

CASE STUDY:  
KNEPP WILD RANGE MEAT / KINGSTON REFRIGERATION SERVICES LTD

## CO2 condensing units deliver usability, efficiency and environmental benefits for wild range meat pioneer.

### The Knepp Estate is one of the most exciting and innovative wildlife restoration projects in Europe

Based near Horsham in West Sussex, 3500 acres of previously intensively farmed land have been allowed to return to nature over the last 20 years. Large grazing animals - Old English longhorns, Tamworth pigs, fallow and red deer amongst others have been introduced to enhance the ecology and biodiversity of the newly 'rewilded' landscape.

These free-roaming, pasture-fed, organic herbivores now also provide an important income stream for the Estate, with over 35 tonnes on the hook (deadweight) of meat being processed and sold annually through the new refrigerated butchery and storage facility which is central to the Knepp Wild Range Meat initiative.

Ian Mepham, Development Manager, has driven the project from the start. "Clearly we need a refrigeration system that meets Knepp's high sustainability and environmental credentials. We worked closely with Fisher Modular, specialists in food production facilities, to outline a suitable system. Very early on we identified that only a CO2 (R744) refrigerant-based system would meet our requirements. Not only does CO2 offer high system efficiency, it also has low Global Warming Potential (GWP), low toxicity and, because there is no impending phase-out, it offers a long-term, future-proof solution. The high operational efficiency offered by a CO2 system was particularly important to us because we have long-term plans to run the entire plant on photovoltaic (PV) solar panels with batteries."





This is the first CO2 installation carried out by Kingston Refrigeration, and Pete Clarke admits he was initially daunted by the prospect. *“It’s easy to be put off by the perception that CO2 systems are unworkable and only suitable for packs and supermarkets. However we’ve found that with good initial design, correct product choice and proper support from your supply chain, smaller commercial systems are very achievable. For the Knepp project we sourced the whole ‘package’ from HRP - products, expertise and training - and they couldn’t have been more helpful. Room load calculations and equipment selection was carried out by HRP’s in-house technical support team, and they also gave us the information we needed in terms of refrigerant and oil charges based on our pipework plans. We were also well supported by Cool Concerns Ltd who provided specific training on the CUBO2 condensing units. All this assistance enabled us to install and commission a CE marked system to meet our customer’s requirements for a safe, usable, highly efficient system. And now, with the learning curve behind us, we’re keen to do another one!”*

Additionally, an operation based on a naturalistic grazing system such as rewilding has unique requirements, as Ian explains. *“Unlike traditional livestock farming where animals can be slaughtered to meet demand throughout the year, all of Knepp’s meat is culled in a limited period between August and December, which allows the animals to overwinter in smaller, more sustainable herd sizes. So, to ensure all-year-round availability for customers all our meat is frozen, which also helps to lock in the taste and goodness”*

This fluctuating meat production and storage cycle means the refrigeration system has to be flexible enough to cope with significant changes in demand throughout the year. Ian also wanted built-in redundancy, so that in the event of an issue in part of the system he could always rely on back-up from another part. Given the flexibility and resilience required, it made sense to steer clear of a single, central, multi-compressor pack and instead go for a system incorporating a number of independent condensing units. The efficiency of these units also means that projected energy usage would be 15% lower than an equivalent pack.

Ian turned to Kingston Refrigeration Services Limited to install the system. Managing Director Pete Clarke takes up the story. *“While the use of CO2 refrigerant is normally associated with larger, more expensive ‘supermarket style’ packs, it’s now becoming much more widespread in smaller commercial systems. At Knepp we used seven CUBO2 Smart high efficiency condensing units, manufactured by SCM Ref, Italy (a Beijer Ref. company). These have inverter-driven compressors which make the units virtually silent when modulating speed according to demand. Even when all seven are in operation the whole system is very quiet, which is an important consideration for such a sensitive, rural location. The seven condensing units are linked to matched Lu-ve evaporators within the four separate areas: the raw meat room; a food production area; a freezer room; and a hanging room. The freezer room and hanging room each have two independent systems with ample capacity to provide cover in the event of any system issue. For added peace of mind, the entire installation is monitored using a Bacharach gas detector system. With sensors in each room, the system protects operators by sounding an alarm if any refrigerant leakage is detected.”*

The new Knepp Wild Range Meat butchery has been in operation since August 2021. After a very busy first six months of operation, Ian Mepham couldn’t be happier with the refrigeration system.

*“We’ve been absolutely blown away by the initial efficiency figures! We have nearly nine-times the refrigerated capacity that we had before the new system was installed and yet our electricity bill is almost the same as it was before. This efficiency will pay dividends as we move towards 100% PV energy. Overall, we are satisfied that we’re building the ‘greenest’, most sustainable, long-term solution we possibly can to complement the aims of the pioneering rewilding project being carried out here at Knepp.”*



**If you would like more details about our range of CO2 based packaged condensing units then please contact your local HRP branch.**