The plug, not the box:

Why reefer capacity at the peak is now set by the power supply, not the container fleet

Reefer newbuilding stays strong. CIMC's reefer sales rose by half in 2025, reefer box deliveries are up 10.7% this year on DHL's count, and the controlled-atmosphere category is growing with the workable fleet now estimated at about 100,000 units. Getting a box at the season's peak is another matter, and this year Middle East diversions have held equipment off its planned repositioning. Attention is turning to the power that keeps the box cold, at the terminal, between the terminal and the cold store, and on the train or barge in between. The operators and manufacturers who answered CM are designing around the outlet.

By Rachael White

CIMC sold 208,200 teu of reefer containers in 2025, up about 50% on 2024. In the first half of 2026 it sold 108,200 teu, up 17.6% year-on-year. The builder credits the South American fruit harvest and the northern-hemisphere harvest for the 2026 figure. Carrier Transicold puts its own installed base at around one million units. Daikin has sold more than 50,000 controlled-atmosphere systems since July 2017. It estimates the workable controlled-atmosphere fleet of all brands at about 100,000 units, a count that excludes older units with earlier CA technology and passive CA units that do not meet the airtightness requirement. Production and installed-base counts of that kind do not say whether a box is where the cargo is in the week the cargo is ready.

Availability follows the season: the southern-hemisphere fruit harvests put large export volumes into a few weeks, and carriers reposition blocks of equipment to meet them. DHL Global Forwarding's Ocean Reefer Market Update for the fourth quarter of 2026, published in October, puts this year's disruption on top of that cycle. Containerised reefer volumes are forecast to grow 2.4% this year, to more than 132 million tonnes. Growth was 3.2% in 2025, and exotics, berries and melons drove the first-half demand. The reefer container fleet grew 3.2% year on year and reefer box deliveries rose 10.7%, DHL reports, while reefer plug capacity on the vessel fleet grew 3.5% to approximately 3.0 million plugs. "Despite fleet growth, effective capacity remains constrained by longer vessel rotations, major port congestion and equipment imbalances across exporting regions," the update states. Drewry's Global Reefer Container Freight Rate Index was up 19% year on year in the third quarter and 8% on the second, and DHL now expects reefer rates to finish 2026 above 2025 levels, reversing its earlier forecast of a decline. The steepest increases are on trades exposed to the Middle East and to reefer export growth: Europe to the Middle East, west coast South America to Europe and Central America to Europe.

Emergency bunker surcharges peaked at approximately 70% above end-2025 levels in the second quarter, after the disruption in the Strait of Hormuz, and Suez transits remain about 41% below pre-crisis levels even as Maersk, Hapag-Lloyd, MSC, CMA CGM and COSCO resume selected services. For reefer equipment availability DHL names Panama Canal draft restrictions and North European port congestion as the key risks, with El Niño the threat to the 2026/27 season, and its tradelane table shows demand ahead of equipment from Latin America to North America and to Europe in November and December. A reefer diverted off its route misses the repositioning it was due for, and a reefer that reaches the cargo without an outlet keeps nothing cold. Unpowered, it is a dry box at a reefer's price.

DHL counts the plugs on the ship; the ceiling the cargo meets is at the terminal, and Kuehne+Nagel's weekly port updates show where it sat as the northern-hemisphere season peaked. In the week of 16 to 22 September it put reefer plug utilisation at Yokohama at 95-100%, reported tight plug availability at Busan and said the same of ECT in Rotterdam. Two weeks earlier plug availability was tight at Tokyo and plug utilisation at Tema was 100%. At Ningbo, plug utilisation was 94% in the last week of August. The readings swing from week to week. In the update for 30 September to 6 October, ECT was at 82% yard occupancy "with reefer capacity under control". Two weeks later Rotterdam was back to "limited reefer plug availability". London Gateway, which DP World lists with more than 3,000 reefer points, went from 70% reefer yard occupancy in late September to 53% in the third week of October. While the pattern is not uniform across all reefer trades, many terminals hit their plug ceiling for a few specific periods a year, dictated both by seasonal fresh produce peaks and demand spikes. This is epitomised by the twin pairing of Chilean cherry harvest and Chinese New Year celebrations. These are the periods the perishables

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Photo: Hutchison Ports

trade is built around.

The manufacturers, power suppliers and terminals that answered *CM* are working on three parts of the same problem: how much each unit draws from the outlet, how many units one outlet can feed, and when a box needs to be plugged in at all.

