



ATMO sphere





CO2 transcritical installation in a meat processing facility in South Africa

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The working team

Meat World is a wholesale and retail butchery group placing strong emphasis on providing the best quality meat at the lowest prices.

They have a process plant near Johannesburg and 11 meat shops across South Africa.

They supply also restaurant, catering companies and small retailers.

So far all the plants and shops are cooled by HFC solutions.

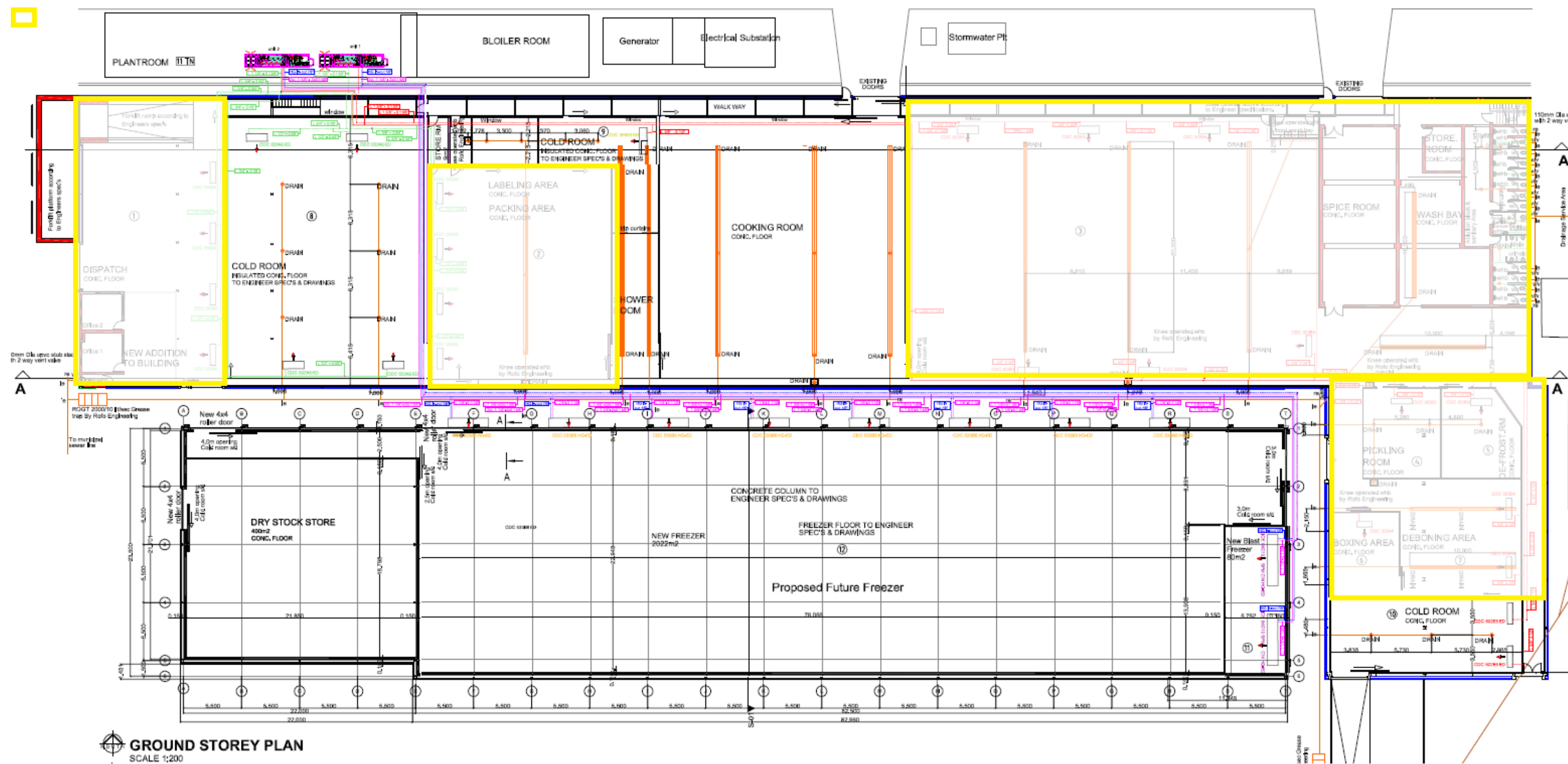
Metraclark (Beijer ref company) in collaboration with SCM have supported COOLCARE Team in the design phase as well as the installation, start up and training of the technician and field people.

