

Industrial Refrigeration Energy Audit Field Pack

Connect load, compressors, condensing, evaporators, defrost and infiltration before estimating savings.

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Version	1.1
Updated	2026-07-15
Use	Pre-audit field collection and technical review
Decision boundary	Replace representative values with site-specific data before investment use.

Before site work

1	List required room and product temperatures by zone and production state.
2	Record refrigerant, safety procedures and equipment operating envelopes.
3	Identify standby capacity and redundancy requirements.
4	Align weather, production, controller and power timestamps.

Sampling note

Preferred resolutions in this pack are kWhScan screening recommendations, not mandatory standards. The site team must set representative periods for its operating modes, production schedule, safety requirements and decision risk.

Industrial Refrigeration Energy Audit Field Pack - field checklist

Yellow columns are intended for site entry. Preserve timestamps and evidence provenance.

Section	Field	Unit / format	Preferred resolution	Evidence source	Site value	Level	Owner	Status	Notes
Boundary	Refrigerant pressure levels and included auxiliaries	Text	Current configuration	P&ID and site walk					
Baseline	Compressors, condensers, fans, pumps and auxiliaries	kW and kWh	1-5 minute for 14 representative days	Power meters					
Plant state	Suction and discharge pressure and temperature	Pressure and temperature	Aligned 1-5 minute	Controller or calibrated sensors					
Compressors	kW, capacity state, speed, starts and sequence	State and kW	Aligned 1-5 minute	Controller export					
Heat rejection	Ambient wet bulb, setpoint, fan, pump and approach	Temperature and state	Aligned 5-minute	Weather and controller trend					
Evaporators	Room, air-on/off, valve, fan and ice condition	Temperature and state	5-minute plus inspection	Controller and site walk					
Defrost	Start, stop, termination, heat source and recovery	Timestamp and state	Event log for 14 days	Controller export					
Infiltration	Door open time, traffic, seals and dock state	Seconds and events	By shift for 14 days	Door log or observation					
Production	Throughput, product mix, temperatures and pull-down	Site-defined	Shift or daily aligned to trend	Production record					
Constraints	Temperature, hygiene, safety and redundancy	Text	Approved current specification	Site operating procedure					
M&V	Post-change matched trend	kW, pressure, temperature, weather and production	Same boundary as baseline	Verified trend					

Industrial Refrigeration Energy Audit Field Pack - overlap control and M&V

Count each physical effect once and preserve the approved operating boundary.

Measures	Overlap mechanism	Aggregation rule
Floating head + condenser controls	Both change auxiliary power and condensing pressure	Model compressor and heat-rejection auxiliaries together
Higher suction + evaporator improvements	Terminal work may enable the suction reset	Calculate one final suction condition
Defrost + infiltration reduction	Lower moisture load can reduce future defrost need	Apply infiltration change before residual defrost
Sequencing + compressor replacement	New equipment changes optimal staging	Simulate the final equipment set and controls
Heat recovery + condensing optimization	Heat recovery may require higher condensing pressure	Compare net electric and displaced-heat effects

Minimum M&V record

Use matched or normalized periods with compressor and auxiliary power, pressure, temperature, ambient wet bulb where relevant, room/product temperatures, production, door activity and control states. Product service and safety constraints must remain unchanged.

Sources and version

Source	URL
DOE Better Plants - Industrial Refrigeration	https://betterbuildingssolutioncenter.energy.gov/better-plants/refrigeration
ORNL - MEASUR	https://industrialresources.ornl.gov/measur/home/
kWhScan methodology	https://kwhscan.com/methodology/
Maintainer	Carl Li
Version	1.1
Review status	Founder-reviewed; no independent reviewer claimed
Public method	https://kwhscan.com/methodology/