Where the plugs run out

The Port of Rotterdam Authority's reefer page, dated May 2021 and still live, gives 18,500 reefer connections at the port's container terminals. Anne Saris, manager container hinterland and logistics at the Port of Rotterdam Authority, confirmed to *CM* that the figure is "still more or less accurate" and that the port does not measure it every year. The number describes "only the fixed reefer stack", she states, which "can be easily expanded 'flexibly' with mobile generators during peak periods". More plugs will come with the deep-sea terminal expansions, though the number is not yet known, and she expects the total to rise.

Yokohama is the port Kuehne+Nagel put at 95-100% plug utilisation in September. The City of Yokohama's Port and Harbor Bureau counts 4,638 reefer plugs across its terminals. Honmoku has 1,974, Minami-Honmoku 2,604 and Daikoku 60. The Bureau has no publicly announced plans to add to them. It does not manage terminal capacity, Miura Masahiro, manager of its logistics planning division, states in the port's reply to *CM*, and where high utilisation "is caused by delays in the pickup of imported cargo, we believe it is important not only to expand facilities but also to encourage the early pickup of cargo and reduce the time containers remain at the terminal".

At Laem Chabang, Hutchison Ports Thailand lists 1,860 reefer plugs and 13,410 ground slots at Terminal D. In answers *CM* received from Stephen Ashworth, managing director, Thailand, South East Asia and Australia, Hutchison Ports, the terminal "is equipped with sufficient reefer plug capacity to support operational requirements", and when export demand rises "close coordination with shipping lines on cargo delivery schedules and vessel arrival windows is the most important factor in ensuring efficient capacity management". In those weeks what runs short is plug-hours, and the terminal manages them by controlling when boxes arrive.

At the terminals that use RTE's RRCE-PM system, which meters the power each reefer draws at the outlet, operators "tend to treat physical plug availability as the practical limit they manage day-to-day", Walter Vinson, vice president, sales and marketing, states in RTE's reply to *CM*. They use the readings to see when a rack or yard is nearing its operating threshold, for example "when to shift to generator power to avoid peak-rate charges". Because the meters sit at the plug, they cannot show whether the transformer or the feeder would run out first, Vinson says.

Grid connections cost more

Power Pool Plus has rented reefer generator sets since 1990, so its order book shows what terminals do when their fixed plugs run out. In responses to *CM*, Adam Hulse, vice president, sales, describes two rental patterns. Seasonal fruit terminals rent Power Packs "strictly for their peak season" and return them when it ends. Terminals with year-round reefer cargo keep them "frequently" for 12 months or more, "particularly in leased yards where permanent capital investments aren't viable, or in dedicated pre-tripping areas".

In Hulse's account, what stops terminals connecting to the grid is the price of the connection. "The cost to make the transition to grid power has increased significantly," he states. "These higher infrastructure costs are causing more companies to pause or delay their plans for full ground power electrification, leading them to rely on generator power and temporary solutions for longer periods." Outside the United States, the company's enquiries in 2026 have come from Central America, the Caribbean and the Middle East, mostly from container terminals, then rail operators, then trucking and inland depots. The buyers are "managing seasonal capacity surges without permanent infrastructure investments, powering reefer storage in non-electrified yard areas, and bridging power gaps caused by local grid unreliability", according to Hulse.

Americold's two newest North American sites show how a cold-store operator provides power when it builds beside a port or a rail yard.



Photo: Americold

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"This is increasingly relevant at terminals, depots and aboard vessels, where the available power supply may constrain the number of refrigerated containers that can be connected simultaneously."

Its Port Saint John hub opened in June 2026 alongside DP World and Canadian Pacific Kansas City (CPKC). It has around 22,000 pallet positions and is "directly connected to a port without drayage", in Americold's words. Its Kansas City hub opened in August 2025 on the CPKC network, at a cost Americold puts above US$100m. The building covers 31,100 sq m (335,000 sq ft) and serves the Mexico Midwest Express refrigerated rail service. "Americold Kansas City and Port Saint John are located on rail lines and at port because that's where customers need the most connectivity," according to responses *CM* received from Mathew Moore, vice president, global market strategy. "By locating our operations close to port or rail terminals, we can help customers reduce handling, eliminate unnecessary moves and accelerate the flow of product through the supply chain."

