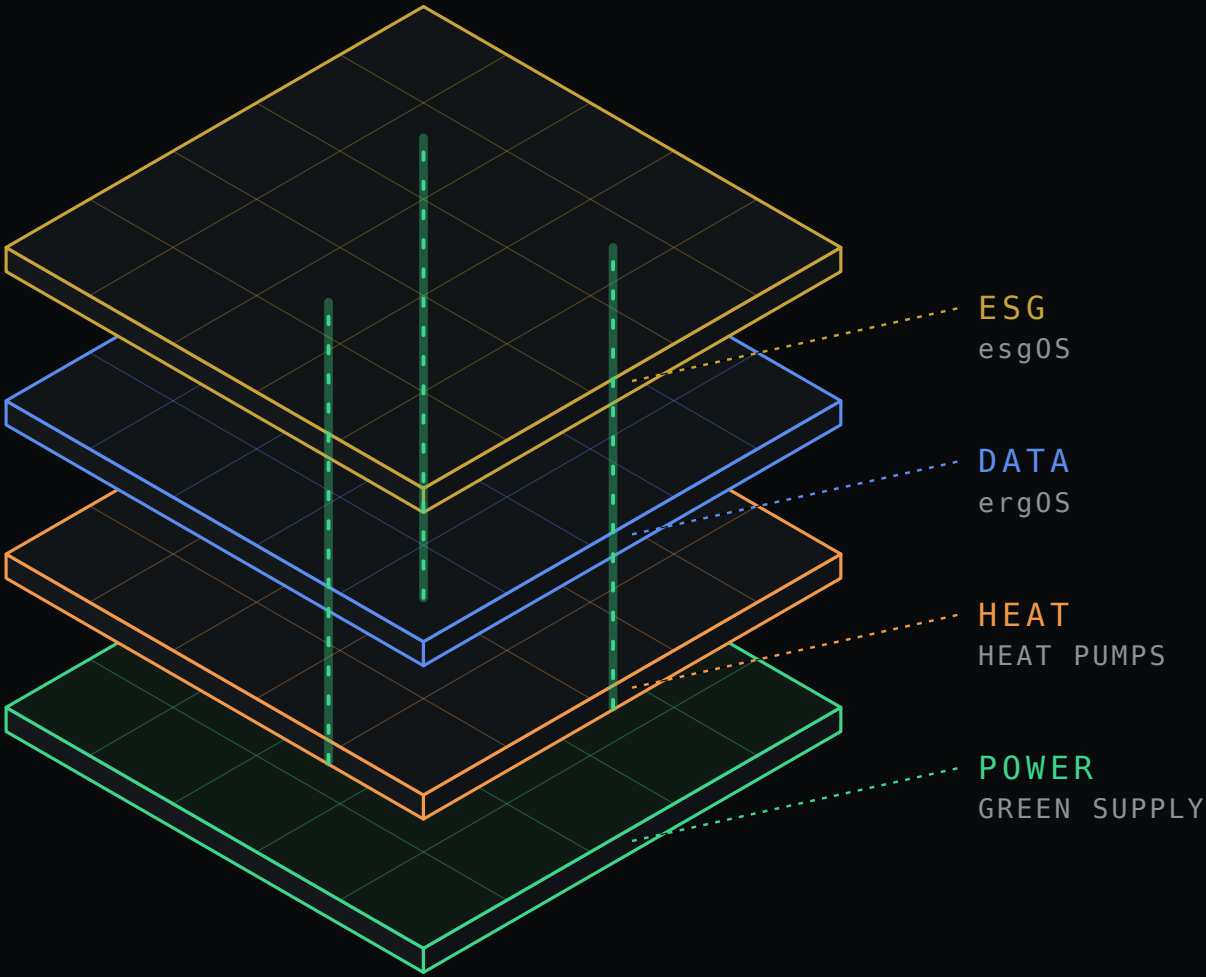


GREEN POWER. GREEN HEAT. ONE STACK. FOR CEMENT PLANTS.

One provider for green power, recovered heat and the data that proves both
— from the quarry to the bag.



4
LAYERS • POWER,
HEAT, DATA, ESG

120 °C
HEAT PUMP RANGE •
LOW-GRADE HEAT

15-min
METERED HEARTBEAT
ON ERGOS

1
ACCOUNTABLE
PROVIDER

THE KILN STAYS. EVERYTHING AROUND IT MOVES.

THE SITUATION

Cement is two problems in one plant. Most of its CO₂ comes from limestone calcination and kiln fuel — chemistry and high-temperature heat that no heat pump can touch. The rest is electricity: crushers, raw mills, fans, cement mills and packing, typically 70–100 kWh per tonne, running around the clock. That electricity, the heat already leaving the cooler and preheater, and the way mills are scheduled are where jouleWise works.

THE GAP

Power, heat and ESG reporting are bought from different vendors on different clocks. Solar is sized without the heat load; boilers are replaced without a plan for cheaper power; ESG data is typed in once a year. Each fix leaves money and carbon on the table.

