29 DATA CENTRES · AI HEAT = REVENUE, NOT WASTE

₱600,000 a month back in your pocket.
From day one.

A 100 kW edge data centre at a Philippine hospital, university or colocation node — swapping conventional CRAC for the Karnot Cascade (DLC + CO_2 heat pump + absorption chiller). The same architecture scales to 25 MW hyperscale. PUE 1.22. Zero water. Heat goes to the hot-water loop, not the atmosphere.

WHY AI KILLED AIR COOLING

A GB200 rack draws 110 kW. *Air physically cannot handle that.*

Air cooling tops out at **~15 kW per rack**. NVIDIA's GB200 NVL72 ships at **110–120 kW per rack** with direct liquid cooling as standard. The Philippine DC market grows at **22.88% CAGR through 2031** — from 633 MW today to 850 MW by 2030 — and the pipeline is dominated by AI-capable, liquid-cooled facilities.

Water is the new permit blocker

Conventional evaporative cooling consumes **~1.8 L per kWh-IT** — ~104 million gallons/yr for a 25 MW facility. **Microsoft has committed to water-positive by 2030**. Communities in Pampanga, Cavite, Batangas are objecting to data-centre water use. Karnot's cascade is **zero-water. Full stop.**

AI heat is your single biggest hidden asset

Every kWh of GPU compute produces ~0.9 kWh of recoverable heat at 30–40 °C. Today you **spend electricity to dump it to atmosphere**. The Karnot CO_2 heat pump upgrades it to 90–110 °C — useful for hot water, absorption cooling, hospital wards, university canteens, district heat.

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THE KARNOT CASCADE · ONE LOOP, TWO OUTPUTS

DLC + CO_2 heat pump + absorption cooling. *Closed loop.*

KARNOT CASCADE · PUE 1.22 · ZERO WATER

STAGE 1 · DLC COLD PLATES

GPU / CPU coolant @ 30–40 °C

Direct Liquid Cooling cold plates on each GPU/CPU. Water moves heat **3,500× more effectively than air** by volume. **No fans, no ducts, no raised floor, no containment.** NVL72-ready.

IHEAT CO_2 (R744)

Transcritical CO_2 heat pump. Cools cold side AND produces 90–110 °C hot side. COP 3.6 cooling, COP 4.6 heating. Panasonic two-stage rotary compressors.

STAGE 2+3 · HOT OUTPUT

90–110 °C · two duties

Drives a LiBr absorption chiller (COP 0.7–0.8) for the remaining cooling capacity — no extra electricity. **Surplus heat to hot water, district loop, fodder, aquaculture.** Closed loop. Zero water.

KARNOT

THE FOUR BOXES · WHAT WE INSTALL

Four products. *One project.*

Karnot iHEAT CO_2

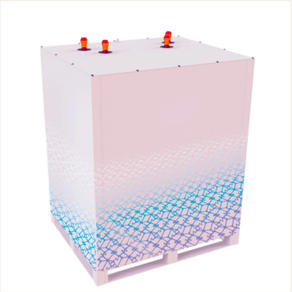
75 kW · transcritical R744

Transcritical CO_2 heat pump. **Cooling COP 3.6, heating COP 4.6 at 110 °C**. Panasonic two-stage rotary. Scales to 750 kW per unit at hyperscale. CE/TÜV/Keymark.

DLC manifolds

NVL72-ready · 30-40 °C

Direct Liquid Cooling cold plates and rack manifolds. **3,500× the heat capacity of air**. Eliminates fans, hot/cold aisle containment, raised floor.



Adsorption chiller

50 kW · water as refrigerant

Fahrenheit (DE) rack-integrated unit. **50 kW cooling from hot water alone**. Zero synthetic refrigerants. Deployed at Leibniz Supercomputing Centre Munich (Top500).

iVOLT Solar · load-matched

Zero-export · ~117%

Behind-the-meter rooftop PV + $LiFePO_4$ battery, sized to offset the iHEAT CO_2 electrical demand. **No grid export, no Meralco net-metering paperwork.**

KARNOT

MODELLED · 100 KW EDGE DATA CENTRE · HOSPITAL / UNIVERSITY / COLO NODE

A real number. *Per rack of compute.*

ANNUAL FIGURE · 100 KW EDGE DC	TODAY · CRAC + CHILLED WATER	KARNOT DLC + CO_2 CASCADE	YOU STOP PAYING
PUE (cooling efficiency)	1.80–2.00	1.22	**40% less overhead**
Cooling electricity	~80 kW continuous	~22 kW continuous	**510,000 kWh/yr saved**
Cooling cost	~₱7.1M/yr	~₱1.95M/yr	**~₱5.15M/yr saved**
Plus — recovered hot water	(LPG boiler still required)	30 kW @ 90 °C continuous	**~₱2.0M/yr LPG replaced**
Water consumption	~158,000 L/yr if evap-assisted	Zero litres	**Permit-blocker eliminated**
Total investment (VAT-inc)	**(already paid)**	**~₱6M**	**< 1 yr cash payback**

