08 HVAC & BUILDING CLIMATE · HYDRONIC FAN COILS

Six heat pumps. One water loop. *40% off the office HVAC bill.*

A Philippine office running its climate on one central plant of 50 kW reversible iHEAT R290 heat pumps and iZONE hydronic fan coils — instead of a wall of split units leaking R410A. Water in the building, not refrigerant. Modelled on a 3,000 m² office.

KARNOT

WHY A SPLIT UNIT IN EVERY ROOM IS THE EXPENSIVE WAY

A split unit in every room is a *refrigerant leak in every room.*

A typical Philippine office runs dozens of split-type DX units — or a VRF system piping R410A through the ceiling of every occupied space. Each runs at COP ~3, leaks F-gas, throws its waste heat onto the roof, and fails on its own schedule.

VRF pumps R410A through every ceiling

VRF and split DX circulate **R410A (GWP 2,088)** through occupied offices — a leak risk over every desk and a growing Scope 1 liability on the Kigali phase-down clock. Karnot keeps **R290 sealed at the outdoor plant** and circulates only water indoors. No F-gas in the building, nothing to leak over your staff.

A hundred compressors at COP 3, and a peak you pay for

Split units run at **COP ~3**, each short-cycling against its own room; the building's sharp morning cool-down creates a 15-minute demand peak that is a charge in its own right. **One modular R290 plant at COP 4.5** stages to match load, recovers the cooling heat as free hot water, and lets iSAVE shave the peak.

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THE ARCHITECTURE · ONE PLANT, BOTH JOBS

Chilled water out. *Hot water back.*

KARNOT IHEAT R290 + IZONE PLATFORM · 5–6 × 50 KW · UP TO ~300 KW, N+1

COLD SIDE · WHAT THE OFFICE NEEDS

Chilled water · iZONE fan coils

7 °C chilled water piped to quiet iZONE fan coils in open-plan floors, meeting rooms, wards and lobbies — cassette, concealed, exposed or floor-standing. Per-zone control; water, not refrigerant, in the occupied space.

IHEAT R290 ×5–6 + IZONE

One reversible R290 plant makes both. In 4-pipe, the heat from cooling makes the hot water.

HOT SIDE · THE FREE BY-PRODUCT

DHW · 4-pipe reheat

45–60 °C hot water for pantries, toilets and end-of-trip showers — recovered from the heat the building is already rejecting. Plus reheat on the dehumidification coil for humidity control. Nothing wasted off the roof.

5–6 × 50 KW · N+1 REDUNDANT

Modules stage on and off to match the office load, holding a high COP at part load. **Service one, the building runs on the rest.**

ISTOR + IVOLT

Daytime cooling is a perfect solar match. iVOLT runs the plant on midday sun; **iSTOR banks chilled water to shave the afternoon peak.**

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THE FOUR BOXES YOU ACTUALLY NEED

Four products. *One project. One commissioning team.*

iHEAT R290 · 50 kW

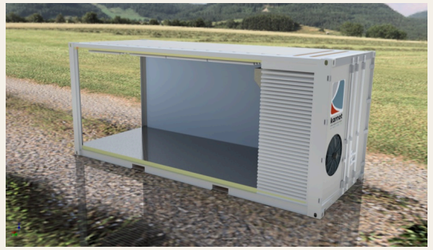
Reversible · COP 4.5 · cascades to ~300 kW

Five or six 50 kW modules on one water loop, staging to load with N+1 redundancy. 7 °C chilled + 45–60 °C hot. Sealed R290 charge per module, EN 378, GWP 3.

iZONE fan coils

Cassette · concealed · exposed · floor

A fan coil for every space, 2-pipe or 4-pipe, per-zone control. **Water in the building, not refrigerant** — the comfort the occupant actually feels, with decades of life.



iSAVE

BMS + IPMVP M&V + peak shave

Zone-by-zone building management, plus **demand-peak shaving** on the air-conditioning load — usually the biggest controllable line on an office bill. Monthly M&V to owner and lender.

iVOLT + iSTOR

Zero-export solar + thermal buffer

Office cooling is **entirely daytime — a perfect solar match**, no wasted night load. iVOLT runs the plant on midday sun; iSTOR banks chilled water for the afternoon peak. Another 30–50% off.

THE BILL · MODELLED 3,000 M² OFFICE

₱3.6M HVAC bill today. *₱2.2M after. −40%.*

ANNUAL FIGURE	TODAY · SPLIT DX / VRF	KARNOT R290 HYDRONIC	YOU STOP PAYING
Cooling electricity	COP ~3 · R410A	COP 4.5 · R290	**₱0.8M/yr**
Hot water / DHW	Separate electric	0 · recovered from cooling	**₱0.2M/yr**
Demand charge (morning peak)	Unmanaged 15-min peak	iSAVE pre-cool + shave	**₱0.4M/yr**
Refrigerant in occupied spaces	R410A GWP 2,088	R290 GWP 3 · plant only	**Scope 1 + leak**
Total HVAC + DHW	**~₱3.6M/yr**	**~₱2.2M/yr**	**−40% / ~₱1.4M**