WHAT WE DO

jouleWise runs the whole decarbonisation stack: **green power** — intrastate and ISTS solar and wind, rooftop solar, BESS and green-market purchase, each source orchestrated to fulfil industrial demand at least cost; **ABT metering and data loggers** on every source and load; **green heat** from industrial heat pumps up to 120 °C; **ergOS** to meter and orchestrate both every 15 minutes; **esgOS** to turn the same data into audit-ready disclosure.

WHY IT COMPOUNDS

Cheaper green power lowers the cost of every unit of heat a heat pump makes. Thermal storage lets that heat be made in the cheapest solar blocks. ergOS proves it; esgOS reports it. Savings from one layer fund the next.

THE VALUE

Up to 25% lower power cost on DISCOM tariff and up to 65% renewable share (reported, year 1 of ergOS). Grinding shifted into the cheapest, greenest blocks, waste heat recovery run against actual kiln operation, and a metered emission-intensity baseline ready for the Carbon Credit Trading Scheme.

HOW TO ENGAGE

Four models, mix and match: **Advisory**, **SaaS** (ergOS + esgOS), **Heat Advisory**, and **Heat as a Service**, where you pay per unit of heat and invest nothing upfront.

FIRST STEP

A four-week decarbonisation baseline on one plant: power bills and 15-minute data, WHRS performance, mill scheduling, electrical and thermal energy per tonne, and the ESG and GEI data map — ending in one business case.

up to 25%

COST SAVINGS ON DISCOM TARIFF

up to 65%

RENEWABLE SHARE ACHIEVED

Reported client impact, year 1 of ergOS; C&I client outcomes. Results vary with state, tariff structure and load profile. Cement-specific value is quantified in the baseline.

THE CHEMISTRY IS FIXED. THE POWER BILL IS NOT.

For a cement producer, the levers that remain are electrical, thermal recovery and data — and all three are now scored by regulators and buyers. Six pressures point at the same metered data.



POWER IS A TOP-THREE COST

Electricity runs 70–100 kWh per tonne of cement, around the clock. A rupee off the landed cost repeats on every tonne for the life of the contract.



CARBON CREDIT TRADING SCHEME

Cement is among the first sectors brought under greenhouse-gas emission-intensity targets in India. Meeting them — or earning credits — starts with a metered, verifiable baseline.



CBAM

Cement is covered by the EU's carbon border mechanism. Clinker and cement reaching the EU, directly or through customers, need verified embedded emissions.



WASTE HEAT ALREADY PAID FOR

Preheater and cooler exhaust carry heat worth a large share of the plant's own power demand. WHRS only pays if it is sized, run and measured properly.



GREEN PROCUREMENT

Infrastructure buyers, green building ratings and blended-cement specifications increasingly ask for per-tonne carbon, EPDs and renewable share.



