

# ₱180,000 a month back in your pocket. *From day one.*

A mid-size Philippine food processor, swapping an LPG steam boiler for one Karnot iHEAT R290 cascade — one electricity bill, financed by the bank, paid out of the saving. 78% off the process-heat line, no flame on site. Modelled 150,000 kWh/yr useful process heat, 2026.

## KARNOT

### WHY YOUR STEAM LINE IS WRONG

# Useful process heat from an LPG boiler costs **₱17 per kWh.**

Most Philippine food processors run an LPG (or diesel) steam boiler 24/7 to feed blanchers, CIP loops, pasteurisers and packing lines. **Once you net out 82% boiler efficiency, steam-line losses and condensate that never returns, useful heat at the point of use costs about ₱17 per kWh.** A heat pump moves heat from the air around the plant into your process loop at **₱2.50 per kWh delivered** — same duty, no combustion.



### **LPG steam is a peso-per-kWh bill that only goes up**

LPG in PH has climbed **~40% since 2020**. Net out 82% boiler efficiency, ~5% steam-line losses, condensate that never returns — useful heat at the process is **~₱17/kWh**. Most CFOs cost it as “boiler fuel ÷ tonnes shipped” and miss the real number.



### **A flame, a flue, a DENR file, an insurance loading**

An LPG boiler room means a permit, a continuous combustion risk, periodic DENR inspections, a flue-gas record, and an insurance loading on your plant licence. **Karnot iHEAT R290 sits outdoors** with a sealed refrigerant charge under 5 kg per unit — no flame, no flue, no inspection.

## KARNOT

ONE CLOSED LOOP · HEAT PUMP + THERMAL STORAGE

# Air-to-water + CO<sub>2</sub> cascade. *The closed loop.*

KARNOT IHEAT R290 + ICOOL CO<sub>2</sub> + ISTORE PCM · PH FOOD-PROCESSOR ARCHITECTURECOLD SIDE · ICOOL CO<sub>2</sub>**Blast chill · freezing · cold store**

CO<sub>2</sub> refrigeration handles **-40 °C blast freezing**, finished-product cold store, ingredient chillers. Replaces R404A. **Reject heat at 60 °C is captured here, not dumped to atmosphere.**

**IHEAT R290 CASCADE**

*Air-to-water heat pump. 60–90 °C process heat at COP 4.0+. CO<sub>2</sub> cascade for >100 °C duty.*



HOT SIDE · IHEAT + ISTORE

**Blanch · CIP · pasteurise · sterile rinse**

60–90 °C wash and rinse water, CIP loop pre-heat, pasteurisation. **iSTORE PCM banks 70–90 °C latent heat from afternoon solar for night-shift CIP** — no diesel or LPG to top up.

## KARNOT

THE FOUR BOXES · WHAT WE INSTALL

# Four products. *One project.*



## Karnot iHEAT R290

9.5–105 kW · cascade

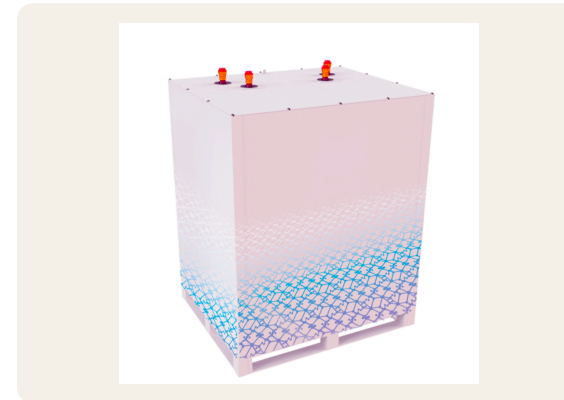
Air-to-water heat pump. **COP 4.0+ at PH ambient**, 60–90 °C delivery. R290 natural refrigerant (GWP 3). Direct replacement for LPG/diesel steam for sub-100 °C duty.



## iCOOL CO<sub>2</sub>

10–500 kW · R744 cascade

CO<sub>2</sub> (R744) refrigeration cascade. **-40 °C cold to 90 °C hot in one machine**. Reject heat captured at 60 °C, not vented. GWP 1, A1 safety. No R404A phasedown.



## iSTOR PCM

100 kWh–2 MWh latent

Phase-change thermal battery at 70–90 °C. **Banks afternoon solar as hot CIP water** for night-shift cleaning. Non-lithium, fire-safe. FLX coconut PCM in development.



## iVOLT Solar · load-matched

Zero-export · flat-roof gold

Behind-the-meter solar sized at **~117% of the iHEAT + iCOOL demand**. No export. Daytime solar runs the heat pumps directly; surplus charges iSTOR for night shift.

