



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

### **Technical details of the conversion project**

The aim of the project is to demonstrate the feasibility and monitor efficiency results of systems with CO<sub>2</sub> as the working fluid and as an alternative to HCFC-22 in retail installations that are still often used in many developing countries. The installed system is a CO<sub>2</sub> transcritical booster system with parallel compression. To ensure high efficiency also during the high ambient temperatures in the summer months, the system integrates state-of-the-art ejector technology. The system features non-superheated evaporator technology for both chilled and frozen food cabinets and storage rooms. The waste heat from the system can be recovered for hot sanitary water supply which saves further energy overall.

The net capacity on the medium temperature side accounts for 31 kW and the gross capacity 69 kW at -2°C. The low temperature capacity amounts to 38 kW at -25°C. The technology supplier of the project is Abdin Industrial, a 100 per cent Jordanian family-owned company, which provided the four and five door cabinets, set up all piping and finalized the on-site installation. The company worked closely with Italian-based international system manufacturer Enex who supplied the refrigeration system. Core components used in the installation come from Alfa Laval, Danfoss, Dorin, Luve, Temprite and others.

“Congratulations to the team from UNIDO and Abdin Industrial in Jordan for a successful implementation and commissioning of the first transcritical ejector supported CO<sub>2</sub> parallel compression system in the Middle East. The fruitful cooperation of Abdin and Enex shows that local manufacturers and suppliers of commercial refrigeration equipment are able to leapfrog towards the latest CO<sub>2</sub> refrigeration technology. The new refrigeration system in the supermarket in Amman, Jordan, is able to maintain chilled food at the set-point temperatures with an evaporation temperature of -2°C, while the frozen foodstuff is cooled by evaporating carbon dioxide at -25°C.” (Dr Armin Hafner, International Technical Project Advisor)