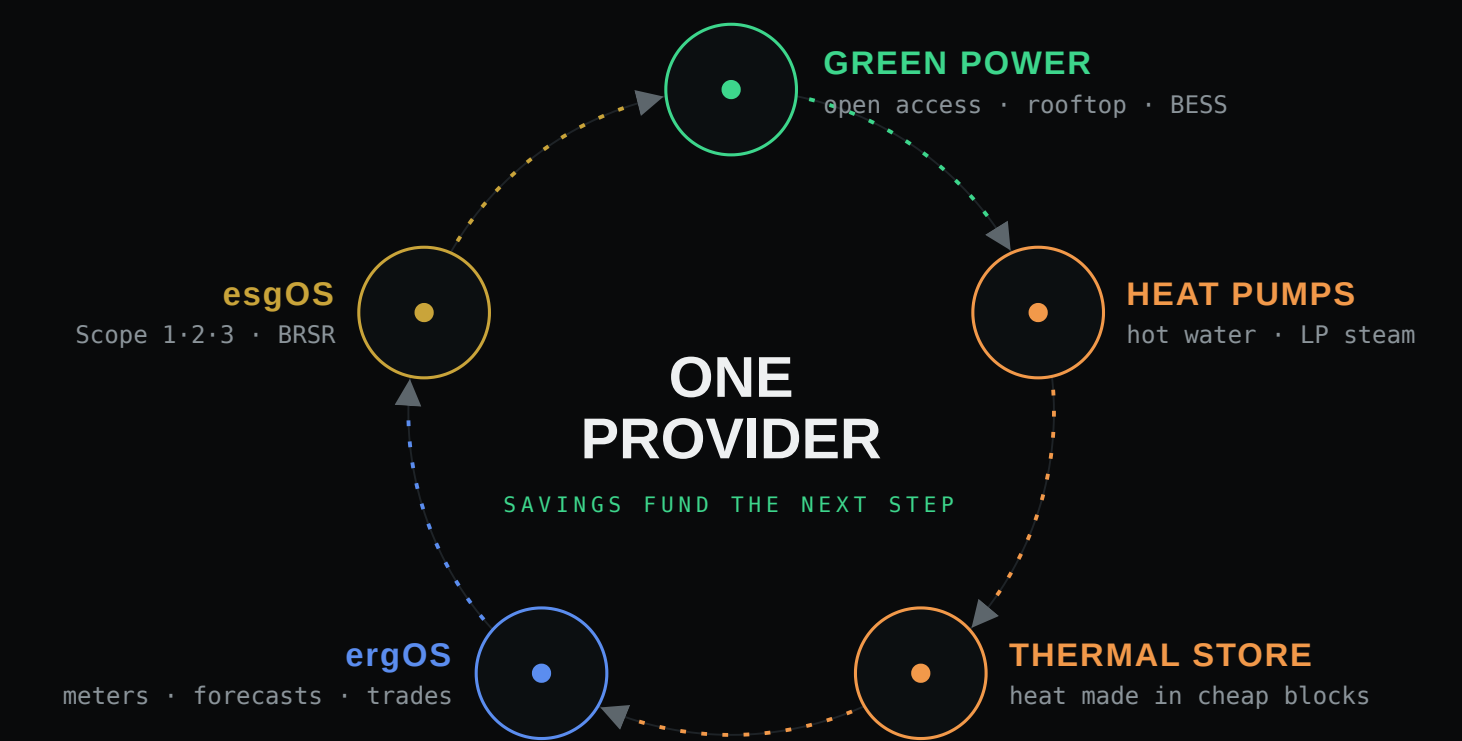
DISCLOSURE

BRSR Core-format reporting, lender diligence and customer value-chain requests all draw on the same plant data.

THE ECOSYSTEM / FIRST OF ITS KIND

ONE STACK. EVERY LAYER FEEDS THE NEXT.

Most plants buy decarbonisation in pieces. We built it as a loop: low-cost green power feeds heat pumps, storage moves heat into the cheapest blocks, ergOS runs it, esgOS proves it.



- 01

Green power
Intrastate and ISTS solar and wind, rooftop solar, BESS and green-market purchase — each source orchestrated to fulfil industrial demand at least cost.
- 02

Heat pumps
Every kWh in becomes three to four kWh of useful heat — for genuinely low-grade loads. In cement, waste heat recovery comes first and the kiln stays fuel-fired.
- 03

Thermal storage
Heat is made when power is cheapest and greenest, and used when the process needs it.
- 04

ergOS
Meters power, steam, fuel and water every 15 minutes; forecasts, schedules and trades; runs heat pumps against price.
- 05

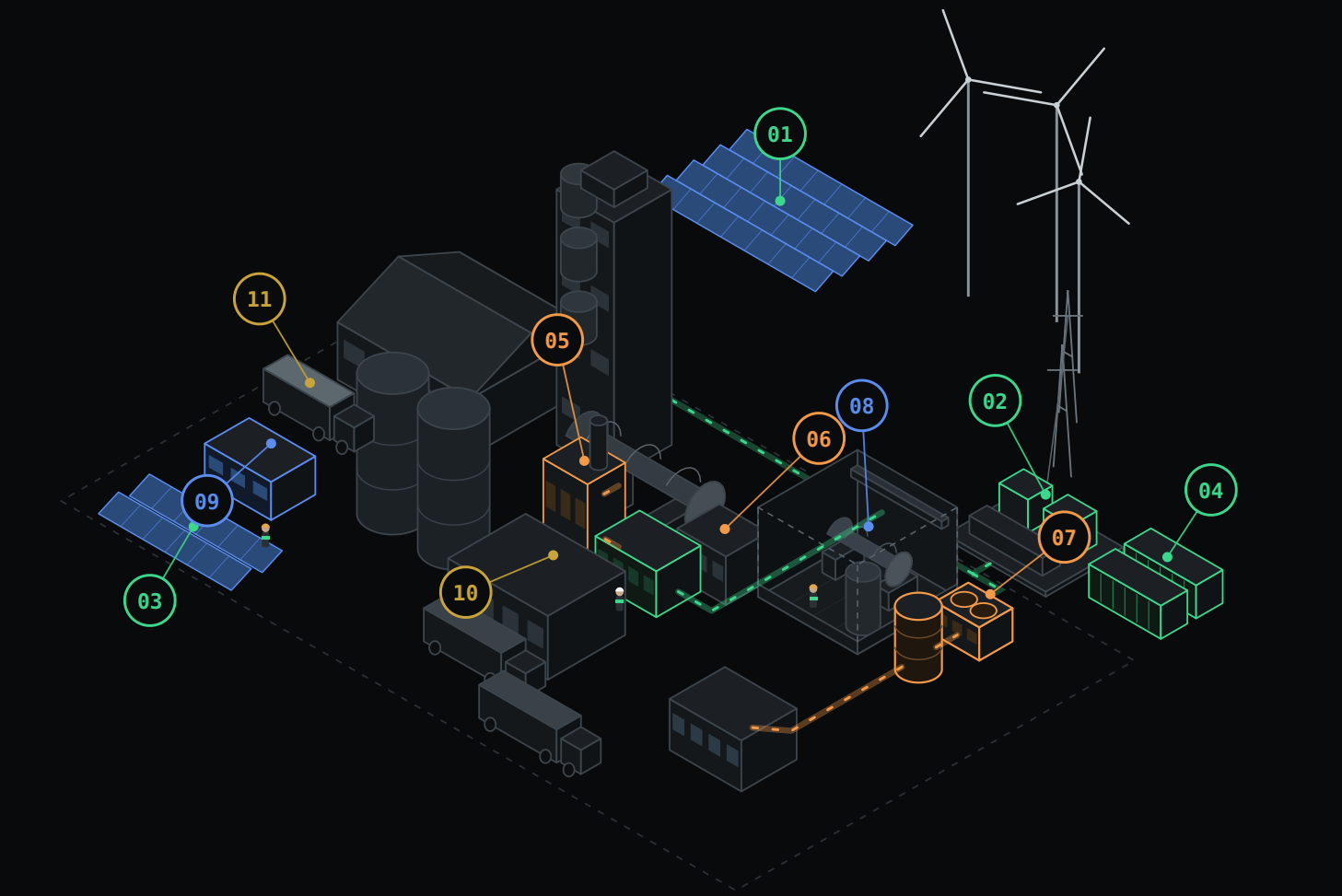
esgOS
Converts the same metered data to Scope 1, 2 and 3, BRSR Core-format, CBAM, CDP and customer disclosures.