## KARNOT

MODELLED · MID-SIZE PH FOOD PROCESSOR · 150,000 KWH/YR USEFUL PROCESS HEAT

# A real number. *Per kWh of process heat delivered.*

ANNUAL FIGURE · 150,000 KWH/YR USEFUL HEAT

TODAY · LPG STEAM BOILER

KARNOT IHEAT R290 CASCADE

YOU STOP PAYING

Cost per kWh useful (at the process)

~₱17/kWh

~₱2.50/kWh

**6.8× better per peso**

System efficiency

82% boiler × 95% steam line

COP 4.0 annualised

**5× better at the meter**

Annual energy cost · process heat

~₱2,550,000

~₱375,000

**-78% / ~₱2.175M**

Refrigerant / combustion

Scope 1 LPG · ~750 tCO<sub>2</sub>e/yr

R290 · GWP 3 · natural

**Scope 1 → zero**

Total investment (VAT-inc)

**(already paid)**

~₱2.5M

**< 6 mo cash payback**

Modelled · mid-size PH food processor · 150,000 kWh/yr useful process heat. LPG ₱85/kg, 13.6 kWh/kg gross, 82% boiler × 95% steam line = **₱17/kWh useful**. iHEAT R290 cascade 50 kW, COP 4.0, Meralco GP ₱14/kWh = **₱2.50/kWh delivered**. CAPEX: iHEAT cascade + 500 kWh iSTOR + Permits. **NPV ~₱19M at 8%, lifetime saving ~₱33M over 15 years**. Your plant might be smaller (50,000 kWh/yr ÷3) or larger (500,000 kWh/yr ×3.3) — per-kWh economics hold.

## KARNOT

THE CASH FLOW · PLAIN AND DULL

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

MONTH 1

**₱180K**

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

YEAR 1

**₱2.16M**

In your pocket while the loan is being repaid. Kit pays for itself by month 5.

YEAR 5

**₱10.8M**

Loan paid. You keep **every peso** of the ₱2.175M annual saving from here on.

YEAR 15

**₱32.6M**

Total cash retained over the 15-year asset life vs running the LPG boiler.

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 — food & beverage qualifies. 70–80% LTV · 5–10 year terms · designed for energy-efficiency CAPEX.

~6.5–8% p.a.

## LandBank

### Sustainable Energy Investment Loan (SEILP)

Path of least resistance if you already bank with LandBank. Standard SME terms with green discount.

~7% p.a.

## BPI

### Sustainable Development Finance (SDF)

Fastest decisions for established SMEs with a BPI relationship. Sized for renewable + efficiency CAPEX.

~1–1.5% below SME

These are **loans**, not grants. Real green-discounted commercial loans, with payment schedules sized to fit on top of the monthly LPG savings. **Karnot files the application, the BOI Pioneer registration and the RA 11285 Income Tax Holiday paperwork as part of project scope.** You sign at the bank window, not before.

THE REGULATORY REBELLION · APRIL 2026

# You've been told 100 kWp is the cap. *It isn't.* *And it hasn't been since April.*

## THE MYTH

## ~~100 kWp~~

What every solar quote you've received told you was the maximum. The net-metering cap, pre-April 2026. Covered **4-8%** of an industrial electricity bill.

## APRIL 2026 ONWARDS

## 1 MW

DOE Circular lifted the net-metering cap to **1 MW** (or contracted capacity) for commercial & industrial consumers. 10x more solar, same paperwork.

## SGF · ZERO EXPORT

## No cap

The Self-Generating Facility route has never had a **cap**. Meralco's own FAQ: "no limitation on the generating capacity that the customer can install to avail of Zero Export." ERC SGF approvals up **170%** q/q.

The 20% offset you've been quoted *isn't a regulatory ceiling. It's the economic ceiling of solar without storage.*

## WHY THERMAL STORAGE BEATS EXPORT

# Three ways to spend a midday solar kWh. *Only one keeps the value.*

## EXPORT IT

₱6

/ kWh · Bilateral Generation Contract

Meralco pays you the BGC rate — about half of what you pay to buy electricity back at night. **You lose 60% of the value** on every kWh exported.

## CURTAIL IT

₱0

/ kWh · wasted

No export permission, no demand at midday, no storage. The inverter clips the surplus. **Zero value recovered.**

## STORE IT THERMALLY

₱13

/ kWh · full retail avoided

Midday solar runs the iHEAT cascade, charges the iSTOR PCM with 70–90 °C latent heat. Night-shift CIP pulls from the buffer, no grid. **Full retail value kept.**

A kWh of solar stored thermally and consumed at night is worth **2.4× the same kWh exported.**

## THE NEXT STEP

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

## 01 Plant scale + product mix

Annual tonnes throughput, current boiler nameplate kW, daily shift schedule, CIP and pasteurisation cycles. Tells us the iHEAT cascade size.

## 02 12 months of LPG + Meralco bills

Just the front summary pages. We compute today's process-heat cost per useful kWh — usually 2–3× what the CFO thinks.

## 03 Your bank relationship

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

## WHAT YOU GET BACK

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

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