



Smart Heating System is an intelligent process-heating solution that applies heat only where, and only as long as, it creates value. The result: noticeably lower energy costs, more stable quality, and higher plant availability all with low integration risk into existing facilities.

Advantages at a Glance

- **Direct business impact:** measurably lower energy and operating costs (maintenance, downtime, scrap).
- **Quality & yield:** precise temperatures at the critical point → fewer deviations, less rework, more predictable output.
- **Productivity:** faster start-ups and changeovers, improved OEE (Overall Equipment Effectiveness), better use of installed capacity.

- **Risk mitigation:** water-free heat transfer, hygienic process, hotspot avoidance, validated safety functions.
- **Sustainability/ESG:** CO₂ reduction through efficiency and electrification; ideally powered with green electricity.
- **Low integration hurdles:** retrofit-friendly, phased roll-out, compatible with common control and IT systems.

What is Smart Heating Advanced?

A modular platform for industrial process heat. It controls zones along your line and regulates temperature with high precision exactly where the product needs it, instead of heating entire systems indiscriminately. That reduces losses, stabilizes quality, and lowers service effort.

How It Works

- **Selective application:** heat is applied only where and as long as demand exists.
- **Precise control:** tight tolerances are maintained at the truly critical points.
- **Intelligent orchestration:** multiple zones/line sections are coordinated with clear operation, reporting, and management.

Business Benefits (Typical KPI Levers)

- **Cost:** fewer kWh per ton/batch, lower media/maintenance costs, less scrap.
- **Quality:** stable recipe and temperature control, lower variance, documented process proof.
- **Time:** faster ramp-ups, fewer unplanned stoppages, shorter troubleshooting.
- **ESG:** reduced energy demand & emissions; better auditability for CSRD (Corporate Sustainability Reporting Directive).

Where It Works Especially Well

- **Food/Pharma/Chemicals/Cement:** hygiene-critical or viscous products, tight temperature windows, hotspot risks.
- **Building services & commercial:** zones that must be heated quickly and precisely.
- **Modernization:** sites with high distribution losses or high service effort for existing systems.

Why Now?

- Energy and CO₂ costs are rising, efficiency becomes a competitive advantage.
- Quality pressure is increasing, scrap is expensive and material to ESG.
- Funding frameworks and the power mix favor electrical, precisely controllable heat.

Low-Risk Introduction

1. **Site assessment:** walk-through, data collection, definition of critical points.
2. **Business case:** robust calculation with sensitivity.

3. **Pilot line:** clear measurement & acceptance plan; KPI review.
4. **Scale-up:** rolling implementation with training, service & reporting.

“Advanced” Package (Scope)

- Orchestration of multiple zones/stations with control-room view (dashboards, KPIs, alarms).
- Energy management & reporting: real-time KPIs, load management, audit reports.
- Integration & IT connectivity: interfaces to common control/IT environments; secure remote services.
- Safety & operations: clear operating concept, emergency stop, maintenance and diagnostics routines.

Smart Grid Heating System

Features & Capabilities



**SMART-GRID-
HEATING**
**Where Heat
meets the
Grid.**

**Connected.
Clean.
Controlled.**
**digital, modular,
sustainable.**

**Turning
energy into
intelligence.**
**digital, modular,
sustainable.**

**Ready for
Net Zero.
Perfect for
retrofit &
new builds.**
Maintenance-free.

A grid-interactive, selective heating system that delivers heat precisely and finely modulated, adapts dynamically to grid and price signals (demand response), smooths peak loads, and automatically optimizes CO₂ and cost targets. Retrofit-capable and integrable into existing building and process environments.

1) Grid Interactivity & Flexibility

- **Demand-response ready:** reacts to price/tariff signals, power limits, CO₂ intensity, and DSO signals (e.g., peak capping, blocking windows, releases).
- **Peak shaving & load shifting:** limit connection capacity; shift non-critical heat loads to cheaper time windows.
- **Renewables integration:** PV surplus utilization (“self-consumption first”), prioritized operation when green-power share is high.
- **VPP/Aggregator option:** cluster multiple sites/units as a virtual power plant (dispatchable load flexibility).
- **Scenes & schedules:** automatic day/week schedules by price, CO₂, comfort/quality.

2) Energy & Process Control

- **Selective zone heating:** energy only where and as long as the process/zone needs it.
- **Finely modulatable power:** stepless control; fast ramps for precision temperature control (hotspot avoidance).
- **Thermal buffering:** exploit existing mass/insulation to decouple energy procurement from product needs in time.
- **Quality & availability:** stable setpoints, reduced variance, shorter start-up times.

3) System Architecture

- **Heat-Device** (Fieldbus) → **Heat Units** (zones) → **Heat Station** (bundle) → Control room/EMS (edge + optional cloud).
- Edge controller with HMI/SCADA connection; local autonomy on grid failure (fail-safe mode).
- Sensing (temperature, power, optional current/voltage, status) with real-time monitoring and alarms.

4) Integration & Interfaces

- OT/fieldbus: PROFINET, EtherNet/IP, Modbus TCP (process-level).
- Building automation (optional): BACnet/IP, KNX/IP gateway.
- IT/cloud: OPC UA, MQTT/REST, energy KPIs; timestamp for audit data.
- Data export: CSV for energy controlling, CO₂ reports, CSRD disclosures.

5) Energy Management (EMS)

- Optimizer: objective selection “Cost”, “CO₂”, “Comfort/Quality”, “Power limit”; automatic schedule generation.
- Load management: priorities/shedding, limits per metering point, coordinated control of simultaneous consumers.
- Forecasts: weather/PV forecast, historical load profile, production calendar.

- Reports: kWh/zone, €/day, CO₂/kg, peak statistics, payback tracking by measure.

6) Safety & Compliance

- Safety: limit monitors, emergency stop, safe states on fault/communication loss.
- Cybersecurity principles: roles/permissions, encryption, event logs; segmentable OT/IT networks.
- Standards/CE and CRA (Cyber-Resilience-Act): design aligned to relevant CE requirements (EMC, low voltage) and common OT best practices.

7) Operation & Service

- Retrofit-capable: installation in existing systems with minimal downtime.
- Remote functions: remote access, software/firmware updates, predictive maintenance (trend & anomaly analysis).
- Lifecycle transparency: spare-parts/maintenance plan, condition indicators (health scores).

8) Typical Operating Modes

- Eco-Cost: minimize €/kWh including grid fees/peaks.
- Eco-CO₂: run during low gCO₂/kWh periods; prioritize PV/green power usage.
- Power-limit: obey fixed kW caps (grid connection, tenant power, temporary power).
- Quality-priority: tightest tolerances for critical processes; load flexibility only outside target windows.
- Island/backup (optional): coordinated operation in a microgrid with battery/backup power.

9) Measurable Impact (KPI Framework)

- Energy intensity (kWh per output/floor area), CO₂ intensity (kg per output)
- Peak reduction (kW), load shifting (kWh into “green”/low-cost windows)
- OPEX reduction (€/year), OEE contribution (start-up time/downtime)
- Data quality (completeness, timestamps, audit readiness)