment rating in MW cannot by itself determine unit counts or project economics. Supply-water temperature, flow and pressure loss, redundancy and residual air-cooling loads must also be considered. Cooling the chip and rejecting heat from the building are separate design tasks.

03 / TECHNOLOGY MAP

DTC and immersion are different propositions

Distinguish deployment, maintenance and conversion costs before grouping technologies under one label.

Comparison	Air cooling	Direct-to-chip / DTC	Immersion cooling
Heat collection	Server airflow and facility air conditioning	Cold plates attached to chips	Servers immersed in dielectric fluid
Core equipment	Fans, airflow management and hot/cold air separation	Cold plates, piping, CDU and leak detection	Tanks, dielectric fluid, heat exchange and lifting/maintenance systems
Conversion question	Can rack density and inlet-air temperature be maintained?	Do server and facility piping and temperature conditions match?	Are components, warranties and maintenance suitable for fluid immersion?
Evidence to monitor	Inlet temperature, fan power and high-density constraints	Platform specifications, field tests and operating reliability. [1] [2]	Operating conditions and customer delivery history. [6] [7]
Analytical role	Not a technology that will be replaced everywhere at once	Identify specific adoption paths in high-density AI racks	A separate architecture, not DTC's inevitable next stage

Technology descriptions draw on NVIDIA and GST materials. Conversion questions and analytical roles are TradeLens interpretations, not adoption rankings. [\[1\]](#) [\[2\]](#) [\[6\]](#) [\[7\]](#)

Analysis | The adopted platform matters first

DTC is examined first not because it is superior in every application, but because the cited AI rack designs and Korean deployment plans show specific adoption paths. Immersion should not be described as research-only either: the company materials include delivery history. Technology ownership, pilot deliveries and recurring revenue are different forms of evidence. [\[1\]](#) [\[5\]](#) [\[6\]](#)

Deployment setting	First analytical question
Existing-center retrofit	Can piping, structural loads, maintenance access and service-interruption costs be accommodated?
New high-density center	Can joint server-and-cooling design reduce excess backup equipment and upfront investment?

Caution | More liquid cooling does not mean removing every air cooler or chiller

Some peripheral devices and power components may still require air cooling. Facility chiller requirements depend on water temperature, climate and heat-rejection design. “Air conditioners disappear from data centers” is not this report’s conclusion. [\[2\]](#) [\[8\]](#)

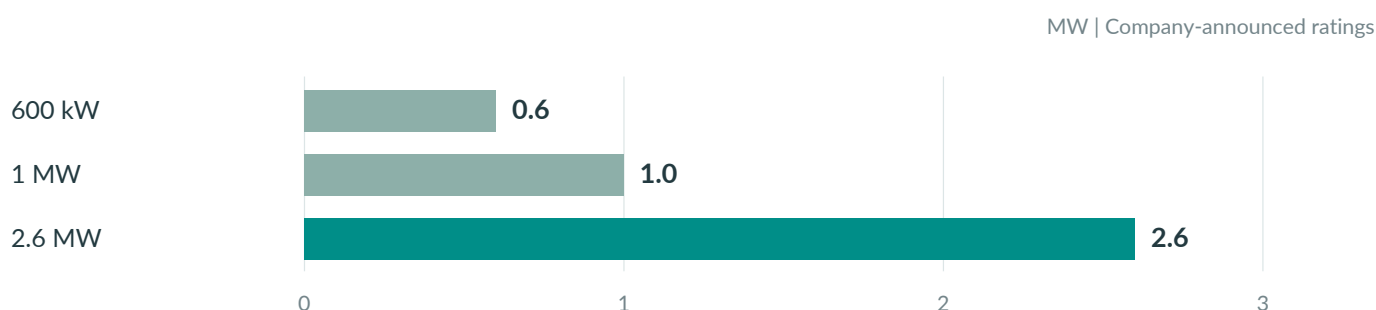
04 / EVIDENCE & COMMERCIALIZATION

Qualification opens doors. Orders prove the market.

LG Electronics' case demonstrates technical suitability—not a customer purchase order or revenue disclosure.