Modelled · 100 kW edge DC at a PH hospital ICU, university research lab, or colocation node. PUE conventional 1.80, PUE Karnot cascade 1.22. Meralco GP ₱14/kWh. Recovered 30 kW @ 90 °C offsets LPG hot water at ₱17/kWh useful. CAPEX includes iHEAT CO_2 + DLC manifolds + Fahrenheit 50 kW adsorption chiller + Permits. ***Total annual saving ~₱7.15M (cooling + recovered hot water).*** *Same architecture scales to 25 MW hyperscale.*

KARNOT

THE CASH FLOW · PLAIN AND DULL

Money in your pocket. *Every month. From day one.*

MONTH 1

₱600K

Saving on the bill **minus** the green-loan payment. Net cash in pocket. Every month.

YEAR 1

₱7.2M

Cash in pocket while the loan is being repaid. Kit pays for itself by month 10.

YEAR 5

₱36M

Loan paid. You keep **every peso** of the ₱7.15M annual saving from here on.

YEAR 15

₱108M

Total cash retained over the 15-year asset life vs CRAC + LPG hot water.

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HOW YOU PAY FOR IT · YOU DON'T

Three Philippine banks *already lend for exactly this.*

DBP

Sustainable Energy Finance Programme (SEFP)

Agri-industrial priority · covers ICT infrastructure. 70–80% LTV · 5–10 year terms.

~6.5–8% p.a.

LandBank

Sustainable Energy Investment Loan (SEILP)

Path of least resistance for hospitals + universities that bank with LandBank.

~7% p.a.

BPI

Sustainable Development Finance (SDF)

Fastest decisions for commercial colocation operators with a BPI relationship.

~1–1.5% below SME

These are **loans**, not grants. Real green-discounted commercial loans. **Karnot files the application, the BOI Pioneer registration and the RA 11285 Income Tax Holiday paperwork as part of project scope.**

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WHERE THE EDGE DC ACTUALLY LIVES · THE PH MARKET TODAY

AI inference at the edge. *The market the hyperscalers can't reach.*

HOSPITALS

ICU patient-monitoring AI

Real-time vital-sign analytics. Imaging triage at the modality. Pharmacy automation. Infectious-disease surveillance. **Latency-critical workloads that cannot run from a Singapore cloud region.** Data sovereignty + life-safety reliability. 50-300 kW per hospital.

KARNOT DHW LOOP INTEGRATION ✓

UNIVERSITIES

Research compute + AI labs

Faculty research clusters. AI lab GPU pools for masters / PhD. Simulation, computational chemistry, climate modelling. **Sovereign academic compute** for UP, Ateneo, La Salle, San Beda. **Heat to canteen DHW, chilled water to campus.** 100-500 kW per campus.

CAMPUS CHILLED-WATER + DHW ✓

COLOCATION

Edge nodes beyond Manila

Cebu, Davao, Iloilo, Clark, Bacolod, CDO. **Closer to users, lower latency, sovereignty-compliant.** Smaller footprint than Metro Manila hyperscale — perfectly sized to the Karnot cascade. STT GDC, EdgeConneX, YCO Cloud all building this segment. 200-500 kW per site.

PREMIUM COLO + COMMUNITY LICENCE ✓

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HYPERSCALE UPSIDE · THE MICROSOFT VALIDATION

Same architecture. *25 MW scale. $66.7M less CAPEX.*

A Microsoft-grade 25 MW NVL72 facility, built on the Karnot Cascade, vs *conventional evap-cooled.*

1.22
PUE achieved
vs 1.50 conventional

Zero
Litres of water
vs 104 million gal/yr

$66.7M
Less CAPEX
(90% smaller building)

17.3 kt
CO_2 avoided / yr
plus 4.9 MW surplus heat at 90°C

200 racks. 14,400 GPUs. 90% smaller footprint. Heat output drives LiBr absorption chillers (single-effect, COP 0.7-0.8) at the right driving temperature. 4.9 MW surplus heat at 90 °C continuously available for hydroponic fodder, recirculating aquaculture, food drying, district heat. **The data centre stops being a community liability — it becomes the local food production engine.** Single-rack pilot (one NVL72 at 110 kW, $175K total cost) validates the cascade. Full Karnot DC Technical Paper on request.

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THE NEXT STEP

Three things from you. *The rest is on us.*

01 **Rack-level IT load + AI workload mix**

Number of racks, kW per rack, NVL72 or H100 or A100, expected utilisation. Tells us the cascade size and the recoverable heat.

02 **12 months of Meralco bills + LPG (if any)**

For the cooling baseline and the LPG hot-water baseline. We compute today's PUE and the displaced LPG to confirm the ₱7.15M saving.

03 **Your bank relationship**

DBP, LandBank or BPI — tell us which you bank with. That's the fastest route to the green loan + BOI registration.

WHAT YOU GET BACK

A sized iHEAT CO_2 cascade, a fixed price, a monthly cash-flow plan and the bank + BOI application *ready to sign.*

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