The power provision differs by site. "At Port Saint John, we have gensets on chassis for containers moving to and from the port, as well as reefer plugs at every other door to support refrigerated equipment during loading and unloading operations," says Patrick Sommervold, Americold's director, value-added services and import-export compliance, in the same responses. "In Kansas City, dedicated reefer plugs aren't necessary. Containers are staged in a drop lot between the rail yard and the facility, and the reefers are equipped with GPS and telematics, allowing them to be remotely monitored and controlled by CPKC." The rail case rests on weight as well as power: because the containers never touch a US highway, Sommervold says, "customers can move heavier loads than they would be able to over the road, maximizing container utilization and lowering transportation costs". Americold describes the service as North America's only single-line refrigerated rail service between the US and Mexico, with container loads above 22.7 t (50,000 lb).

Designing to the outlet

The power available at the outlet is fixed for the season. What a manufacturer can change is the unit's draw on it. Maersk Container Industry (MCI) gave *CM* the figures for its Star Cool 1.1 against the previous generation. Average consumption in chilled operation fell from 1.05 kW to 0.96 kW, a reduction of 8.5%. The frozen figure was 1.87 kW before and 1.69 kW after, down 9.6%. The maximum permissible current stayed at 16 A, and both generations are protected by a 16 A breaker.

The design logic, as Georg Fösel, senior manager, refrigeration technology and industry affairs at MCI, explains in the company's written answers to *CM*, is that a reefer spends roughly 90-95% of its life at part load, so that is where the saving is. "During pull-down, the unit controller utilizes the available current up to the 16 A limit to maximize refrigeration capacity and achieve rapid temperature reduction," he writes. "As the cargo temperature approaches the setpoint, the controller automatically reduces compressor speed and optimizes operation for efficiency." "Lower average power consumption can effectively translate into additional operating capacity where electrical infrastructure is the limiting factor," he continues.

"This is increasingly relevant at terminals, depots and aboard vessels, where the available power supply may constrain the number of refrigerated containers that can be connected simultaneously."

A standard reefer outlet is rated and protected at 32 A, twice the Star Cool ceiling, so "two Star Cool units can be operated simultaneously from a single 32 A outlet using a suitable splitter cable, without any software changes, special settings or operational limitations", Fösel says. The capability is inherent to the platform; the optional part is the splitter cable. It was developed "to help operators make more efficient use of existing electrical infrastructure", with "terminals, depots, vessels and generator-powered operations where the number of available outlets can become a practical constraint" as the typical cases.

Carrier Transicold starts from the standard. "Carrier Transicold container refrigeration units are designed and built to the ISO 1496-2 standard for thermal containers," writes Charu Mahajan, general manager, genset, global container, in Carrier's responses to *CM*. "The standard sets the electrical supply requirements, including voltage and frequency ranges and limits on maximum power consumption." Because every unit must run on shore power, vessel power and generator sets within those limits, "customers generally do not establish a separate power-draw limit based solely on conditions at the receiving end". What customers do specify is efficiency and reliability on every supply a container meets, "because each switch between power sources adds risk for the cargo". Mahajan places that concern in operating profiles "that combine high-value perishables, long inland movements, high ambient temperatures or extended time between plug points"; no single trade lane stands out.

Carrier does not publish generator-set sales by product line or region. Mahajan says customer conversations about its PowerLINE gensets "have increasingly centered on continuity of power across the entire journey, not only on the ocean leg", while cautioning against reading fixed-plug shortfalls off genset demand alone, since route length, dwell time and emissions rules all bear on the purchase. The clip-on RG15 and undermount UG15 come in EU Stage V and California Air Resources Board-compliant models. FuelWise two-speed operation, now standard on the Stage V series, cuts fuel use by up to 34% against the previous models at typical refrigerated setpoints, by Carrier's figures. Through Lynx Fleet, operators can see "when a container is running on a generator set, helping protect cargo through power transitions", Mahajan says.



Photo: UNIT45

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UNIT45, which builds 45 ft palletwide units to its clients' specification, including a diesel-electric reefer it describes as 1,200 kg lighter than a standard build, puts the case for carrying power on the box itself. Independent power matters most where external connections are limited and at the hand-over between modes, J.B. Koolen, managing director, writes in UNIT45's answers to *CM*; it "provides greater flexibility at terminals, inland depots and along transport routes where power availability may vary". Whether that tips a shipper from road to rail, he says, depends on sustainability, transit time, cost and infrastructure together.