On September 22, 2026, LG Electronics said its 2.6 MW CDU met NVIDIA DSX Ready criteria. The release also set out 600 kW, 1 MW and 2.6 MW products and its cooling portfolio. This establishes products and qualification scope, not customer volumes, prices or business profit. [3]

LG Electronics' CDU capacity lineup



Nameplate cooling capacity, not power consumption, efficiency or order value. The source does not establish performance curves measured under identical operating conditions. [3]

Evidence category	What the material supports	Further evidence needed
Product specifications	MW-class CDU lineup and portfolio	Capacity at different inlet/outlet temperatures, pump power and redundancy
Validation / qualification	DSX Ready criteria met, according to the company	Site-specific approval scope and warranty terms
Commercial results	Customer-specific order values and profit are not provided in the release	Orders, shipments, repeat purchases and revenue recognition

Analysis | Integrated supply expands both opportunity and responsibility

Combining cold plates, CDUs and facility cooling may reduce the customer's design and coordination burden. It can also broaden responsibility for system performance, commissioning and fault response. A wider supply scope is not proof of higher margins.

How not to use the numbers

Do not divide a 2.6 MW CDU rating by a 142 kW rack-power figure to establish how many racks a site can support. Liquid heat-capture shares, temperature differences and redundancy may differ. Qualification is not a confirmed order from a particular customer.

05 / EFFICIENCY & WATER

PUE alone cannot explain the economics

Total energy, useful computing output, water consumption and reliability must be assessed together.

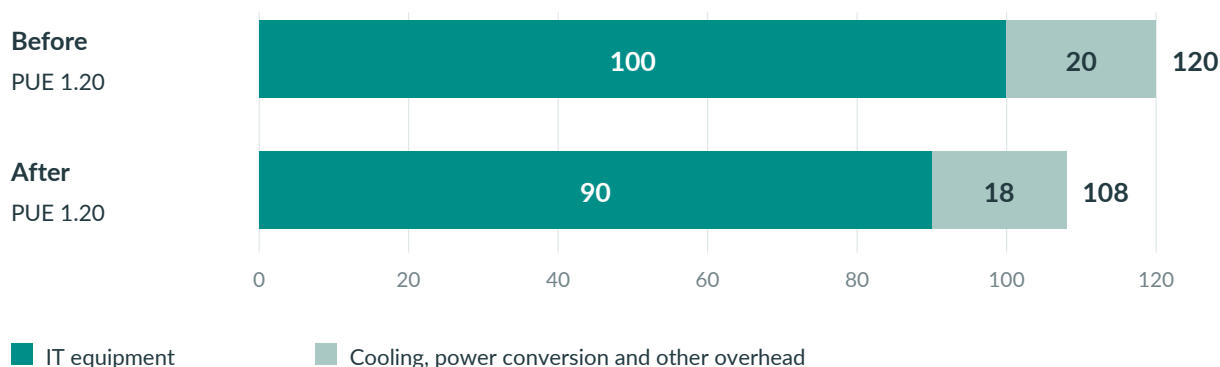
EDNA's public summary gives potential total-energy savings of 10–21% from liquid cooling. About 8% at the server level and about 30–40% on the facility side refer to different measurement boundaries and cannot be added. These are neither measured results at a specific site nor guaranteed performance for every product. [4]

PUE: its definition and its limits

$PUE = \text{total data-center energy} \div \text{IT-equipment energy}$. Both absolute quantities can decline while the ratio stays unchanged. Alongside PUE, assess total kWh, energy per unit of computing output at the same service quality, water consumption and downtime. [9]

Same PUE, different total energy

Illustrative units; identical computing output



Total energy: 120 → 108, a 10% reduction. $120/100 = 108/90 = 1.20$. Relative energy units and illustrative assumptions, not site measurements or a simulation of EDNA's reported savings range.

Circulating liquid is not the same as consuming water

In a design disclosed in 2024, Microsoft described recirculating water in a closed loop to reduce water use associated with evaporative cooling. It also noted that replacing evaporation with mechanical cooling could increase PUE. Water and power savings therefore do not always move in the same direction. A past design announcement is not evidence of completed deployment across all current facilities. [8]

Analysis | Compare like with like

Align measurement boundaries, utilization, ambient conditions and useful computing output. Mixing product-level PUE with a facility's full-year PUE, or presenting circulating flow as water consumption, can distort the assessment of economic benefits.

06 / ECONOMICS LAB

Turning savings into won changes the question

An illustrative model of investment recovery—not an actual project or an earnings forecast.

