Building materials / QM-04

AI-based kiln control

Plants worldwide are using AI to stabilise kiln operation. This first requires a reliable data layer.

AI can run the kiln, but not without data.

Leading cement groups are introducing AI-assisted control of the kiln and preheater tower. In Uzbekistan, with gas supply constrained, fuel remains a major share of production cost.

Conceptual architecture. No operating results are shown.

01 Collection	DCS / SCADA · Laboratory · Meters
02 Archive	Time series · Shift · Batch
03 Quality	Data completeness · Faulty signals · Calibration
04 Transfer	AI partner · Reports · Production cost

At a glance

–5.4% — Reduction in specific heat consumption at Carbon Re (Gigaton) customers, according to the company. [1]

$26 mln — Investment raised by Gigaton (formerly Carbon Re) in 2026. [3]

6 mln m³ — Daily gas shortfall in winter 2025–2026, according to the Ministry of Energy. [4]

November 2026

01 Evidence and context

Who it is for

CEO	Fuel costs.
Chief Process Engineer	Kiln operation and clinker quality.
Chief Power Engineer	Gas and heat consumption.
Head of IT	Data and integration.

Facts and global practice

Carbon Re (partner content)

At customers using Carbon Re AI process control, specific heat consumption fell by 5.4% and the alternative fuel share rose by 3.8%. [1]

Innovate UK

In 2024, the Carbon Re platform was deployed at Heidelberg Materials' Mokrá plant in the Czech Republic; the plant reduced its fuel costs. [2]

Cemnet

Gigaton (formerly Carbon Re) develops autonomous control software that adjusts fuel mix, kiln speed and oxygen levels in real time. [3]

Ministry of Energy

In winter 2025–2026, Uzbekistan's gas shortfall reached approximately 6 mln m³ per day. [4]

Presidential Decree

From 2026, the government will allocate UZS 100 bn annually for AI and digitalisation in the building materials sector. [5]

AI systems rely on the plant's historical process data. A plant that has not collected data first needs measurement and archiving.

02 Where the losses occur

No archive

DCS data is not stored, or is stored only briefly.

Laboratory kept separate

Clinker analysis is not linked to process data.

Fuel metered only in total

Gas and coal consumption is not measured separately per kiln.

No access for vendors

There is no secure way to transfer data.

How the loss is calculated

Fuel	heat consumption gap (kcal/kg clinker) × clinker output (t per year) × fuel cost per unit of heat
Instability	process upset hours (h per year) × hourly output (t/h, valued at cost per t)
Quality	reprocessed clinker (t per year) × cost per tonne
Delay	months of delay in AI deployment × potential savings per month

Illustrative calculations; establish the baseline, units and rates during the site assessment. Avoid counting the same loss twice.

03 Solution architecture

Data layer: the foundation for AI

MEENTAKA collects and stores process and laboratory data and transfers it securely to a partner AI system. AI control itself is provided by a specialised vendor.

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Modules

Process data collection and archiving	DCS/SCADA integration	Engineering capability
Linking laboratory results	By time and batch	Engineering capability
Data quality monitoring	Signal dropouts and faulty signals	Engineering capability
Integration with AI partner	Secure transfer	In development

Each module has a readiness status. Third-party results are not a forecast for your site.

04 Implementation and measurement

01 Data audit

Which signals exist and where they are stored.

Output: readiness map.

02 Archive

3 months of data for the kiln line.

Output: history suitable for analysis.

03 Partner selection

Trials with AI vendors.

Output: pilot terms.

04 Subscription

Data layer service.

Output: continuous data.

What is measured

Data completeness	Recorded / expected signals	Archive
Heat consumption	kcal/kg clinker	Meters, laboratory
Process upsets	Hours	Archive
Laboratory linkage	Share of linked results	System

What is needed to start

- Chief Process Engineer
- Read access to DCS/SCADA
- Laboratory log
- IT security requirements

05 Readiness checklist and next step

01 Are kiln signals stored for at least 3 months?	Yes / No / Unknown
02 Is gas consumption measured separately per kiln?	Yes / No / Unknown
03 Is clinker analysis recorded with timestamps?	Yes / No / Unknown
04 Are signal dropouts monitored?	Yes / No / Unknown
05 Is there a secure way to transfer data to an external partner?	Yes / No / Unknown
06 Is heat consumption calculated in kcal/kg?	Yes / No / Unknown
07 Is the cause of process upsets recorded?	Yes / No / Unknown
08 Are operator decisions recorded in a log?	Yes / No / Unknown
09 Have you held discussions with an AI vendor?	Yes / No / Unknown
10 Is there a person responsible for data?	Yes / No / Unknown

What we do not promise

- Firm timeline and price without an audit
- Exchange rules and government decisions
- Repair of plant equipment
- Unmeasured results or savings
- Replicating results announced by vendors

AI readiness audit

We review your kiln line data and show what is missing for AI deployment.

- Readiness map
- Archive plan
- Implementation fee and monthly subscription

Scope, price and schedule are agreed after reviewing the site and its data.

06 Sources and scope

[1] Carbon Re (now Gigaton): «AI co-pilot for plant optimisation», partner content. cemnet.com, 2025.

cemnet.com

[2] Innovate UK Business Connect: «AI takes the heat out of decarbonisation» (Heidelberg Materials, Mokrá plant). 2025.

[3] «AI cement optimisation firm Gigaton raises US$26m». cemnet.com, 2026.

cemnet.com

[4] Ministry of Energy data: winter 2025–2026 gas restrictions. spot.uz, 26.02.2026.

spot.uz

[5] Presidential Decree on the development of the building materials industry (PQ-365). spot.uz, 03.12.2025; buxgalter.uz.

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