



turn to the experts™ 

All-Electric Refrigeration. A Perfect Pick For Produce Center.



Vector™ 5100 All-Electric Technology Helps Clear the Air for New England Produce Center.

Like many North American metropolitan food distribution operations, the New England Produce Center (NEPC) in Chelsea, Mass., uses stationary refrigerated trailers to manage capacity at its facility, the nation's second largest produce market. In such applications, refrigerated units serve 24-hours a day, 365 days a year, consuming diesel fuel and adding exhaust emissions to already-stressed urban environments. The NEPC and community advocates were ripe for a change and rallied to replace nearly 100 diesel refrigeration units with Carrier's all-electric Vector™ 5100 units. This helped to clear the air and reduce the drone of engines emanating from the center, making the NEPC a better neighbor to the residents of Chelsea while also significantly reducing fuel consumption and cutting operating costs for the center.

Carrier Solution:

All-electric Vector 5100 single-temperature units are designed for situations just like Chelsea's. At the NEPC, the engineless units simply plug into AC power at the loading docks and quietly provide emissions-free refrigeration for on-site food storage. The result is a sharp contrast to the traditional approach of using conventional diesel-powered units.

The Vector 5100 units are credited with ridding the local atmosphere of more than 1,025 tons of air pollutants annually. For the NEPC, they also eliminate more than 268,000 gallons of diesel fuel consumption. That alone saves an estimated \$590,000 a year in operating expense, because the cost of electricity, with its relatively stable pricing, is more economical than using diesel fuel. Elimination of engine maintenance adds more savings. *In short, the Vector 5100 provided bushels of benefits for both the center and the community.*



All-electric Vector 5100 units drive diesel exhaust emissions down to zero because they do not use an engine.



Location:
Chelsea, Mass., USA

Customer:
New England Produce Center (NEPC), the nation's second largest produce market.

Carrier Transcold Equipment:
Vector 5100 all-electric units for portable and stationary storage.

Number of Units:
98 Vector 5100 units.

Objectives:
Eliminate emissions associated with use of diesel-engine powered trailer refrigeration units by replacing them with engineless all-electric units.

Decision Drivers:
Chelsea is considered an environmentally overburdened city. Reducing diesel emissions helps clean the air and create a healthier environment.

Equipment Benefits:*
The Vector units eliminate the annual consumption of more than 268,000 gallons of diesel fuel and eliminate 1,025 tons of particulates, NOx, VOCs, CO and CO2. The NEPC saves about \$590,000 annually in operating costs because use of electric power is more economical than burning diesel fuel.

*Data provided by M.J. Bradley and Associates, strategic environmental consultants.

For more information please visit www.trucktrailer.carrier.com



turn to the experts™

A Perfect Pick for Produce *(continued)*

Located along the Mystic River across from Boston, Chelsea has been identified as the third most environmentally overburdened city in Massachusetts, with some of the state's highest reported incidences of respiratory ailments, cardiovascular disease, strokes and cancers related to diesel engine exhaust pollution. This densely populated suburb is crisscrossed with diesel corridors for trucking, shipping and airport traffic. The NEPC alone has 37,000 truck deliveries each year.

Given this situation, the leadership of the community-based non-profit Chelsea Collaborative Inc. identified ways to improve the local atmosphere and then took their case to the U.S. Environmental Protection Agency. The EPA responded with a grant to help support proposed emissions-reducing programs, the largest of which was for the NEPC's Vector 5100 units and corresponding facility upgrades to provide electrification at the loading docks.

Bushels of Benefits

The Vector 5100 is based on the refined all-electric refrigeration system architecture of Carrier's successful Vector 6500 single-temperature transport refrigeration unit (TRU). A hybrid unit, the Vector 6500 uses a diesel engine and electric generator for on-highway power and offers plug-in electric-standby capability when parked near "shore power," such as at a loading dock. Vector systems have fewer moving parts compared to conventional belt-driven mechanical TRUs, providing many benefits, such as quieter operation and reduced maintenance requirements.

The Vector 5100 delivers the same quiet, emissions-free performance as the Vector 6500 on electric standby, without the added expense of the power plant – the engine, radiator, exhaust system, fuel filter, air cleaner and generator are examples of components that were eliminated. Although the Vector 5100 is intended for stationary situations, it is designed to be road-worthy for transport to other locations, having been qualified to handle shock, vibration, corrosive road salts and other challenges, the same as a standard over-the-road TRU.

Requiring just an AC power supply, the all-electric Vector 5100 delivers best-in-class capacity – 59,000 BTU of cooling at 35° F setpoint and 100° F ambient temperature. It is designed for near-silent operation and exceptionally low lifecycle costs.

Maintenance-free electric motors drive its evaporator fan and condenser fans. The semi-hermetic compressor has no shaft seal to wear out. Heating, when needed, is provided by electric-resistance elements, rather than hot gas. It also uses Carrier's quiet V-force™ condenser fans and high-performance Novation™ condenser coil.

Healthy Outcome

The impact of the installation, which was handled by Carrier Transicold of Boston, has been significant. "The program is working very smoothly," said Brian Eddy, general manager for the NEPC. "It's definitely quieter and we don't have the exhaust fumes. To me the air seems a lot cleaner."

Using U.S. EPA data that relates environmental emissions to healthcare costs, the Chelsea Collaborative and M.J. Bradley and Associates calculated a \$78 million, 10-year economic benefit to the community associated with reduced health outcomes anticipated from the NEPC installation.

"It is so gratifying to work on a project that brings about significant air quality improvements," said Roseann Bongiovanni, associate executive director of the Chelsea Collaborative. "Replacing old, dirty diesel engines that ran throughout the day, every day, with quiet, clean, electric Carrier Vector 5100 units, has significantly reduced diesel emissions in Chelsea. By eliminating hazardous pollutants that pose numerous serious health consequences, this project will bring about lasting improvements to ambient air."

"It is so gratifying to work on a project that brings about significant air quality improvements."

— *Roseann Bongiovanni, Chelsea Collaborative*



The Vector 5100 (above) is similar to Carrier Transicold's successful Vector 6500 single-temp hybrid unit, minus the diesel engine and associated components.



Like an electric refrigerator, a Vector 5100 unit only needs to be plugged into an electric power supply to deliver heating or cooling capacity for perishable or frozen loads.



Vector 5100 units have replaced a significant number of conventional diesel-powered trailer refrigeration units docked at the NEPC that were a concentrated source of noise and exhaust emissions.