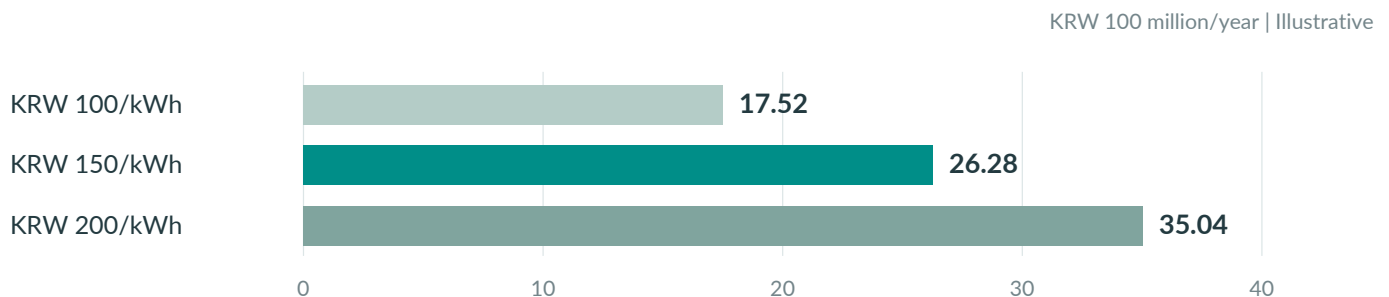
Starting assumptions | Average IT load of 10 MW, 8,760 hours per year

The model holds IT load constant and calculates only the change in overhead energy from a lower PUE. The 10 MW input is assumed actual average demand, not design capacity. Electricity prices and PUE reductions are illustrative sensitivity inputs.

PUE reduction	Energy saved (GWh/year)	KRW 100 per kWh	KRW 150 per kWh	KRW 200 per kWh
0.05	4.38	4.38	6.57	8.76
0.10	8.76	8.76	13.14	17.52
0.20	17.52	17.52	26.28	35.04

Cost-savings unit: KRW 100 million per year. Formula = 10,000 kW × 8,760 h × PUE reduction × electricity price ÷ 100,000,000.

Annual electricity savings with a 0.20 PUE reduction



If additional investment is KRW 10 billion

At KRW 150/kWh and a PUE reduction of 0.20, simple payback is KRW 10 billion ÷ KRW 2.628 billion = about **3.81 years**. At the same investment cost, a 0.10 PUE reduction extends payback to about **7.61 years**. The achievable efficiency gain matters alongside installation cost.

What this calculation excludes

Financing, taxes, water bills, fluid replacement, inspection labor, component life, retrofit downtime, demand charges and time-of-use tariffs are excluded. Pump and other power already captured in measured PUE must not be deducted twice. This is not a full-project net present value or supplier-profit estimate.

Unlike the earlier example in which IT and overhead energy fall together, this model fixes IT load. The two savings effects must not be automatically added.

07 / BUSINESS EXPOSURE

Three companies, different routes to revenue

Equipment manufacturing, systems integration and immersion solutions have different business models.

Company / role	What official materials establish	Limits and next checkpoints
LG Electronics Cooling equipment and portfolio	2.6 MW CDU DSX Ready qualification and product-line announcement. [3]	Product validation ≠ customer-specific orders. Track liquid-cooling revenue, margins and repeat purchases.
LG CNS Data-center design, construction and operation	DTC installation and validation with NAVER Cloud at the Samsung center; completion planned for 2027. [5]	Plans ≠ completion or commercial operation. Track contract scope, completion and operating revenue.
GST Immersion equipment and solutions	Single- and two-phase products and company-listed customer deliveries in 2023–2025. [6] [7]	Past deliveries ≠ large-scale production. Track named customers, units, repeat orders and revenue share.

Companies are ordered by business role, not investment preference. The cited materials do not establish that all three supply the same NVIDIA or NAVER project.

Different business models call for different metrics

Business model	Revenue-generating activity	Metrics that matter
Equipment sales	Equipment deliveries and system supply	Units sold, product mix, warranty provisions and shipment margins
Construction / integration	Design, construction and commissioning	Order backlog, completion progress, cost increases, acceptance and collection
Operation / maintenance	Service contracts and replacement demand	Contract duration, renewals, response time and failure/replacement costs

TradeLens analysis: Suppliers that reduce customers' redesign costs and validation burden may secure repeat business. But pricing power and high margins require evidence from contracts, results and cash flow—not product descriptions alone.

Leave undisclosed figures unfilled

The cited materials do not provide comparable standalone AI liquid-cooling revenue, operating profit or total confirmed orders for these companies. Group market capitalization or existing-business profit is not converted directly into a cooling-business valuation. No target prices are provided.