Durian and the special box

China imported 1.87m tonnes of durian in 2025, twice the 2022 figure, Wang Jun, vice minister of the General Administration of Customs, told a State Council Information Office press conference on 22 July. The fruit now reaches China by rail, sea and air. China State Railway Group said on 5 August that imported fruit over the China-Laos Railway had passed 180,000 tonnes for the year, more than 170,000 tonnes of it durian. In April, Xinhua quoted a China Railway Kunming Group staff member as saying the group had deployed more than 4,000 specialised refrigerated containers for the trade. By sea, Xinhua reported that three "durian express" vessels delivered 356 containers of Thai fruit to Nansha in about 24 hours from the morning of 25 April. The fruit weighed more than 6,300 tonnes, and Xinhua describes Nansha as China's largest seaborne durian gateway. APM Terminals lists 1,108 reefer plugs at its South China Oceangate terminal there.

The newest route, Malaysia to Dalian, is the hardest test for the equipment. On 24 September Daikin Reefer, Malaysian grower and processor Hernan and Dalian importer Yidu Group announced the first sea shipment of tree-drop ripe Malaysian durian to Dalian under Daikin's Active CA controlled-atmosphere system. The two-tonne consignment spent 12 days at sea and was inspected on 19 September. Tree-drop fruit is harvested only after it falls at full maturity, which gives it a very high respiration rate and a husk that splits within days, so air freight had been the only way to land it in China in edible condition. Active CA cuts respiration by more than 50%, to approximately 20 mg CO2/kg/hr, according to the release, and holds positive pressure in the box so humid ambient air cannot enter and condense on the cartons. "Shifting Malaysian durian exports from air to sea reduces the carbon footprint of moving this fruit by around 70 times," said Goh Ah Huat, general manager, global marketing and service at Daikin Reefer, in that release.

The supporting material Daikin provided to *CM* sets out what has to change for the trial to become a flow. The next Malaysian season runs from December 2026 into January 2027, before Chinese New Year, when Thai and Vietnamese fruit is out of season, and Daikin says there is "huge interest from importers". Daikin is working with the parties to scale up the commercial programme so that each of them is practised in handling tree-drop fruit, whose process "differs greatly from the pre-cut model" used by Thailand and Vietnam. On power, Daikin reports "no issues to note with reefer plug capacity in Malaysia due to it being a surplus reefer market". The constraint it is working on is the box: Malaysia "is not a traditional origin market for controlled atmosphere cargo", so Daikin is lining up enough CA-capable units with customers for the season. The same system has already moved Malaysian chrysanthemums from air to sea. For Hernan's group CEO, Datuk Anna Teo, the shipment showed "a viable logistics solution that removes the dependency on air cargo".

Daikin claims more than 90% of the active-CA market in 2026 to date and 55% of all controlled-atmosphere units sold, active and passive combined.

"These higher infrastructure costs are causing more companies to pause or delay their plans for full ground power electrification, leading them to rely on generator power and temporary solutions for longer periods."

Latin America remains the main Active CA trade, by Daikin's account, and intra-Asia is growing: from Vietnam, where bananas trucked from Cambodia, limes and cut flowers use it, from the Philippines, with bananas, avocados and pineapples, and now from Malaysia. Evergreen placed the first order for Daikin's ZeSTIA refrigeration unit in March, for 6,000 units; how many of them will carry Active CA has not been announced. In Malaysia, where power is plentiful, what is scarce is the controlled-atmosphere box and the know-how to handle the fruit.

Power between the plugs

Inland from the European gateways, most reefers still travel by truck. The Port of Rotterdam Authority reported in April 2024 on the "Cool Corridor" to the DACH region (Germany, Austria and Switzerland), run by Nordfrost, Neska Container Line and DP World's inland terminal.