Why the order matters. A heat pump on grid power cuts fuel cost but, at today's grid emission factor, barely cuts carbon against gas. Put the same heat pump on green power and its heat is close to zero-carbon. Power first, then heat — from one provider.

QUARRY TO BAG / WHERE WE INTERVENE

THE KILN STAYS. EVERYTHING AROUND IT MOVES.

Limestone is crushed and stacked, raw meal is preheated and burnt, clinker is cooled, ground with gypsum, fly ash or slag, stored and packed. jouleWise acts at eleven points — electrical, thermal recovery and data, never inside the kiln chemistry.



POWER HEAT DATA · ERGOS ESG · ESGOS

01

Green sourcing
Intrastate and ISTS solar and wind contracted through open access for a flat 24×7 load — the largest single lever in cement.
POWER

02

Connectivity and metering
Open access approvals, connection agreement and ABT metering at the 132 or 220 kV incomer.
POWER

03

Solar on plant land
Ground-mounted and rooftop solar on land the plant already owns, sized from measured load.
POWER

04

Battery storage
LFP storage to shave peaks, ride through grid events and firm the solar block.
POWER

05

Waste heat recovery power
Preheater and cooler heat to WHRS power — benchmarked, then run and metered against actual kiln operation.
HEAT

06

Cooler heat to drying
Cooler vent air and kiln gases routed to raw, coal and slag mill drying before any fuel is burnt for it.
HEAT

07

Heat pumps where heat is low grade
Colony, canteen and workshop hot water and low-temperature drying air — the slice of cement heat a heat pump can actually serve.
HEAT

08

Mill scheduling against price
Grinding is the plant's flexible load. ergOS moves mills into the cheapest, greenest blocks within silo and despatch limits.
DATA · ERGOS

09

ergOS control
15-minute metering of every mill, fan, drive and WHRS train; forecasting, scheduling and trading.
DATA · ERGOS

10

Per-tonne disclosure
kWh and kg CO₂ per tonne of cement, EPD inputs, BRSR Core-format and customer disclosures from esgOS.
ESG · ESGOS

