247 ENERGY

Powering Logistics and the Cold Chain

How warehousing, distribution, and cold-storage operators meet refrigeration loads, fleet charging, and grid limits with on-site storage and power.

James Troch

Chief Executive Officer

247 Energy NV

July 2025

FOREWORD

The Front Line of the Energy Transition

Logistics and cold storage are where the energy transition stops being an abstraction and becomes an operating problem. These are sites with enormous roofs, continuous refrigeration loads, fleets moving from diesel to electric, and almost no tolerance for an interruption. Every pressure reshaping energy, namely electrification, grid congestion, rising costs, and the demand to decarbonise, lands on them at once, and lands hard.

I spend a great deal of time with operators in this sector, and the pattern is consistent. The energy bill is rising and becoming harder to predict. Fleet electrification is arriving faster than the local grid can support. Refrigerated sites cannot afford the loss an outage brings. And the customers and investors these businesses answer to increasingly expect a credible decarbonisation story attached to the service. These are not separate issues. They are facets of one question: how to power a logistics or cold-storage operation reliably, affordably, and cleanly in a system that was not built for what these sites now demand.

This paper is about that question. It starts from the energy profile that logistics, warehousing, and cold storage share, a profile unlike any other sector, and then sets out how on-site storage, on-site power, and the roofs these sites already own can be combined to meet it. The technology exists today. What is still uncommon is treating energy as a designed part of the operation rather than a bill that arrives at the end of it.

The operators who make that shift will run cheaper, more resilient, and cleaner sites, and they will electrify their fleets while competitors are still waiting for a connection. The ones who treat energy as someone else's problem will find it quietly setting the limits of what their business can do. This paper is for the first group.

James Troch, Chief Executive Officer, 247 Energy

THE CONTEXT

An Energy Profile Unlike Any Other Sector

What makes logistics and cold storage distinctive

Most discussions of industrial energy treat all sites as broadly similar. Logistics and cold storage are not. They carry an energy profile with a specific and demanding shape, and understanding that shape is the first step to powering them well.

The first feature is the scale of the footprint. Distribution centres and cold stores occupy vast buildings with vast roofs, often the largest unbroken roof areas in a region. That footprint is an underused energy asset and, at the same time, a large surface to heat, cool, and light. The second feature is the refrigeration load. Cold storage and chilled distribution run continuous, temperature-critical cooling that draws power around the clock and peaks sharply as compressors cycle, a load that cannot be switched off to save money or shed during a shortage.

The third feature is the arrival of fleet charging. As trucks and vans electrify, the depot becomes a charging hub, and charging a fleet concentrates a very large power demand into specific windows, often overnight or between shifts. This is new load, it is large, and the grid connection sized for the old operation was never designed to carry it. The fourth feature is outage intolerance. A refrigerated site faces spoilage when power fails, and a distribution operation faces penalties and broken commitments when it cannot run. Reliability is not a preference here. It is the core of the service.

The fifth feature is commercial pressure. Logistics runs on thin margins and tight service-level commitments, and the businesses sit under growing expectations, from customers and investors alike, to decarbonise. Put together, these features describe a sector that needs continuous, reliable, growing power, that owns the means to generate a great deal of it, and that is acutely exposed to cost, interruption, and emissions all at once. No single off-the-shelf tariff answers that. A designed energy system does.

THE ALWAYS-ON LOAD

The Cold Load That Never Stops

Refrigeration as the defining demand

Refrigeration is the load that defines cold storage and chilled logistics, and it behaves unlike ordinary industrial demand. It runs continuously, because product must stay within temperature at all hours, and it peaks sharply, because compressors draw heavily when they cycle on and when ambient heat rises. The result is a high baseline with frequent spikes, exactly the profile that makes a grid connection expensive and a power interruption dangerous.

The peaks matter for cost. Because a connection and many tariffs are priced on peak demand, the compressor surges that punctuate a refrigerated site's day can dominate its energy charges even though they last only minutes. Shaving those peaks with on-site storage lowers the demand the grid sees and the charges that follow, while the continuous baseline keeps the stored energy working rather than sitting idle.

> ***A refrigerated site cannot switch its load off to save money or shed it in a shortage. The cooling runs, or the product is lost.***

The peaks also matter for resilience. A refrigeration system that loses power begins losing temperature immediately, and for a cold store full of perishable or pharmaceutical product the clock to spoilage is short. Storage that can switch in instantly holds the cooling through a disturbance that would otherwise become a loss, and on-site generation can carry it through a longer outage. For this load, fast and reliable backup is not an add-on. It is protection of the product the business exists to keep.

There is a siting dimension too. Storage placed to support refrigeration sits among stored goods, sometimes flammable, sometimes high in value, and frequently close to people working the site. A storage technology that cannot catch fire can be placed where it is needed without the separation and suppression a fire-propagating chemistry would demand, which on a packed warehouse site is often the difference between a workable installation and an impossible one.