08 / CATALYSTS & FALSIFICATION

Track catalysts and evidence that could disprove the thesis

The quality of business evidence matters more than the volume of related headlines.

Area to monitor	Evidence supporting the thesis	Evidence weakening the thesis
Product suitability	Adopted platforms, validation scope and published performance curves	Restricted operating conditions or frequent redesign
Site execution	Commissioning, customer acceptance and service launch	Delays and prolonged acceptance
Repeat demand	Reorders, customer expansion and selection for capacity additions	No follow-up orders after pilot supply
Operating reliability	Leak response, maintenance history and uptime	Rising quality, warranty and downtime burdens
Economics	Measured efficiency and bill savings under comparable conditions	Total costs rising faster than energy benefits
Profit / cash	Improving segment revenue, margins and cash collection	Rising inventory, receivables or losses despite revenue growth

These are forward-looking TradeLens monitoring criteria, not claims that such problems have occurred.

Separate company plans from completion evidence

Company	Next event to monitor	Status at the analysis date
LG Electronics	Further customer orders and product-level revenue disclosures	Product / qualification announced. [3] Timing of order disclosures unconfirmed.
LG CNS	Samsong center installation, validation and acceptance	Company targets completion in 2027. [5] Completion not yet established.
GST	New customers, repeat deliveries and revenue contribution	Company-listed historical deliveries. [6] Timing of new announcements unconfirmed.

Overall view | Execution matters more than the size of the market

Monitor **product suitability** → **site acceptance** → **repeat orders** → **margins** → **cash collection**. Liquid cooling represents a real design change in AI infrastructure, but this does not translate into investment returns for every related company. Technical necessity and equity attractiveness must be assessed separately.

Current share prices, valuations and trading values are outside this report's verification scope. Companies are cited to explain business exposure.



09 / SOURCE REGISTER

Follow the evidence to its source

Click any teal citation number in the report, or a source title or “Open source” below, to open the original material.

01. NVIDIA | NVL72 AI Factory: System Hardware & Components

Updated Sep 15, 2026 · GB300 NVL72 reference specifications · [Open source](#)

02. NVIDIA | DGX GB Rack Scale Systems User Guide: Hardware

Updated Sep 17, 2026 · Combined liquid/air cooling and leak detection · [Open source](#)

03. LG Electronics / LG Media | 2.6 MW CDU Meets DSX Ready Criteria

Sep 22, 2026 · Company announcement; separate from delivery and revenue evidence · [Open source](#)

04. IEA 4E EDNA | Liquid Cooling in Data Centres

Jun 22, 2026 · Public summary; full report requires registration · [Open source](#)

05. LG CNS / LG Media | Next-Generation Liquid Cooling at Samsung

Aug 26, 2026 · NAVER Cloud cooperation; installation and validation planned for 2027 · [Open source](#)

06. GST | R&D: Liquid Cooling / Immersion Cooling Milestones

No publication date shown · Company-listed delivery history, 2023–2025 · [Open source](#)

07. GST | Products: Liquid Cooling

No publication date shown · E3 WAVE products and condition-dependent specifications · [Open source](#)

08. Microsoft | Sustainable by Design: Next-Generation Datacenters Consume Zero Water for Cooling

Dec 9, 2024 · Design announcement, not evidence of completed current deployment · [Open source](#)

09. Google Data Centers | Power Usage Effectiveness / Efficiency

Source reference date: Sep 28, 2026 · PUE definition and measurement boundaries · [Open source](#)

Source dates and scopes follow the Korean report's September 28, 2026 analytical basis. Company announcements are attributed to the issuing companies; product qualification, planned deployment and historical deliveries are distinct evidence categories.

10 / METHODOLOGY & USE

Basis of analysis, disclaimer and use

Facts, company plans, TradeLens interpretations and illustrative calculations should be read separately.

Scope of the sources and calculations

The analysis date is September 28, 2026. Product qualification, company deployment plans and historical delivery records are distinguished. EDNA figures are taken from its official public summary, not the full report that requires registration. Company releases are used as company statements and do not substitute for independent external verification.

Flow, PUE, electricity-cost and payback calculations are illustrative models using the inputs stated in the report. They are not site measurements, company results or forecasts of investment returns. Charts and diagrams have been redrawn by TradeLens and do not imply approval or a guarantee by the originating organizations.

Preparation note: Generative AI was used in researching, analyzing and drafting this report.

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