11

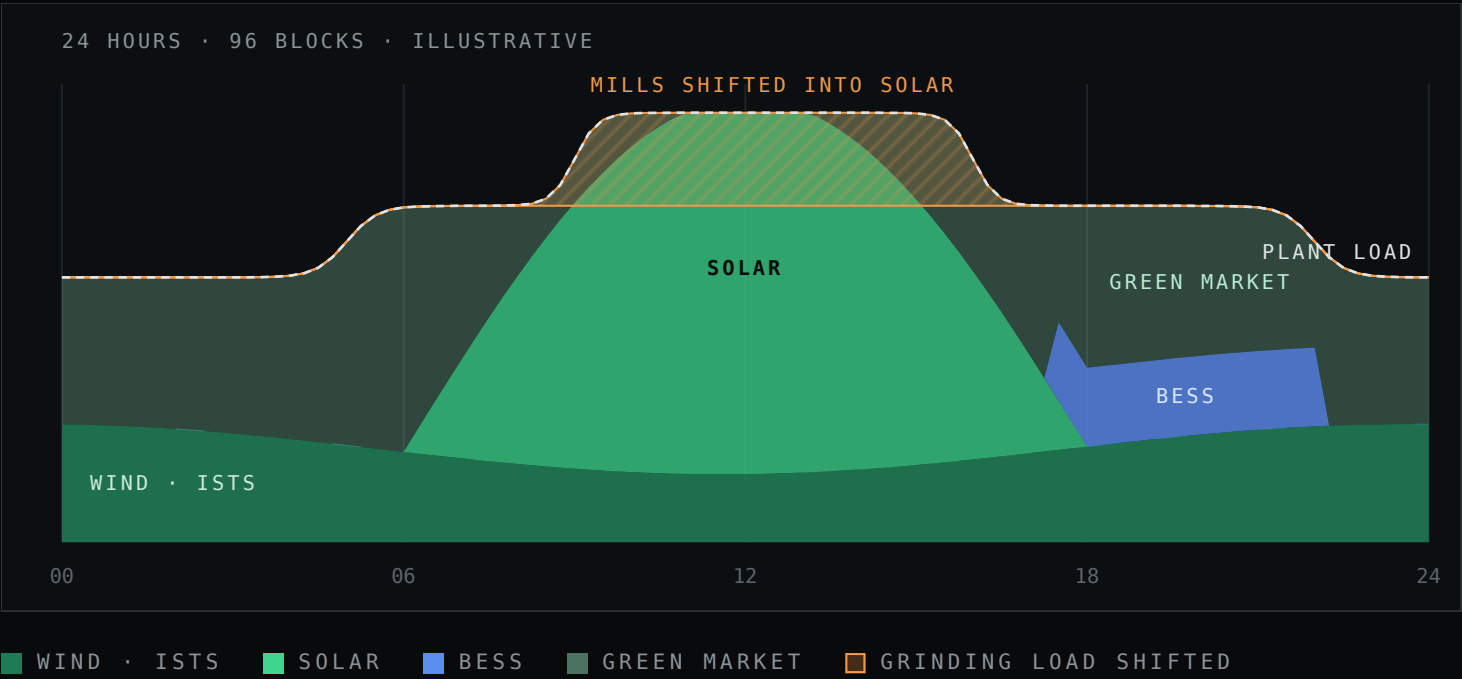
Quarry and logistics
Limestone, fuel, fly ash and slag movement for Scope 3 and the emission-intensity baseline.
ESG · ESGOS

Illustrative plant. Actual intervention map built site by site in the baseline.

LOW-COST GREEN POWER.

A cement plant is a heavy, flat, round-the-clock load with one large flexible block: grinding. We size the green portfolio to the flat load — and move the mills into the solar hours.

Every source, one dispatch. Intrastate and ISTS solar and wind, rooftop solar, BESS and green-market purchase — each source orchestrated to fulfil industrial demand at least cost.



01 PLAN

Meter-data due diligence: bills, load survey, rooftop and captive parameters. Solar, wind, hybrid, BESS and exchange power optimised together, capex or opex, with each state's ToD, banking and open access charges in the landed-cost model.

RE-100 ROADMAP · SIZE, LOCATION, SAVINGS, NPV

02 IMPLEMENT

RfP over a 25-year horizon, developer evaluation, reverse auction, PPA and shareholder agreements (26% SPV equity for captive status), open access approvals and connection agreement.

GREEN POWER CONTRACTED · ~3 MONTHS ONCE PLANNING CLOSES

03 METER AND LOG

ABT meters at injection and drawal points — main and check meters on CTs and PTs of the required accuracy class — plus data loggers on every incomer, heat pump, steam, fuel and water line. Installed, tested, sealed and linked to the SLDC and to ergOS.