COOLCARE Team took care of the design, installation and operation of the plant. They are specialized in industrial and commercial refrigeration and are employing more that 200 people. This is their first installation with CO2



Needs for the new production facility

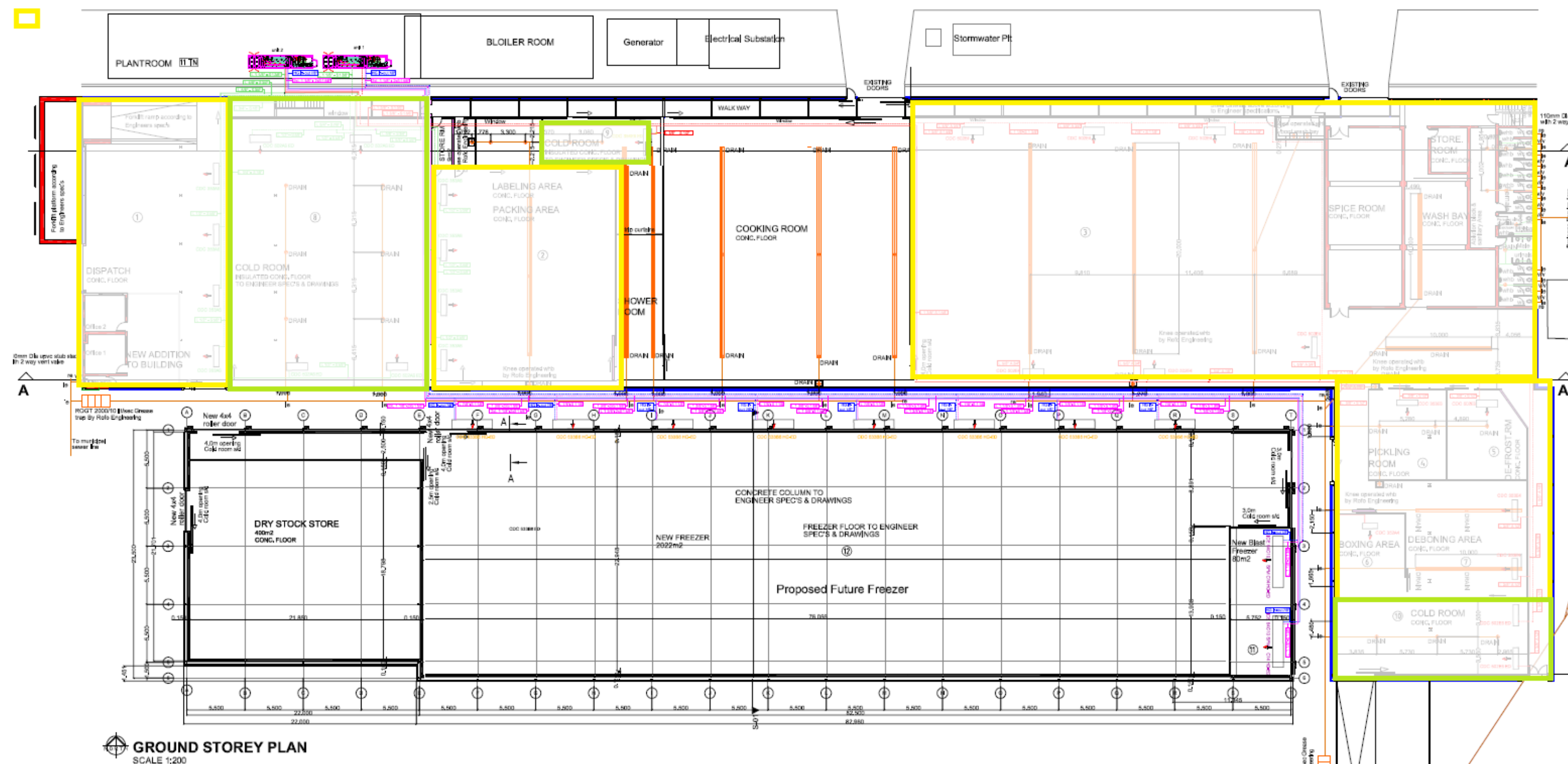
The plant is treating fresh meat entering the processing area daily with a range from 80 to 160 ton and 1000 tons of frozen products in the following refrigerated areas:



Processing area 7500 m³ @ +10°C

Needs for the new production facility

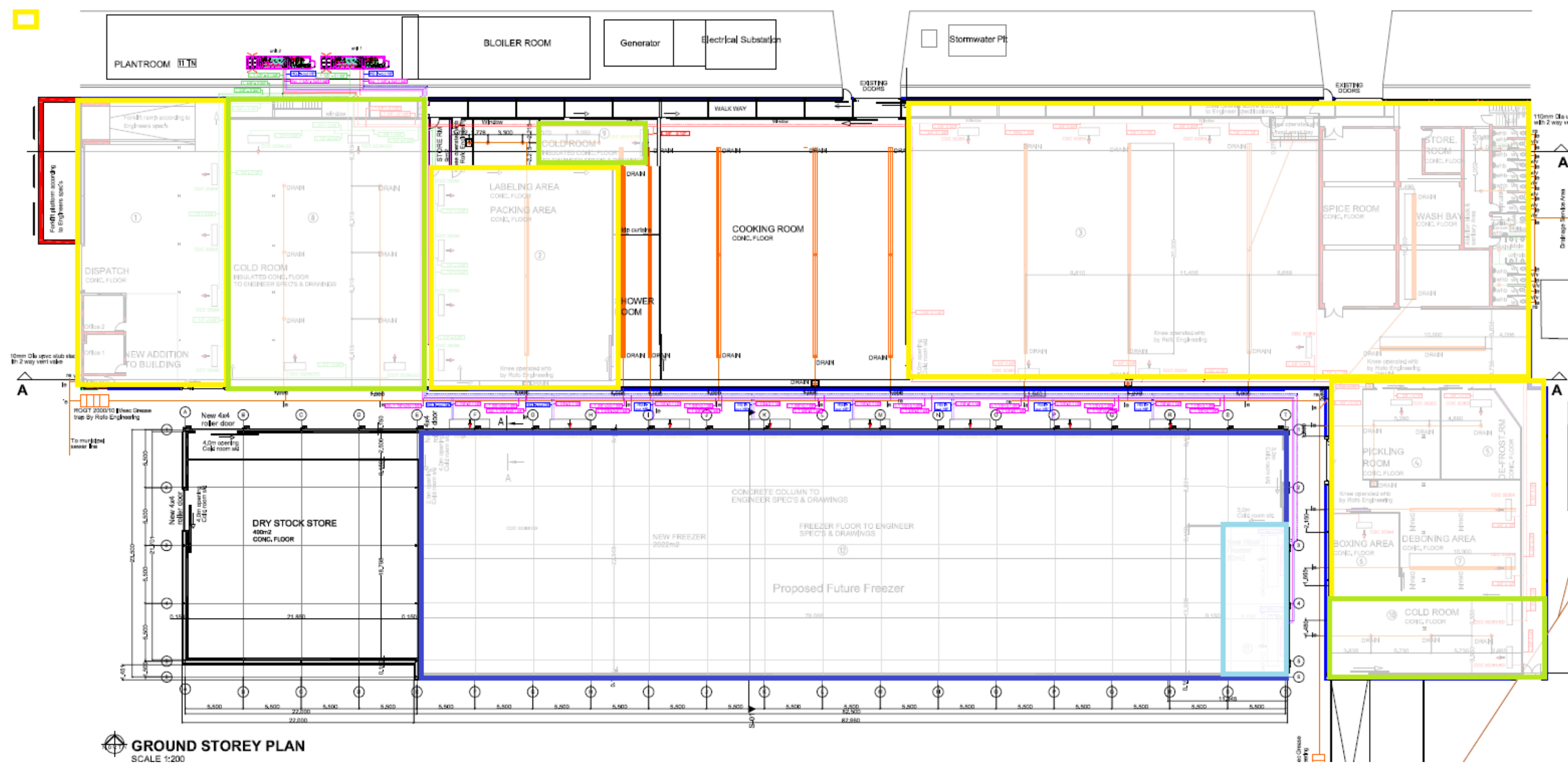
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The plant is treating fresh meet entering the processing area daily with a range form 80 to 160 ton and 1000 tons of frozen products in the following refrigerated areas:

