



42 APPLICATION BRIEF

Bakeries

For commercial bakeries, bread plants and dough-supply operators across the Philippines

Heat from the cooler. *Power for the proofer.*

A commercial bakery runs two opposing thermal jobs at the same time — the proof box at 40–46 °C / 80–90% RH, and the cooling hall at 20–25 °C / 60–70% RH. Today most Philippine bakeries pay for both jobs **twice**: a chiller dumps usable heat to atmosphere, an electric resistance heater buys it back from the grid. The Karnot Simultaneous Heating & Cooling architecture — one iHEAT R290 reversible heat pump driving twin AHUs through two iSTOR PCM tanks, with iVOLT solar in front — runs both loads from one heat-pump loop. **Combined COP 6–8. ~70% off the thermal energy bill.**

-80%

Daily thermal energy
vs electric resistance + chiller
baseline

COP 6– 8

Combined heat AND cool
One compressor input · two useful
outputs

18–36 mo

Per-facility payback
Industry F&B heat-pump benchmark

— WHAT WE INSTALL

A single platform replaces three machines.

iHEAT R290 reversible

SHC engine · monobloc outdoor · GWP 3 · no phasedown clock

Extracts heat at cooling AHU, delivers it to proofing AHU in same cycle. Sized 25–100 kW per bakery.

iSTOR PCM x 2

Hot tank 44 °C · cold tank 22 °C · patented PCM, natural fluids

Buffers minute-by-minute imbalance between cooling and proofing demand. No heat-pump short-cycling.

Twin Karnot AHUs

Fully inverter-controlled · hot + cold coils · humidistat

Proofing AHU 40–46 °C / 80–90% RH · Cooling AHU 20–25 °C / 60–70% RH · HEPA + positive pressure

iVOLT solar + Li-ION

Zero-export PV · Karnot inverter · LiFePO4 battery

Powers the SHC loop through daylight. Drops bakery thermal cost from ~₱4,480/day to ~₱1,500/day.

— HOW IT WORKS

Audit. Install. Pay-per-kWh.

01

Free site survey

One-day audit. We datalog proof-box and cooling-hall temperatures and humidities through a full bake cycle, pull 12 months of utility data, and model the combined thermal load using the ASHRAE Refrigeration Handbook Ch. 41 method.

02

Capital purchase · ~6 mo install

Karnot equipment is sold outright with a 3-year warranty on the heat-pump core. Phased install on planned shutdowns — production runs through commissioning, no lost batches. BOI registration paperwork under RA 11285 included.

03

M&V proves the saving

Dedicated kWh sub-meters on the heat pump + continuous T/RH datalogging per IPMVP Option B. Combined COP verifiable monthly — bankable for ESCO contracts, CECO reporting and PFRS S2 disclosures.

— WHAT YOU SAVE

Modelled on real Philippine properties.

CONFIGURATION · 100 KW THERMAL · 16 H/DAY	DAILY THERMAL COST	VS BASELINE	ANNUAL SAVING
Electric resistance + chiller (existing)	₱22,400	baseline	—
Standard single-mode heat pump (COP 3.5)	₱6,400	-71%	~₱5.0M
Karnot SHC heat pump (combined COP 5.0)	₱4,480	-80%	~₱5.6M
+ 15 kWp iVOLT solar bolt-on	₱1,500	-93%	~₱6.5M

Modelled scenario · typical mid-size Philippine commercial bakery · not an actual installation. Tariff: Meralco GP April 2026 — ₱14/kWh blended + ~₱700/kW combined demand charges. Per-facility figures sized from a free site survey.

“ The bakery proofer needs heat. The cooling hall dumps it. Today every Philippine bakery pays for the same kilowatt twice. The Karnot SHC architecture closes that loop — combined COP 6 to 8, and you stop buying the same heat from Meralco that you already paid for at the oven door. ”

Stuart Cox · Founder & CEO · Karnot Energy Solutions Inc.

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