EVERY SOURCE AND LOAD VISIBLE IN 15-MINUTE BLOCKS

04 ORCHESTRATE

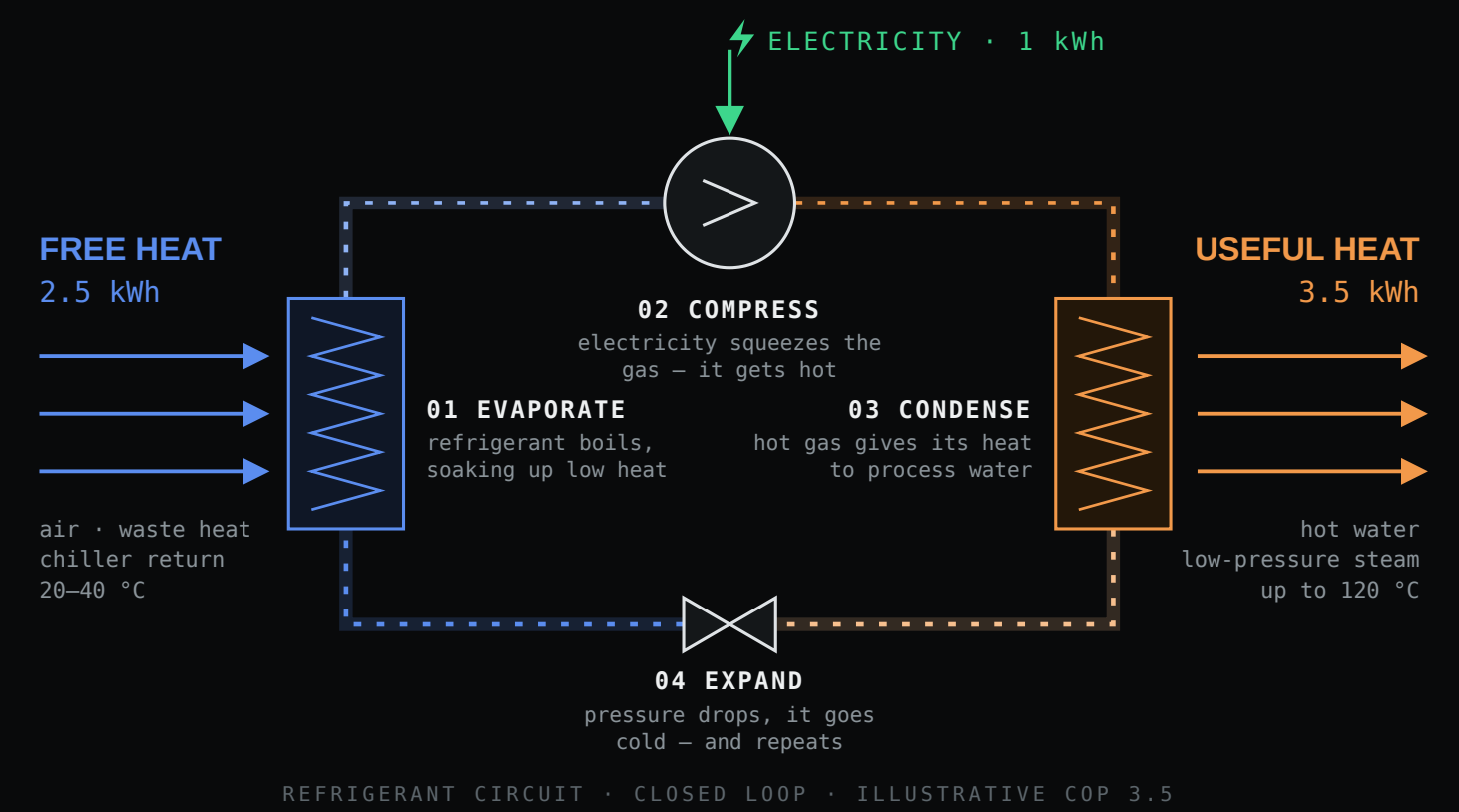
ergOS forecasts 96 blocks, schedules with the SLDC, trades DAM, GDAM, RTM and GTAM, manages banking and battery health — and now dispatches heat pumps and thermal storage against price.

FOR THE LIFE OF THE ASSETS

HEAT PUMP 101 / THE QUESTION CLIENTS ASK MOST

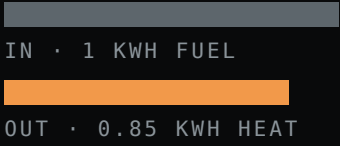
WHAT IS A HEAT PUMP?

A heat pump is a refrigerator run the other way round. It does not make heat by burning anything — it moves heat that already exists, from a cooler place to a hotter one, and uses electricity only to do the lifting.



WHAT GOES IN, WHAT COMES OUT

Fuel boiler



Heat pump



COP (coefficient of performance) = useful heat ÷ electricity. A boiler can never exceed 1; a heat pump typically delivers 2 to 5.

TEMPERATURE LIFT SETS THE COP · INDICATIVE

~5	~3.5	~2.5	~2
COP AT 30 K LIFT	COP AT 50 K LIFT	COP AT 70 K LIFT	COP AT 90 K LIFT

Lift = delivery temperature minus source temperature. Recovering warm waste heat first and delivering no hotter than the process needs keeps the COP high.

DOES IT REPLACE MY BOILER?

For loads up to 120 °C, yes — as the primary heat source. The boiler usually stays on standby and for any loads above that range.

WHAT IF POWER IS EXPENSIVE?

Each kWh of power returns three to four kWh of heat, so heat costs roughly a third of the power price. On green open access, the carbon falls close to zero as well.

WHAT DOES THE SITE NEED?

Spare electrical capacity, space near the heat users and a steady heat demand. A hot-water store smooths peaks and lets the unit run in the cheapest blocks.

IS IT PROVEN?

It is the same refrigeration cycle as the chillers already on your site, run for heat. Industrial units are in service worldwide in food, chemicals, pharma and textiles.

RECOVER FIRST. THEN ELECTRIFY.

Cement is the exception in this stack. The kiln, precalciner and raw-mill dryers sit far above any heat pump and stay fuel-fired. The levers are recovering the heat the plant already makes — to power through WHRS and to drying — and using heat pumps only where the heat is genuinely low grade.



HEAT SOURCES WE REUSE

Clinker-cooler vent air, preheater exhaust, compressor and grinding-circuit heat — a cement plant makes far more heat than it can use.



RECOVERY BEFORE REPLACEMENT

In cement the first question is never which heat pump. It is whether the heat already leaving the cooler and preheater is being used — for power through WHRS and for drying — before anything new is bought.



SIZED FROM METERED HEAT

Portable heat meters log flow and temperature on candidate processes for two to four weeks before anything is sized.

THE LOOP IN NUMBERS / ILLUSTRATIVE

CHEAPER POWER MAKES CHEAPER HEAT.

What one kWh of useful process heat costs, and what it emits, depending on where the heat comes from. The heat pump cuts cost on any power; green power is what cuts the carbon.