Processing area 7500 m³ @ +10°C

Cold rooms 2500 m³ @ 0°C

Freezing room 18000 m³ @ -20°C

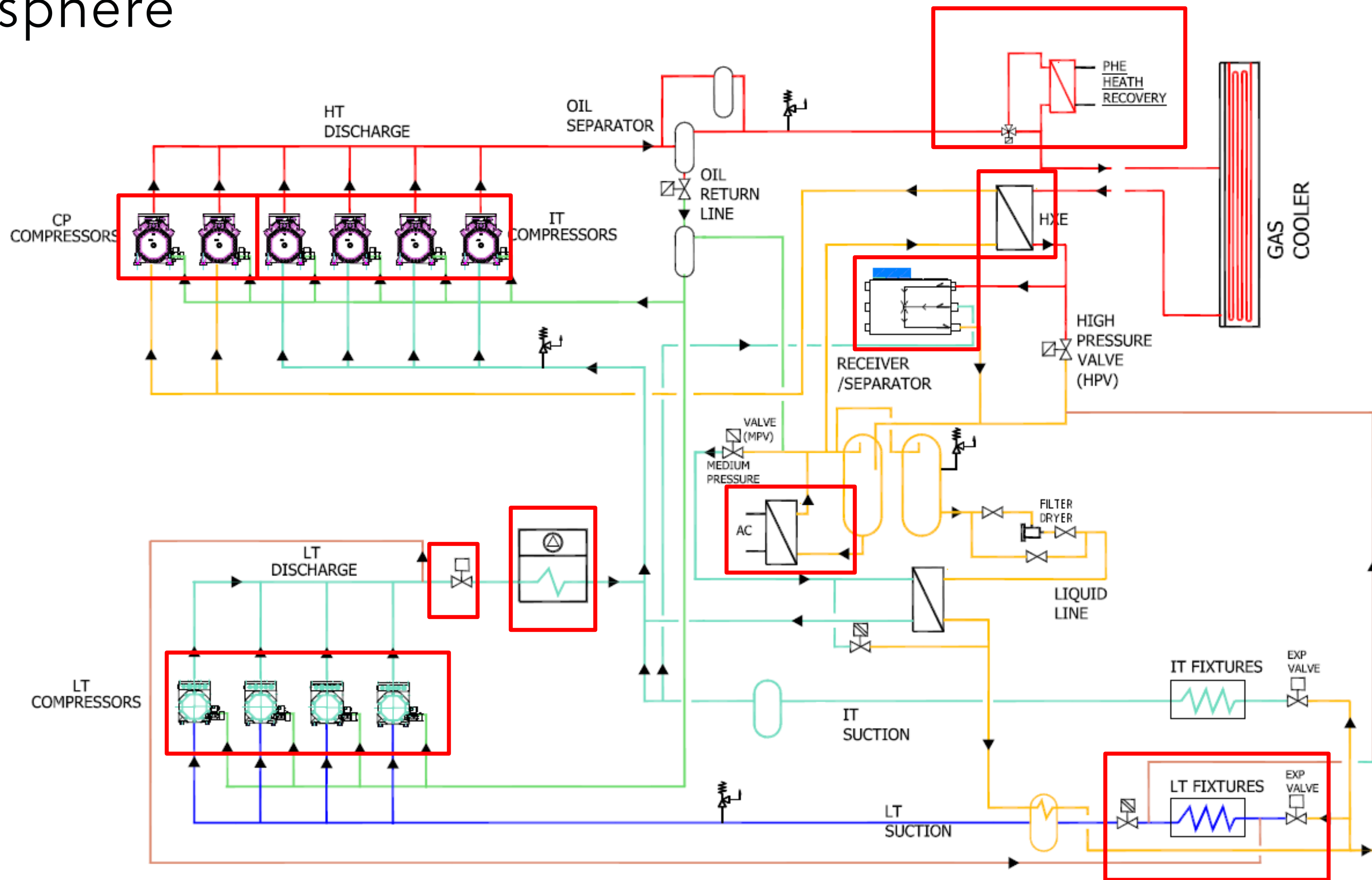
Pull down freezer 720 m³ @ -20°C

SCM FRIGO proposed solution

SCM FRIGO selected 2 transcritical units for outdoor installation (walk-in box), each one equipped with:

