

07 FOOD COURTS & DISHWASHING · HEAT THE SINKS FROM THE COLD ROOMS

₱75,000 a month back in your pocket. *From day one.*

A Philippine mall food court, running its walk-in chillers and freezers while heating every drop of dishwashing water from the heat they throw away — one electricity bill, no flame on site, financed by the bank, paid out of the saving. Modelled on a ~25-stall central dishwashing food court.

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WHY YOUR FOOD COURT PAYS FOR EVERY KILOWATT TWICE

The dish line heats water at COP 1. The cold rooms throw their heat away. *Karnot connects them.*

A food court runs **two opposing thermal jobs at once, every trading hour**: the dishwashing line wants a 60 °C wash and an 82 °C sanitising rinse; meanwhile every walk-in chiller, freezer and ice machine dumps its condenser heat into the back-of-house. The same kilowatt-hour, paid for twice — once to Meralco to heat the water at COP 1, once to Meralco again to throw the same heat into the corridor.



The electric water heater runs at COP 1

Commercial dishwashing wants a **60 °C wash and an 82 °C sanitising rinse**, all day. Today PH food courts heat it with electric instant and storage heaters at **COP 1.0 — one kWh of Meralco power for one kWh of heat**, roughly 87,000 kWh/yr (~₱1.22M) on a 25-stall court. It is the most expensive heat there is — and a heat pump delivers it at a quarter of the electricity.



Your cold rooms are a free boiler — nobody told you

Walk-in chillers, freezers, beverage cold rooms and ice machines run all day on **ageing R404A at COP ~2.8 with an F-gas phasedown clock** — dumping their condenser heat into the back-of-house. But that rejected heat is the same heat your sinks need — captured at the CO₂ gas cooler, **it makes the dishwashing hot water for free, and the cold rooms run 40% more efficiently at the same time.**

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THE ARCHITECTURE · ONE MACHINE, BOTH JOBS

Chill the cold rooms. *Capture the heat. Retire the electric heater.*

KARNOT FOOD-COURT PLATFORM · MODELLED ~25 STALLS · SCALES WITH COVERS & STALLS

COLD SIDE · WHAT THE FOOD COURT NEEDS

Walk-in chillers · freezers · ice machines

Tenant **walk-in chillers** at 2–4 °C, freezers at –18 °C and **ice machines** running every trading hour. Beverage cold rooms and prep fridges. All from iCOOL CO₂ at **COP 4.2 (Oak Ridge validated)** — 40% less electricity than the legacy R404A racks.

**iCOOL CO₂ + iHEAT R290**

The heat pulled out of the cold rooms is delivered to the dish line. Nothing is dumped into the back-of-house.



HOT SIDE · WHAT THE DISH LINE NEEDS

60 °C wash · 82 °C rinse · pot & hand wash

Dishwasher wash tank 60 °C and the **82 °C sanitising rinse**. Pot-wash sinks and hand-wash hot water 45–60 °C. Fed from **recovered refrigeration heat** via the CO₂ gas cooler + iHEAT R290 top-up. **Electric resistance heat: zero.**

ISTOR PCM · BOTH SIDES BUFFERED

Hot buffer banks recovered heat for the lunch-rush rinse load. **Cold buffer carries the walk-in freezers through a brownout — the food stays cold and the dishes keep moving.**

THE KITCHEN STAYS

Your dishwashers, sinks and walk-in boxes don't change. **We replace the utilities around them, not the kitchen.** Commissioning overnight, between trading days.

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THE FOUR BOXES YOU ACTUALLY NEED

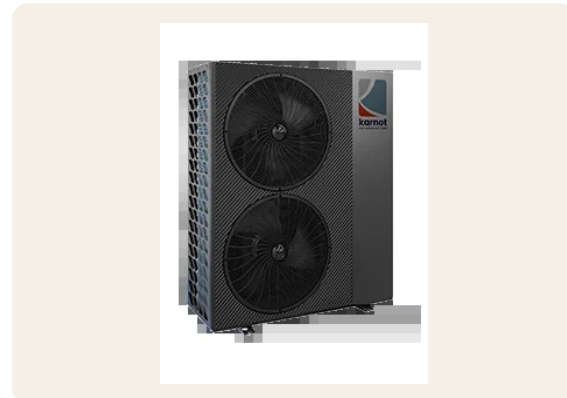
Four products. *One project. One commissioning team.*