SOURCE OF HEAT	₹ PER KWH OF USEFUL HEAT	₹/KWH-TH
PNG-fired boiler ₹55/SCM · 85% efficiency		6.22
Diesel (HSD) boiler ₹90/L · 85% efficiency		10.59
Coal-fired boiler ₹8,000/t · 4,000 kcal/kg · 75% efficiency		2.29
Pet-coke fired kiln fuel ₹14,000/t · 8,000 kcal/kg · shown for reference		2.01
Heat pump on DISCOM power ₹8.5/kWh · COP 3.5		2.43
Heat pump on green open access ₹5.5/kWh landed · COP 3.5		1.57
Heat pump in solar blocks + store ₹4.0/kWh · COP 3.5		1.14

SOURCE OF HEAT	KG CO ₂ PER KWH OF USEFUL HEAT	KG/KWH-TH
PNG-fired boiler		0.22
Diesel (HSD) boiler		0.32
Coal-fired boiler		0.49
Pet-coke fired kiln fuel		0.47
Heat pump on DISCOM power		0.20
Heat pump on green open access		≈ 0
Heat pump in solar blocks + store		≈ 0

Illustrative only, not an offer. Assumptions: PNG 10.4 kWh/SCM, 1.95 kg CO₂/SCM; HSD 10.0 kWh/L, 2.68 kg CO₂/L; grid 0.716 kg CO₂/kWh (CEA baseline order of magnitude); green power treated as zero-emission on a market basis with green attributes retired. Heat pump COP 3.5 reflects hot water near 60 °C for colony, canteen and workshop, and low-temperature drying air; COP falls as delivery temperature rises. Tariffs, fuel prices and COP vary by site and are replaced with metered values in the baseline. Coal: ₹8,000/t, 4,000 kcal/kg (4.65 kWh/kg), 1.7 kg CO₂/kg, 75% efficiency. Pet coke: ₹14,000/t, 8,000 kcal/kg (9.3 kWh/kg), 3.3 kg CO₂/kg, shown for reference only — kiln and precalciner heat is not addressable by heat pumps, so the comparison applies to the plant's low-temperature heat.

ONE SCREEN. POWER AND HEAT.

ergOS is the operating layer. It sits on every meter, every source and every heat pump — watching prices, weather, storage and the production plan, and acting every 15 minutes.

ERGOS · PLANT 1 · MILLS, WHRS AND UTILITIES

LIVE

RE SHARE MTD 47% ▲ OPEN ACCESS	LANDED POWER ₹4.9/kWh ▼ VS DISCOM	WHRS OUTPUT 8.6 MW COOLER + PREHEATER
GRINDING IN SOLAR BLOCKS 64% MILLS 1 AND 2	KWH PER TONNE CEMENT 71 ▼ VS 30-DAY	CO₂ AVOIDED MTD 4,100 t SCOPE 2

✓ Day-ahead schedule sent to SLDC at 09:58

● Cement mill 2 scheduled into solar blocks 10:00–16:00

● WHRS holding 8.6 MW — cooler vent temperature steady

! Raw mill kWh per tonne +4% vs 30-day average — separator check raised

ILLUSTRATIVE SCREEN · VALUES INDICATIVE

 FORECAST AND TRADE 96-block day-ahead load, SLDC scheduling, DAM, GDAM, RTM and GTAM bids, deviation settled block by block.	 DISPATCH HEAT Heat pumps and thermal stores charged in the cheapest, greenest blocks, within process temperature limits.	 BILL AND BANK Banked-energy ledger, audit-ready billing and state-wise compliance tracked continuously.
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LAYER 04 / ESG • ESG05

ESG, OPERATED. NOT REPORTED.

The same data that runs the plant produces the disclosure. Metered where possible, integrated where the data already lives, audited where it does not.

FIRST CHOICE

METER

Electricity, steam, thermal energy, fuel flow and water — every 15 minutes.

SECOND

INTEGRATE

ERP, HRMS, EHS tools and portals — no retyping.

LAST RESORT

AUDIT

Refrigerant, waste, safety and supplier data — photo-evidenced and signed off.

WHAT ESG05 PRODUCES FOR CEMENT

- ❑ BRSR and BRSR Core-format disclosures
- ❑ Emission-intensity baseline, target tracking and credit position under the Carbon Credit Trading Scheme
- ❑ CBAM embedded-emissions data for clinker and cement reaching the EU
- ❑ EPD inputs per product — OPC, PPC, PSC and blends
- ❑ kWh and kg CO₂ per tonne by process — crushing, raw milling, kiln, cement milling, packing
- ❑ Thermal substitution rate and alternative fuel tracking
- ❑ CDP climate response and assurance support
- ❑ Green attribute tracking — iREC eligibility for renewable consumption

Deterministic by design. Regulations and methodologies are stored as versioned, machine-readable rules and run by a rule engine. AI extracts, explains and drafts — it never produces a reported number.

WORKING MODELS / HOW TO ENGAGE

FOUR WAYS IN. ONE PROVIDER.

