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This summer Germany-headquartered food wholesale specialist METRO AG opened its first two CO_2 transcritical stores in Russia, along with its first in Bulgaria.

— By Charlotte McLaughlin

Germany-based METRO AG is a world-leading international food wholesale company that has built a global reputation as a committed player in environmental protection efforts.

By the end of its last fiscal year (1 October 2016-30 September 2017), METRO had reduced its greenhouse gas emissions by 21% compared to 2011.

The company's F-Gas Exit Program is widely seen as one of the most forward-thinking initiatives to phase out the use of HFCs in the world today. For METRO, the three new installations are important steps in the right direction.

In place since 2013, the F-Gas Exit Program aims to phase out f-gases in all METRO stores worldwide by 2030, replacing them with natural refrigerant systems where it is technically and economically feasible to do so.

"METRO operates in 35 countries worldwide. Today in more than 170 of our stores we are using natural refrigerants," Olaf Schulze, METRO AG's director of energy management, investments and technical solutions, told *Accelerate Europe* (July 2018 data).

For METRO, the two stores in Russia – the first of which opened on 26 July in Aparinki, near Moscow, with the second opening on 23 August in Odintsovo, a western Moscow suburb – are significant milestones in this journey.

"By using this technology, METRO is one of the most progressive companies in the sector in Russia. The recent store openings are important milestones in our global F-Gas Exit Program," Schulze says.

This is not the first time a CO_2 transcritical system has been installed in Russia's food retail sector. In 2016, Russian retailer Magnit opened a hypermarket in Voskresensk, a city 88 km southeast of Moscow, using a CO_2 transcritical booster refrigeration system.

Local manufacturer Nord-SM provided the system, with the cooperation of Danfoss and the United Nations Industrial Development Organisation (UNIDO), which undertook some preparatory work. Switzerland-based Frigo-Consulting provided technical support.

Russia is also a signatory to the global HFC phasedown under the Kigali Amendment to the Montreal Protocol.

"Following the Kigali Amendment in 2016, Russia has been tasked with reducing its CO_2 emissions by 40-45% by 2025. As a consequence, Russian retailers are now pushing the roll-out of CO_2 refrigeration systems," said Marcus Hoepfl, managing director, Frigo-Consulting.

To the knowledge of *Accelerate Europe*, the Aparinki store is the first time that a CO_2 transcritical store has been achieved in Russia without the backing of an international project.

For Schulze and his team, implementing the F-Gas Exit Program in locations unfamiliar with CO_2 transcritical technology is certainly more challenging than business as usual. "To implement these projects, we have to consider the entire supply chain, the technology, experienced installers and an efficient and safe maintenance and repair process," Schulze explains. "Our refrigeration systems are the backbone for the sale of food in our stores. We cannot afford to compromise here."

METRO Russia now boasts two transcritical CO_2 stores, 25 subcritical CO_2 stores, and one ammonia cold storage centre, according to Schulze.

Russian installer Ingenium, based in Rostov-on-Don (a town in southern

THE CALL OF THE EAST

1 / Exterior of METRO store in Aparinki, near Moscow.
2 / Cabinets inside the Aparinki store.

Photography: METRO AG

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Russia), carried out the METRO installation in Aparinki. It also provided two CO_2 racks to refrigerate the 6,547 m^2 cash and carry store.

Aparinki is the first time that Ingenium has installed a CO_2 transcritical system in a supermarket. "For three years we have been using CO_2 in subcritical systems," Anton Rostokin, deputy director of engineering at Ingenium, told *Accelerate Europe*. "More than 10 projects (similar in size) were implemented with CO_2 subcritical."

Ingenium's first installation of a transcritical CO_2 system was at its own training centre. To familiarise itself with the technology, the Russian installer also sought training from other European manufacturers and institutes.

"We were trained on the basis of the companies Bitzer and Danfoss," Rostokin says. "Additional training was conducted at an institute in Belgium."