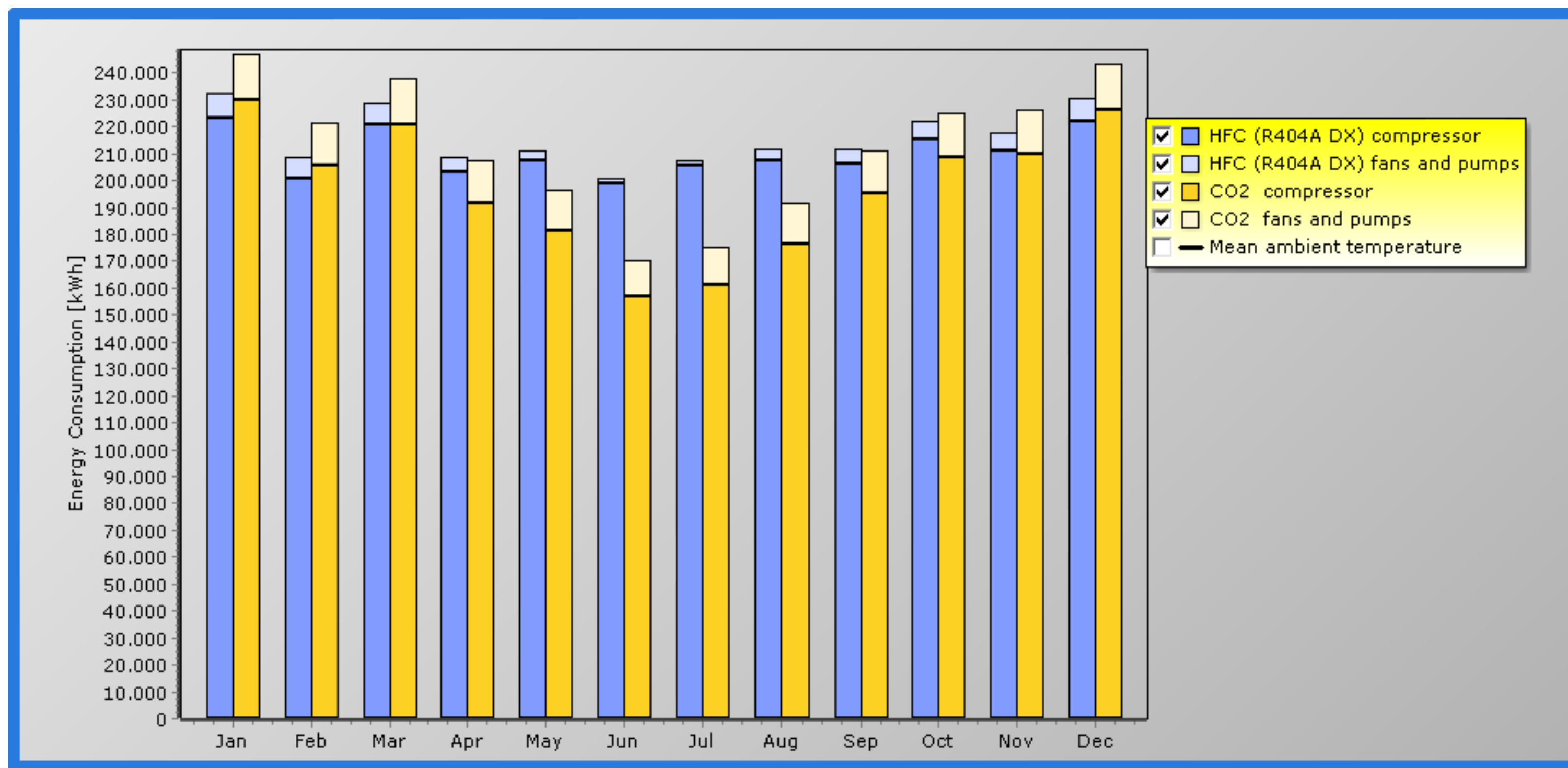
- 4 Bitzer MT compressors, 230 kW @ -7°C
- 4 Bitzer LT compressors, 200 kW @ - 27°C
- 2 Bitzer **Parallel** compressors
- 1 Danfoss Vapor Multi Ejector
- 1 Luvata gas cooler
- Hot gas defrost for LT coolers
- Hot water heat recovery (water 25/60°C)
- AC load (30 kW water 12/7°C)





