

COLD STORAGE · DOOR MONITORING

Door monitoring in a 12,000 m³ freezer

A UK food distribution depot, three months before against three months after

What changed when door sensors and alarms went on a busy freezer: the temperature results, measured on Sematics, and what they might mean for energy, estimated and labelled as an estimate.

16%

less temperature variation
(measured)

-0.52 °C

lower peak temperature
(measured)

100%

data completeness, from
96.5% (measured)

~65,700 kWh

a year, estimated, not
metered

MEASURED

Temperature, door and data completeness figures come from the freezer's own Sematics records over the two three-month periods.

ESTIMATED

Energy, cost and carbon figures are estimated from the measured temperature data using UK average tariff and plant efficiency assumptions. They are not metered.

01 · MEASURED RESULTS

The freezer ran colder and steadier

Sematics temperature data for the freezer, three months before door monitoring against the three months after. The customer is not named.

MEASURED	BEFORE (3 MONTHS)	AFTER (3 MONTHS)	CHANGE
Measured Average temperature	-20.23 °C	-20.91 °C	0.68 °C colder
Measured Standard deviation	0.69 °C	0.58 °C	16% less variation
Measured Highest temperature	-15.93 °C	-16.45 °C	Peaks 0.52 °C lower
Measured Lowest temperature	-22.35 °C	-22.75 °C	0.40 °C lower
Measured Data completeness	96.5%	100%	Every expected reading received

02 · THE DOORS

A busy door, promptly closed

The door data shows **1,200 to 1,600 openings a day**, with the door open for **4 to 5 hours a day in total**: about **11.5 seconds per opening**. Short openings like these point to doors being closed promptly.

Fewer long openings let in less warm, humid air. That means less frost on the evaporator coils, so fewer defrost cycles are needed, and the compressors spend less time pulling the freezer back down after a warm peak.

03 · HOW MONITORING SAVES ENERGY

A sensor on a door saves nothing on its own

The saving comes from what the monitoring makes happen: problems are caught sooner, and people work differently once they know the doors are watched.

01

Alarms when a door is left open

A door left open raises an alarm, so it is closed promptly instead of being found later, and any temperature excursion is dealt with sooner.

02

People change how they work

The biggest effect. Once staff know the doors are monitored and an alarm will be raised, they stop leaving them open.

03

A steadier freezer, less work for the plant

Less warm air in: a steadier temperature (16% less variation here), less frost on the coils and less energy spent on pull-down.

An estimate, with its working

The freezer's electricity was not metered over these periods, so the energy effect is an estimate. Here is how it is worked out, so you can check it or put in your own figures.

ESTIMATE · NOT METERED		
Thermal load avoided (warm air no longer getting in)	from the measured temperature data	12 kW
Plant efficiency (coefficient of performance, COP)	low-temperature plant benchmark	÷ 1.6
Electrical demand avoided	12 kW ÷ 1.6	7.5 kW
Hours in a year	continuous running	× 8,760 h
Electricity a year	7.5 kW × 8,760 h	about 65,700 kWh
Cost a year	× £0.15 per kWh (UK non-domestic average)	about £9,900
Carbon a year	× 0.13096 kg CO ₂ e per kWh (DESNZ UK electricity factor)	about 8.6 t CO ₂ e
Estimated from the measured temperature data using UK average tariff and plant efficiency assumptions; not metered. Your tariff, plant and running hours will differ.		

What would make it a measured figure

- **Meter the plant.** A MID approved energy meter on the refrigeration plant, read through current transformers, records the real kWh. On Sematics it sits beside the freezer's temperature, so a change in how the doors are used shows in both.
- **Compare like with like.** Weather, throughput and defrost settings all move consumption, so compare periods with similar conditions, or normalise for them.
- **Keep the doors on the record.** Door events next to the energy and temperature show cause and effect, not just a total.

In short: lower risk to the product, measured; lower running costs, estimated until the plant is metered.

Sources and assumptions

Temperature, door and completeness data: Sematics records for one freezer, two three-month periods
Tariff £0.15/kWh and COP 1.6: UK non-domestic and low-temperature plant averages, as assumptions

Emission factor 0.13096 kg CO₂e/kWh: DESNZ UK electricity factor, as used for this estimate
Energy monitoring: jtfwireless.com/services/energy-monitoring

Want the real figure for your plant?

We fit MID approved energy meters on refrigeration plant and incoming supplies, installed by qualified electricians from our contractor partners, and put the readings beside your temperatures on Sematics.

Get a quote

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