Ingenium would like to work more with natural refrigerants. "CO_2 is a topic of interest for many companies," Rostokin notes. "But not many companies in Russia decide to implement such projects. We think that with the development of this technology in Europe and [due to] changes in legislation, the situation will develop in a positive way."

"Our company made a bet on CO_2," Rostokin says. "But we also plan to develop in the direction of ammonia systems."

The CO_2 transcritical system in Aparinki uses monitoring controls from Danfoss, compressors from Bitzer, gas coolers from Güntner and cooling furniture from Freor. "We started in Moscow because in other Russian regions, we are still scouting for the right installer capacities for transcritical," METRO's Schulze explains.

The two Ingenium racks provide 85.77 kW of low-temperature cooling and 224.85 kW of medium-temperature cooling to the cabinets inside the store. They provide high-temperature free cooling to the tune of 262.04 kW.

1 / Güntner gas cooler on the roof of Aparinki store.
2 / CO_2 transcritical rack, Aparinki.

TIME TO SWITCH THINGS UP

METRO's second CO_2 transcritical store in Russia opened in the city of Odintsovo, the administrative centre of Odintsovsky District in the Moscow Oblast region, on 23 August 2018. The 10th METRO store in the Moscow region, with a trading area of approximately 5,800 m², is a little different from METRO's first Russian transcritical CO_2 installation in Aparinki in July.

For this store METRO decided to work with a different Russian contractor called LAND, based near St. Petersburg (in northern Russia, over 700 km from Moscow), according to Holger Guss, head of building services and engineering at METRO AG.

Danfoss provided the monitoring controls again, while this time Dorin provided the CO_2 compressors for the LAND-manufactured transcritical rack.

Frigo-Consulting was again involved in the design of the project.

The gas coolers are from Güntner and the refrigerated glass-door cabinets are from Arneg, which provided 80 cabinets (with a total length of 200 m and a display surface area of approximately 560 m²).

The latest Russian installation also features heat reclaim and parallel compression. 150 kW of reclaimed heat warms the store in the winter, according to Schulze.

The cooling capacity of this second installation is a little lower, as the Odintsovo store is smaller than the Aparinki one. The system provides 73 kW of low-temperature cooling, 202 kW of medium-temperature cooling, and 260 kW of high-temperature cooling (built with a free cooling system).

METRO is planning to open more CO_2 transcritical stores in the Moscow area. "Solntsevo [will follow] in December […] with transcritical CO_2," Schulze told *Accelerate Europe*.

METRO'S FIRST TRANSCRITICAL CO_2 STORE IN BULGARIA

Not content with opening two stores in Russia, on 14 September METRO opened its first transcritical CO_2 store in Bulgaria.

The store, located in the Bulgarian capital of Sofia, is yet another demonstration of METRO's commitment to growing the use of CO_2 transcritical technology.

"We are committed to sustainable action. This includes the responsible use of refrigeration systems," Guss says. "We install environmentally friendly refrigeration systems wherever it is feasible to do so."

The approximately 8,400 m² Sofia store is a retrofit and was originally opened in 1999. Carrier carried out the installation with consultation from Frigo-Consulting.

METRO AG has increasingly taken on the role of a pioneer. It was the first retailer, to the knowledge of *Accelerate Europe*, to install a CO_2 transcritical system in China's food retail sector (for more on this store, check out *Accelerate China*, Issue #1).

It also installed a CO_2 transcritical system with innovative ejector technology in Opole, Poland in May of this year, and its ZEUS store in St. Pölten, Austria (opened in October 2017) claims to emit zero emissions.

"The transcritical system in Sofia has an ejector, similar to our system in Opole," Guss says.

"It is not our primary goal to be a pioneer in certain locations, but we are proud to promote environmentally friendly technology in new countries like China and Russia," he explains.

"Against the background of the global challenges we face today, we are also happy about every competitor who thinks and acts the same way," he adds. ■ CM