THE NEW PEAK

The Charging Peak

Fleet electrification meets a connection that was not built for it

The depot is becoming a power station in reverse. As trucks and vans electrify, vehicles return to be charged, and charging a fleet concentrates an enormous demand into narrow windows. A yard that once drew a steady, modest load now faces sharp, scheduled surges as dozens of vehicles draw power at once, typically overnight or between shifts when the fleet is parked.

This new load collides with an old connection. The grid connection serving a logistics site was sized for the building, the refrigeration, and the handling equipment, not for charging a fleet on top of all of it. Adding that demand can exceed the connection outright, and enlarging a connection now often means a multi-year wait in a congested grid. Fleet electrification can stall not on the vehicles but on the power to charge them.

Storage resolves much of this by separating when the fleet charges from when the grid supplies the energy. A battery can draw steadily from the connection across the day and release that energy quickly into the vehicles during the charging window, so the grid sees a flat draw while the fleet receives a sharp one. This lets a site charge a larger fleet than its connection could support directly, and it avoids the demand charges an unbuffered charging peak would trigger.

Where the connection cannot supply even the steady average a growing fleet needs, on-site generation closes the gap, supplying power independently while a connection upgrade is awaited or where none is available. Combined, storage and on-site power let a logistics operator electrify on its own timetable rather than the grid's, which for a business facing electrification deadlines is the difference between meeting them and missing them.

THE CEILING

When the Connection Runs Out

Grid congestion arrives at the logistics park

Logistics sites are disproportionately exposed to grid congestion. They tend to cluster in industrial parks and along transport corridors, drawing on shared local network capacity, and they are growing their demand at exactly the moment that capacity is scarcest. The result is that connection constraints, refused upgrades, and multi-year queues are now a routine obstacle to logistics expansion and electrification.

The consequence is concrete. A site that wants to add charging, expand cold storage, or take on more throughput can find that the single thing it cannot get is more power. Expansion plans that are sound on every other measure stall on the connection. For a sector that grows by adding capacity and sites, a power ceiling is a growth ceiling.

The responses available are clear. Storage reshapes the demand the site presents, so that a given connection carries a larger operation. On-site generation supplies power the connection cannot, as a bridge during the years of a queue or where no upgrade is coming. Together they let a logistics operation grow behind a fixed connection rather than waiting for the network to be rebuilt around it.

For multi-site operators and logistics landlords, this becomes a portfolio capability rather than a one-off fix. A standard energy design that can be deployed across sites, sized to each connection and load, turns grid access from a site-by-site gamble into a managed part of the development model. The operator that has solved power can build and electrify where competitors, waiting on connections, cannot.

THE ASSET OVERHEAD

The Roof as an Underused Asset

Turning footprint into generation

The defining physical feature of a distribution centre or cold store is its roof. These are among the largest unbroken roof areas anywhere, and they sit over an operation that consumes power continuously. The combination is unusually favourable for on-site solar generation: a large surface to generate, directly above a large, steady load to consume what is generated.

The difficulty is timing. Solar generates most strongly in the middle of the day, while a logistics site's demand, including refrigeration peaks and overnight fleet charging, does not align neatly with that profile. Without a way to store the midday surplus, much of the roof's potential is either exported at low value or left uncaptured. The roof generates, but the site cannot use what it makes when it makes it.

> ***The largest roofs in any region sit over operations that run around the clock. Storage is what turns that surplus into power the site can actually use.***

Storage closes the gap. By holding the midday solar surplus and releasing it into the evening peak, the overnight charging window, and the refrigeration spikes, on-site storage lets a site consume far more of its own generation rather than exporting it cheaply. Self-consumed solar is worth far more than exported solar, so the storage does not merely shift energy in time. It raises the value of every kilowatt-hour the roof produces.

For the logistics landlord, the roof-plus-storage combination also changes the asset itself. A building that generates and stores its own clean power, supports fleet charging, and rides through outages is more valuable and more lettable than one dependent entirely on a constrained grid connection. The roof stops being overhead and becomes part of the building's energy and commercial value.

THE STAKES

The Cost of an Outage

Why resilience is the core of the service

For most businesses a power cut is an inconvenience. For logistics and cold storage it can be a direct, immediate loss. A refrigerated facility begins losing temperature the moment power fails, and the product inside, food, pharmaceuticals, or other perishable and regulated goods, has a short and unforgiving tolerance. An outage of hours can mean the loss of an entire store of product, plus the compliance and reputational consequences that follow a broken cold chain.

A distribution operation faces a parallel exposure. Logistics runs on service-level commitments, and a site that cannot operate cannot meet them. The cost of an outage is measured not only in the hours lost but in penalties, missed deliveries, and the erosion of the reliability the business sells.

> ***In a sector where reliability is the product, an outage does not just cost hours. It costs the cold chain, the commitments, and the trust the business sells.***

This is why resilience belongs at the centre of a logistics energy design rather than at its edge. Storage that switches in instantly holds critical loads through the short disturbances that cause most damage, bridging the moment before any backup generation starts and covering the brief dips and spikes that would otherwise trip sensitive equipment. On-site generation extends that protection through longer outages, keeping refrigeration and operations running when the grid cannot.