iCOOL CO₂

Transcritical R744 · GWP 1 · food-safe A1

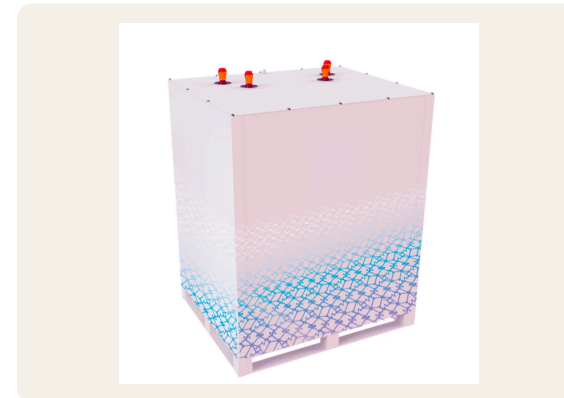
Walk-in chillers, freezers, ice machines. **COP 4.2 at -5 °C** (Oak Ridge validated). Gas cooler delivers **75–90 °C hot water from the same cycle**. The right refrigerant for a commercial kitchen.



iHEAT R290

9.5–100 kW · COP 4.0+ · 60–85 °C

Dishwashing and sanitising-rinse duty. **Drop-in replacement for the electric water heater**. Outdoor install, sealed 1.4 kg charge, EN 378 compliant. No flame, no flue, no resistance bank.



iSTOR PCM

38 kWh · 8–12 hr backup

Thermal battery on both sides. **Hot:** recovered heat banked for the lunch-rush rinse. **Cold:** the walk-in freezers ride through a PH brownout with zero compressor load. 1,500+ charge cycles.



iSAVE + iVOLT

IPMVP M&V + zero-export solar

iSAVE meters every duty — **monthly IPMVP Option B report to your accountant and your lender**. iVOLT zero-export solar cuts the remaining grid draw 30–50%. Mall roofs are flat and big.

THE BILL · MODELLED ~25-STALL MALL FOOD COURT

₱1.72M energy bill today. ~~₱1.72M~~ **₱0.55M after. –68%.**

ANNUAL FIGURE	TODAY · ELECTRIC HEATERS + OLD FRIDGES	KARNOT PLATFORM	YOU STOP PAYING
Dishwashing hot water (wash + rinse)	COP 1.0 · ~87,000 kWh/yr	COP 4.0 · recovered fridge heat	₱915K/yr
Walk-in refrigeration	COP 2.8 · R404A	COP 4.2 · CO ₂	₱255K/yr
Scope 2 + refrigerant exposure	grid load + GWP 3,922	GWP 1 & 3 · natural	~40 tCO₂e/yr
Total investment (VAT-inc)	(already paid)	~₱1.5M	1.3 yr payback

*Basis: mid-size mall food court, ~5,000 L/day dishwashing hot water heated 25→75 °C plus an 82 °C sanitising rinse, today heated by COP 1.0 electric instant/storage heaters (PH food courts use electricity, not LPG). Walk-in cold rooms + ice machines on the cold side. Meralco GP ₱14/kWh. CAPEX includes iCOOL CO₂, iHEAT R290 heat-pump water heater, hot buffer, controls, commissioning, Permits-Managed Service LOW. **Scale by stalls / covers — a 12-stall canteen halves it, a 50-stall regional centre doubles it. The per-cover economics hold.** Excludes iVOLT solar (further 30–50% off the remainder).*

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THE CASH FLOW · BANK-FINANCED

From day one. *Net of the loan payment.*

MONTH 1

₱ 75K

~₱98K monthly saving **minus** the green-loan payment (~₱23K). Net cash in pocket. Every month. From day one.

YEAR 1

₱ 0.9M

In your pocket while the loan is being repaid. **The kit has paid for itself in cash terms by month 16.**

YEAR 5

₱ 4.5M

Banking ~₱0.9M a year after the loan payment. **The loan clears in year 7 — then you keep all of it.**

YEAR 15

₱ 16M

Total cash retained over the 15-year asset life vs keeping the electric heaters and the old cold rooms.