Basis: 3,000 m² Philippine office on split DX / VRF at COP ~3, Meralco GP ₱14/kWh, daytime occupancy. Central plant of 5–6 × 50 kW reversible iHEAT R290 (up to ~300 kW, N+1) at COP 4.5 with 4-pipe heat recovery and iSAVE peak control. ***On a new build the CAPEX is comparable to VRF, so the incremental payback is under a year;*** *a full retrofit pays back on running cost in ~5–6 years. Excludes iVOLT solar (further 30–50% off).*

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THE RUNNING SAVING · BANK-FINANCED

₱1.4M a year off the bill. *On a new build, nearly free.*

PER YEAR

₱1.4M

Off the combined HVAC + DHW bill — a **40% cut** at COP 4.5 vs ~3, cooling heat recovered as free hot water.

NEW BUILD

<1 yr

Incremental payback. The plant costs **about the same as VRF**; the small extra pays back in months.

YEAR 5

₱7M

Cumulative saving. Demand-peak shaving and the daytime solar match keep compounding it.

YEAR 15

₱21M

Total retained over the plant's life vs running split DX and replacing it twice — before solar.

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HOW YOU PAY FOR THE PLANT · YOU DON'T, THE BANK DOES

Three banks. *One BOI Income Tax Holiday. Karnot files everything.*

DBP

Sustainable Energy Finance Programme (SEFP)

Energy-efficiency priority for commercial real estate. Covers heat pump + fan coils + solar. 70–80% LTV. 5–10 year terms.

~6.5–8% p.a.

LandBank

Sustainable Energy Investment Loan (SEILP)

Strong fit for offices, hospitals, schools and hospitality already banking with LandBank.

~7% p.a.

BPI

Sustainable Development Finance (SDF)

Fastest decisions for established developers and building owners. ESG-aligned loan book.

~1–1.5% below SME

On a new build the running-cost saving covers the loan payment with cash to spare. Plus **BOI Pioneer Income Tax Holiday under RA 11285** for qualifying green developments. Karnot files **the loan, the BOI registration, the building permits and the monthly IPMVP M&V report your lender wants** as part of project scope.

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THE NEW-BUILD MATHS · HYDRONIC VS VRF

Same install cost as VRF. *Spend it on water instead.*

WHAT RUNS IN THE WALLS

Water, not R410A

VRF pipes **R410A through every ceiling** — F-gas over occupied desks, on the phase-down clock. Karnot circulates **water**; the R290 stays sealed at the outdoor plant. Nothing to leak on staff, nothing with a retirement date.

HOW HARD IT WORKS

COP 4.5 vs ~3

A modular plant at part load beats fifty small compressors. In 4-pipe it **recovers the cooling heat as free hot water** instead of dumping it on the roof — a saving VRF cannot make.

WHAT IT COSTS

Same CAPEX, −40%

Same capital line as the VRF you were going to buy, **about 40% lower running cost**, the morning peak shaved by iSAVE, and a plant with no F-gas phase-down date. Incremental payback close to **immediate.**

Indoor units and pipework go in on any new build — the only question is whether they carry refrigerant or water. ***Water is cheaper to run, safer over your staff, and recovers the heat.***

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THE REFRIGERANT DECISION · WHAT IS OVER YOUR STAFF'S HEADS

Three ways to cool a building. *Two pump F-gas through the ceiling.*

VRF · R410A

2,088

GWP · piped through every room

VRF runs **R410A through the ceiling of every occupied space**, leaking 5–10% a year — a Scope 1 bill and an indoor-air risk, on the Kigali phase-down clock with service prices climbing.

SPLIT DX · R32

675

GWP · one machine per room

R32 is lower-GWP but still F-gas, still in the occupied space, still **a hundred small compressors at COP ~3** with no heat recovery and no central control. Lower number, same architecture problem.

KARNOT · R290 HYDRONIC

GWP 3

Propane · sealed at the plant

R290 stays outside in a small sealed charge under EN 378; only water runs through the building. No F-gas over a desk, no phase-down date, COP 4.5, and the cooling heat recovered as free hot water.

SEC PFRS S2 climate disclosure: *the Scope 1 refrigerant line from your HVAC goes to near zero, audit-grade from iSAVE.*

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WHAT HAPPENS NEXT

Four steps from this deck *to a building that runs on water.*

1 **Send us the building**

Floor area, occupancy and your HVAC + DHW design brief — or your 12 months of electricity bills for a retrofit. That is all we need to size the plant.

2 **We size the plant + fan coil layout**

How many 50 kW modules, the iZONE fan coil schedule by zone, the projected saving against VRF, NPV and payback — on your numbers.

3 **Bank + BOI paperwork — we file it**

DBP / LandBank / BPI green-loan application, BOI Pioneer ITH registration, building permits. You sign at the bank window, not before.

4 **One plant, commissioned**

Five or six 50 kW modules on a slab outside, iZONE fan coils through the building, iSAVE controlling every zone. No F-gas crosses the wall.

GET YOUR BUILDING'S NUMBERS

Send us your *floor area, occupancy and HVAC + DHW brief.*

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