



► HIGH-EFFICIENCY, FUTURE-PROOF COOLING FOR A MAJOR EUROPEAN LOGISTICS HUB

CLIENT: Makios Logistics (HIG Group) **LOCATION:** Olympias Facility, Greece **SOLUTION PARTNER:** J & E Hall, Ecoref, Afoi Mouteveli



TECHNICAL HIGHLIGHTS: DESIGNED FOR EFFICIENCY

Cascade cooling system: CO₂ condenses via an ammonia spray chiller, ensuring stable performance even in high ambient temperatures. Buildings can dynamically switch between:

- 80% freezing / 20% chilled
- or adapt based on demand

Thermal distribution: CO₂ separators at -8°C and -30°C, with dedicated evaporators for chilled and frozen.

Heat rejection: 3 × evaporative condensers for efficient heat dissipation.

THE CHALLENGE: REPLACE INEFFICIENT, HIGH-GWP COOLING AT SCALE

Makios Logistics operates one of Greece's largest cold chain facilities, handling up to 20,000 pallets of chilled and frozen goods across two 11,000m² buildings.

The existing R404A system posed two critical issues:

- Regulatory risk: High GWP refrigerant being phased out under F-Gas regulations
- Operational inefficiency: High energy consumption and ageing performance

THE BRIEF WAS CLEAR:

Deliver a high-capacity, energy-efficient, and future-proof refrigeration system capable of handling variable temperature demand, from chilled storage to -25°C freezing, without compromising reliability.

THE SOLUTION: HIGH-PERFORMANCE NH₃/CO₂ CASCADE SYSTEM

A fully integrated ammonia/CO₂ cascade refrigeration system engineered by Ecoref, installed by Afoi Mouteveli, and powered by J & E Hall's HallScrew compressors.

SYSTEM CONFIGURATION

High Stage (NH₃ – Ammonia)

- 3 × HSO4 226 open-drive HallScrew compressors
- Total capacity: 2.54 MW
- Operating conditions: -10°C suction/+35°C condensing
- COP: 4.18
- IE5 ultra-high-efficiency motors

Low Stage (CO₂ – Carbon Dioxide)

- 4 × HSH3120 semi-hermetic HallScrew compressors
- Total capacity: 2.26 MW
- Operating conditions: -30°C suction / -9°C condensing
- COP: 6.2

System Performance

Total absorbed power: 980.7 kW

Combined system COP (-30°C / +35°C): 2.3



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CASE STUDY



WHY HALLSCREW?

Instead of using multiple small reciprocating compressors (~90 kW each), the system deployed high-capacity single screw HallScrew compressors:

- 565 kW per compressor
- Equivalent to 6 reciprocating units

IMPACT:

- Reduced compressor count
- Lower installation complexity
- Fewer components and failure points
- Streamlined maintenance

THE RESULT: SCALABLE, EFFICIENT COLD CHAIN INFRASTRUCTURE

The Olympias facility now operates with:

- Multi-megawatt cooling capacity
- High-efficiency natural refrigerants
- Reduced lifecycle costs
- Future-proof compliance

This project demonstrates how advanced compressor technology plus intelligent system design can transform large-scale logistics cooling, delivering both performance and sustainability at industrial scale.

OPERATIONAL BENEFITS:

- High system COP (2.3 at -30°C / +35°C)
- Significantly reduced energy consumption
- Minimal maintenance requirements
- Long service intervals and fewer spare parts

EXPERT INSIGHT

Daniel Pappos, Ecoref:

“Given the scale and complexity of the facility, we needed a solution that was both robust and highly efficient. J & E Hall’s compressors delivered exactly that - reliable performance with minimal maintenance, helping us meet demanding operational requirements.”

Lloyd Newman, J & E Hall:

“We worked closely with the project partners from design through to delivery - optimising compressor selection and system configuration to ensure maximum efficiency and long-term reliability.”

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