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

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

DBP

Sustainable Energy Finance Programme (SEFP)

Commercial energy-efficiency priority. Covers heat pump + refrigeration + solar. 70–80% LTV. 5–10 year terms.

~6.5–8% p.a.

LandBank

Sustainable Energy Investment Loan (SEILP)

Strong fit for malls and canteen operators already banking with LandBank. Friendly underwriting.

~7% p.a.

BPI

Sustainable Development Finance (SDF)

Fastest decisions for established operators with a BPI relationship. ESG-aligned loan book.

~1–1.5% below SME

These are **loans**, not grants. The monthly saving covers the payment **4x over**. Plus **BOI Pioneer Income Tax Holiday under RA 11285** — energy-efficient commercial systems qualify. 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 ENGINEERING BEHIND THE NUMBER · PINCH ANALYSIS

We don't guess the saving. *We calculate your thermodynamic minimum.*

NUMBER 1 · MINIMUM HEATING

$Q_H \text{ min}$

The **absolute least bought-in heat** your food court needs after maximum heat recovery. If your electric heaters draw more than this — and in every kitchen we have surveyed, they do — **the difference is pure waste.**

NUMBER 2 · MINIMUM COOLING

$Q_C \text{ min}$

The **absolute least chiller energy** required after recovery. Everything your cold rooms reject above this is heat you paid to remove and then **paid again to throw away.**

NUMBER 3 · THE BOTTLENECK

~30 °C

The food-court pinch point — between the cold-room reject heat and the dishwater demand. Above it: heat deficit. Below it: heat surplus. **A heat pump is the only utility that moves surplus heat from below the pinch to the deficit above it.** That is why the saving is 68%, not 15%.

Hot streams are income. Cold streams are expenses. Pinch analysis is the accountant that finds the maximum internal transfer before you pay the grid to heat (electric heater) or pay it again to throw money away (cold rooms). *Plain-English guide: karnot.com/blog/idiotsguide-utility-pinch-analysis*

THE REFRIGERANT DECISION · CHILLING THE COLD ROOMS

Three ways to chill a food court. *Two of them have a clock running.*

LEGACY HFC · THE PHASEDOWN

3,922

GWP of R404A · F-gas phasedown clock

R404A / R134a walk-in racks face **quota-driven service price rises every year**. The EU PFAS restriction names the HFC family explicitly. PH typically follows 6–8 years behind. **Every peso spent maintaining one is a peso spent on a dying asset.**

INDUSTRIAL AMMONIA · THE EXCLUSION ZONE

B2L

Toxic safety class · specialist compliance

NH₃ is efficient but **toxic** — **exclusion zones, specialist technicians, emergency response plans**, and an insurance loading. Sized for industrial cold stores, not the walk-in chillers and freezers of a mall food court behind a public dining hall.

KARNOT NATURAL · NO CLOCK, NO ZONE

GWP 1

CO₂ (R744) + propane (R290 · GWP 3)

CO₂ is food-safe, A1 class — the right refrigerant for a kitchen. R290 sits outdoors in a sealed 1.4 kg charge under EN 378. No phasedown, no exclusion zone, no insurance loading, **nothing on the asset register with a death date.**

SEC PFRS S2 climate disclosure: ~40 tCO₂e/yr avoided, audit-grade data from iSAVE, monthly.

WHAT HAPPENS NEXT

Four steps from this deck *to a retired electric heater.*

- 1 Send us three things**

Stall count and daily covers, 12 months of electricity bills, and your dish-line + refrigeration schedule. That is all we need for the first model.
- 2 Level 1 Energy Survey + pinch study**

₱90K, one week of portable metering on your actual dish-line and cold-room load — **refunded in full when you proceed to install.** Output: your Q_{Hmin} , Q_{Cmin} and a sized system quote.
- 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 Install in 4–6 weeks · no lost trading days**

The kitchen stays. We swap the utilities around it — commissioning overnight, between trading days. Electric water heater retired on handover day.

GET YOUR FOOD COURT'S NUMBERS

Send us your *stall count, 12 months of bills and your dish-line schedule.*

Stuart Cox · Founder & CEO

stuart.cox@karnot.com

+63 75 510 8922

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