Start where the value is largest for your plant. Models combine — most clients begin with Advisory and SaaS on power, then add heat.

MODEL 01

ADVISORY

Power strategy and delivery, from RE-100 roadmap to live open access.

SCOPE	RE-100 roadmap, RfP and reverse auction, PPA, approvals, ABT metering, regulatory filings
YOU PAY	Fixed fee, with a success-fee option
ASSETS	Owned by you or your developer
BEST FOR	Plants ready to contract green power

MODEL 02

SAAS

ergOS and esgOS as a subscription — the operating and disclosure layers.

SCOPE	15-minute metering, forecasting, trading support, heat dispatch, ESG pipeline and reports
YOU PAY	Per plant, per year
ASSETS	Meters per BOQ; platform hosted
BEST FOR	Multi-plant groups that want one source of truth

MODEL 03

HEAT ADVISORY

Engineering-grade route from boiler to heat pump, with you owning the asset.

SCOPE	Heat audit and metering, pinch and waste-heat study, heat pump sizing, vendor selection, EPC oversight, commissioning
YOU PAY	Fixed fee per study and per project stage
ASSETS	Owned by you (capex)
BEST FOR	Plants with capex budget and a fuel-cost target

MODEL 04

HEAT AS A SERVICE

You buy heat, not equipment. Hot water and low-temperature drying air, delivered where you need it.

SCOPE	Design, install, own, operate and maintain heat pumps and storage; powered by jouleWise green power; run on ergOS
YOU PAY	Per unit of heat delivered, priced against your current fuel cost
ASSETS	Owned on the jouleWise side — zero upfront capex
BEST FOR	Sites that want low-grade green heat without capex

Commercial terms indicative and finalised per engagement.

THE ROADMAP / INDICATIVE

BASELINE. POWER. HEAT. PROOF.

- 01

BASELINE

WEEKS 1-4

Bills, load survey, fuel and steam records, portable heat metering on candidate processes, ESG data map.

SIGNED-OFF ENERGY, HEAT AND CARBON BASELINE
- 02

ROADMAP

WEEKS 4-8

RE-100 power plan, waste-heat and WHRS review, a mill-scheduling model, and the ESG and emission-intensity data map — in one business case.

ONE BUSINESS CASE – POWER, HEAT, ESG
- 03

METER AND LOG

WEEKS 6-12

ABT metering at the incomer and data loggers on power, heat, fuel and water lines — the measured base every later step is sized, settled and reported on.

ERGOS LIVE ON METERED DATA
- 04

POWER LIVE

~3 MONTHS AFTER ROADMAP

Open access contracted and approved; rooftop solar and BESS where they fit; every source orchestrated against demand on ergOS.

GREEN POWER FLOWING
- 05

HEAT LIVE

PILOT, THEN SCALE

Waste heat first — WHRS optimisation and cooler heat into drying — then heat pumps on colony, workshop and low-temperature drying air.

FUEL DISPLACED, MEASURED ON ERGOS
- 06

OPERATE AND DISCLOSE

EVERY BLOCK · EVERY YEAR

ergOS runs power and heat; esgOS publishes BRSR Core-format, CBAM, CDP and customer disclosures with an audit trail.

ASSURANCE-READY NUMBERS

Timelines indicative; confirmed after the baseline and dependent on state approvals and equipment lead times.

TRACK RECORD / RE-100 ASSIGNMENTS

~1 GW OF RE-100 STUDY SCOPE.

RE-100 assignments across eight industrial groups, cement to FMCG. Deep Indian power-sector regulatory work, with team experience on lender's-engineer mandates.

CLIENT	INDUSTRY	RE STUDY SCOPE
Dalmia Cement	Cement	~300 MW
Chettinad Cement	Cement	~200 MW
SAEL	Solar cells	~160 MW
Wonder Cement	Cement	~140 MW
Haldiram's	Snacks & beverages	~35 MW
Bikaji	Snacks	~25 MW
Bharatiyam (Campa)	Beverages	~19 MW

1 GW+

RE PROJECT WORK BY
OUR TEAM

15+

STATE REGULATORY
JURISDICTIONS

8

INDUSTRIES SERVED

20+

YEARS OF LEADERSHIP
IN ENERGY

Industries: food & beverages, FMCG, cement, chemicals, textiles, metals, automotive ancillary, solar manufacturing, real estate.
ISO 9001:2015 · ISO 27001.

LET'S TALK / START WITH ONE PLANT

TELL US THE PLANT. WE'LL MAP THE STACK.

Send one year of electricity bills and fuel records. We return the baseline, the power-and-heat roadmap and the business case.

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9001:2015 · ISO 27001

DISCLAIMER

This presentation is issued for discussion purposes only. Prices, durations, heat pump performance and outcomes shown are indicative, depend on site, state, load profile, process temperatures, contracted terms, exchange prices and the regulatory orders in force, and do not constitute an offer, warranty or commitment by jouleWise. Screens and plant illustrations are illustrative. Client names are cited from jouleWise assignments. Any engagement is governed solely by definitive agreements between the parties.