Cost analysis and results

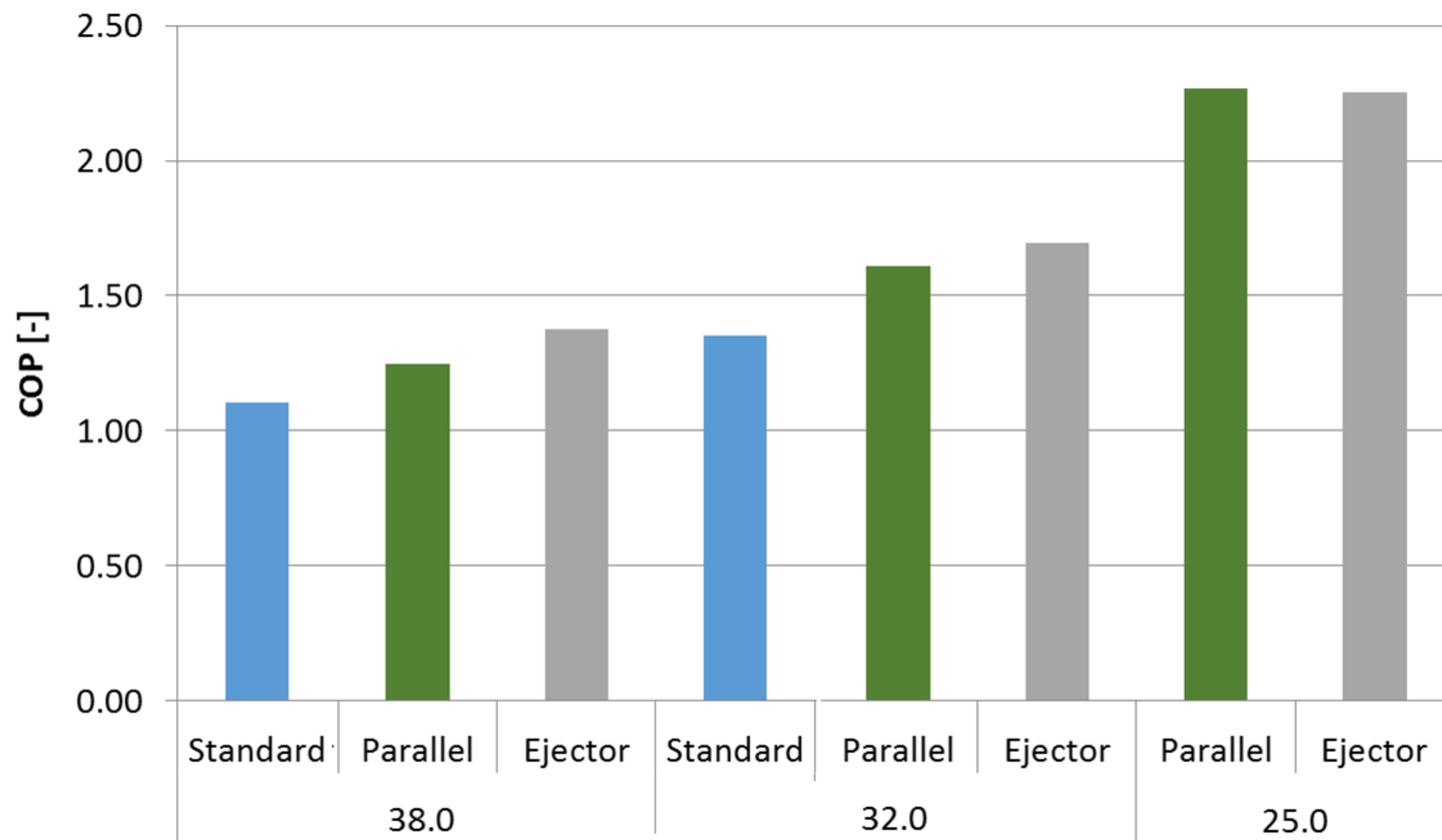
Here after the comparison between the HFC solution typically adopted (R404a) and the transcritical solution with parallel compression:



An average 6% lower power consumption is expected

Cost analysis and results

The implementation of the vapour ejector will improve the energy efficiency of the cycle especially during the high ambient operation :



An average 7% increased efficiency in addition to the parallel compressor operation is expected

Cost analysis and results

The hot gas defrost system for the LT evaporators is the most effective way to remove the frost from the coolers and help to reduce the energy consumption of the entire installation.

Full heat recovery is installed on the unit to produce hot water at 50°C for the production operations.

A total AC load of 60 kW is providing the air conditioning of the offices and the dry stock areas where is needed a control of the temperature.

Challenges and solutions

Both customer and installer had no experience with CO2 application. There were the needs to support them in improving the knowledge in the technology and in the engineering of the installation.

SCM FRIGO and Metraclark have supported on both side with:

- Full training of the refrigeration engineers and field engineers involved on the design and installation phase in the SCM training facility
- Collaboration with the main supplier of components locally to chose the better solutions for the installation
- Full training of the commissioning and field engineers on site during the commissioning of the plant

Conclusion

An average 13% of improved efficiency of the system is expected compare with the traditional HFC due to the use of the vapor ejector.

No HFC is used in the installation with a reduction of about 40% of the carbon emission in the lifetime of the plant

Customer wants now to extend the transcritical CO₂ technology also to their shops.

Using the collaboration / synergies between manufacturers, installers and wholesalers, CO₂ technologies can be spread around the world without climate or applications barriers



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Thank you very much!