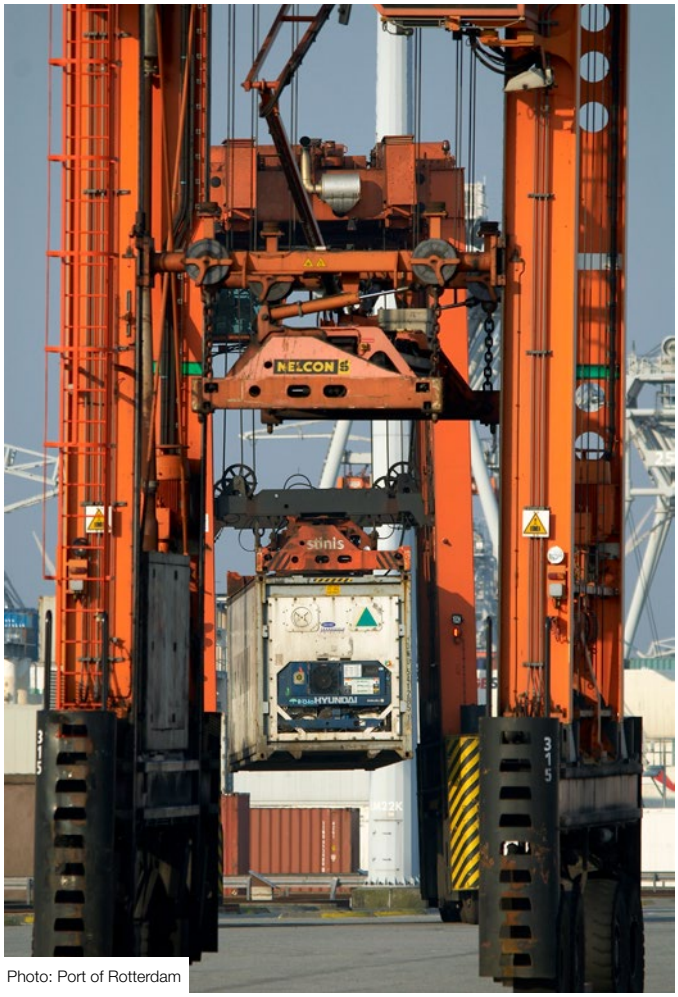

Photo: Port of Rotterdam

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On that service reefers are disconnected only while they are loaded and unloaded and otherwise run on onboard generators. The authority put the cut in CO2 from seaport to inland port at more than 65%. DP World's Rotterdam barges carry 60 to 70 reefer plugs each, by its 2022 account.

The authority holds no recent figures for plugs on barges or at inland terminals, Saris states. While "there is certainly demand from the market", a relatively large share of shipments is still trucked, for reasons of "costs, reliability, flexibility". The initiative she cites runs inside the port: the Dutch Fresh Port corridor, a pilot barge service running three times a week between the Maasvlakte and the Waalhaven since January 2026, backed by the authority, the province of South Holland and the national infrastructure ministry. Rotterdam's 2025 container modal split, given to *CM* by the authority, was 61% road, 30% inland shipping and 9% rail.

Equipment that powers a reefer on the train, with no plug at either end, exists. VTG's electrified wagon generates power on the wheelset, stores it in a battery and feeds temperature-control units on reefer containers, swap bodies and refrigerated semitrailers; Baltic Rail is using it, VTG says on its website. Thermo King's E-COOLPAC battery genset, tested by ECS on Belgium-Netherlands legs from February 2024, is listed as a current product. In India, DP World's weekly reefer train from Hyderabad to Nhava Sheva, launched in October 2025 for pharmaceutical exporters with Ocean Network Express, powers each container from DP World's own powerpacks; the train carries up to 43 forty-foot containers. In Canada, Canadian National lists more than 2,100 refrigerated containers and more than 500 shore power plugs across its network.

The United States' largest refrigerated export gateway makes the opposite case for the road. Georgia Ports Authority handled 55,957 teu of frozen poultry at Savannah in the 12 months to February 2026, up 8.5%, by its own figures. It puts its share of US frozen poultry exports in 2025 at 37%. The cargo reaches the port by truck, and the authority opened its Gainesville inland port in May to give north Georgia producers a rail option. Savannah has approximately 3,600 powered reefer slots, nearly 3,400 of them at racks.

What to specify

Terminals size the fixed stack for the year and rent or schedule the peak, and the first tool for the peak is the arrival window. Operators that need year-round reefer capacity in yards they do not own, or whose grid connection now costs more than the business justifies, run on generators for years. Manufacturers hold the unit's maximum draw where the standard puts it and take the saving in the long hours below full load, and a given feeder can then supply more boxes; MCI's splitter turns that saving into a second box on the same outlet. Cold stores on the rail line choose between plugs at the door and telematics in the drop lot, and choose by what the railway can monitor. And where the origin has power to spare, as Malaysia does, the scarcity moves to the specialised unit and its handling.

"Carrier Transicold's role is to provide efficient, dependable equipment that keeps cargo protected wherever it travels," Mahajan states. The efficiency gains in Star Cool 1.1 "come without reducing the maximum available power to the refrigeration system", according to Fösel. The builders are keeping up; the limit is how many boxes can be kept cold at once, and that depends on the outlets and on the schedule that decides when each box needs one.

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