The value of this protection is the loss it prevents, which is large and concentrated in exactly the events resilience is built for. For an operator weighing the cost of an energy system, the avoided cost of a single serious outage, a spoiled cold store or a day of missed commitments, frequently justifies the investment on its own, before any saving on the routine energy bill is counted.

THE INTEGRATED ANSWER

Designing the Logistics Energy System

Storage, on-site power, and the roof as one system

The features of this sector's energy profile are not separate problems with separate fixes. They are facets of one system, and they are best solved as one. The roof generates. Storage holds that generation, shaves the refrigeration and charging peaks, and provides instant backup. On-site generation supplies power the connection cannot and carries the site through longer outages. Designed together, these elements answer cost, capacity, charging, self-generation, and resilience at the same time.

The design is specific to the site, because the profile is. The roof area, the refrigeration load, the fleet size and charging windows, the connection limit, the local fire and siting constraints, and the resilience requirement all shape how much solar, how much storage, and how much generation a site needs, and how they should be operated. A system sized without reference to the fleet electrification plan, or the refrigeration peak, or the connection ceiling, will be wrong. The value comes from designing the energy system around the operation it serves.

The technology has to suit the setting. Storage on a packed warehouse or cold-store site must be safe among stored goods and people, which is why a non-flammable system that can be sited without separation distances matters here in particular. It must work across the temperature range a cold-store environment presents. And it must switch instantly to protect a refrigeration load and a charging operation that cannot tolerate a gap. These are not generic storage requirements. They are what this sector specifically needs.

Done well, the result is a logistics or cold-storage site that generates much of its own clean power, charges its fleet behind a connection that could not otherwise support it, shaves its costliest peaks, and rides through the outages that would otherwise cost it most. That is not a collection of upgrades. It is an operation with energy designed into it, and it performs differently from one that leaves energy to chance.

THE TIMING

Why Logistics Cannot Wait

Several deadlines are converging on this sector at once. Fleet electrification is being driven by regulation, customer demand, and the economics of running vehicles, and it is arriving on timelines that do not pause for grid connections. The operators preparing the power to charge now will electrify on schedule. Those assuming the grid will provide it on demand will not.

Grid congestion is tightening at the same time, and logistics sites, clustered and power-hungry, are among the most exposed. Connection slots, equipment, and installers are scarcest when everyone reaches for them at once, which is precisely what happens as a sector electrifies together. Moving ahead of that crowd secures capacity and cost that latecomers will not find.

Commercial pressure is rising in parallel. Customers and investors increasingly expect logistics providers and landlords to show a credible decarbonisation path, and energy is the largest lever most of these sites have. A building that generates clean power, charges electric fleets, and operates reliably answers that expectation directly, and it does so while lowering cost rather than adding it. The decarbonisation case and the cost case point the same way.

The conclusion for the sector is clear. Logistics and cold storage face the full force of the energy transition earlier and harder than most, they own unusual assets to meet it, and the tools to combine those assets into a reliable, affordable, clean energy system exist today. The advantage goes to the operators who design that system now, ahead of the deadlines and the congestion, rather than to those who wait for a grid and a market to solve a problem already at their gates.

Energy Built for Logistics and the Cold Chain

247 Energy develops, builds, and operates distributed energy solutions for sites with demanding energy profiles, and logistics and cold storage are among the clearest cases. Our work combines on-site energy storage, containerised power generation, and the integration of on-site solar into one designed system, matched to the refrigeration loads, charging peaks, connection limits, and resilience needs these sites carry.

Our storage is built on supercapacitor technology, which suits this sector for specific reasons. It cannot enter thermal runaway, so it can be sited safely among stored goods and people and in ATEX-classified areas, without the separation distances a fire-propagating chemistry requires. It operates from minus twenty to plus fifty-five degrees Celsius, which suits cold-store environments, runs quietly at around fifty-five decibels, and switches between charge and discharge instantly, which is what a refrigeration load and a charging operation need from their backup. It is warranted for ten thousand cycles or ten years, with a projected lifetime of up to fifty thousand cycles.

Our containerised generation runs on liquefied natural gas and is operational in under four hours from delivery. Against an equivalent diesel installation it produces roughly a quarter less carbon dioxide, cuts nitrogen oxide emissions by close to ninety-nine percent, and can roughly halve the total cost of ownership, which makes it a clean bridge for sites electrifying ahead of their grid connection or needing resilient backup for a critical cold chain.

At utility scale, 247 Energy develops, builds, and co-invests in battery energy storage parks rated at 100 MW and above, with a current European pipeline spanning two regions and five countries and a combined capacity of 505 MW / 2,025 MWh. We retain skin in the game in the assets we develop, and we work with co-investors and partners who share a long-term view of energy infrastructure.

For logistics operators, cold-storage businesses, and the landlords who serve them, and for partners interested in co-investment, we welcome direct engagement. We can discuss specific sites in detail, from sizing storage and on-site power around a refrigeration load and a fleet charging plan to integrating rooftop solar, under appropriate confidentiality arrangements.

247 Energy NV

Schaarbeekstraat 20E/11 | 9120 Beveren, Belgium

+32 3331 0000 | storage@247.energy | 247.energy