Case Study: QinetiQ
Battery Production

Munters solutions give you:

- Reduce CO2
- Achieve low dewpoints
- Stable conditions
- Reduce energy consumption
- Dewpoint monitoring and alerts
- Modular systems
- PowerPurge™ technology

478 tonnes CO2 saved for QinetiQ battery production

Energy saving, low dewpoint conditions for advanced battery system dry rooms at QinetiQ.

QinetiQ is a world leader in providing technology-based independent advice and support to customers in the Aerospace, Defence and Security industry. QinetiQ's Power Sources Research and Development team, based in the UK, works with a wide range of industry and academic partners in developing advanced battery systems.

To enhance their capability, QinetiQ tasked Munters to design an air treatment system to achieve low dewpoint in the battery production dry rooms whilst also reducing their existing energy consumption and carbon emissions. And here's how Munters, the experts in climate control, achieved it.

The production of advanced battery systems such as lithium-ion batteries requires very dry conditions. The components are extremely moisture sensitive and will quickly react with the smallest amount of moisture from the air. In fact, if conditions are not strictly maintained, moisture-related damage and deterioration can occur in minutes.

With advancements in technology and the need to reduce energy consumption, QinetiQ's challenge was to deliver a reliable air treatment system capable of maintaining performance of the existing system but using less energy.

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So Munters designed a replacement solution that would achieve the lower dewpoint conditions while still maintaining operating efficiencies. The main objectives of the replacement system were to:

- Achieve and maintain a dewpoint of between - 25°C dpt and - 40°C dpt (depending on operational requirements)
- Reduce energy consumption to achieve payback within 3 years
- Consistently maintain conditions no matter what the ambient conditions

	Original Plant (3yrs)	New Plant (3yrs)
Gas	2660 MWh	509 MWh
Electricity	2400 MWh	421 MWh
Total (3yrs)	**5060 MWh**	**930 MWh**

Figure A

Working closely with QinetiQ, Munters expert team re-engineered an existing design to create a bespoke packaged air treatment solution using Munters MDU modular technology.

The Munters MDU2000 is a low dewpoint system that incorporates energy efficient features, cooling, heating, chillers, ducting and controls. The low dewpoint system is fitted with Munters PowerPurge™, a patented recovery system that has been proven to reduce energy consumption by up to 30%*.

The bespoke MDU2000 system operates by using pre-cooled air which is partially dehumidified (by virtue of the cooling) and is then passed through the desiccant wheel (rotor). The air passing through the purge sector is further dehumidified, and then moves into the reactivation sector.

The overall effect maintains the required drying performance, whilst utilising heat recovered in the purge sector (the dehumidification process produces heat) to reduce the reactivation heater power required.

Using Munters PowerPurge™ essentially enables system to achieve the same conditions but in a more energy efficient manner. In addition to creating a more energy efficient system, the MDU2000 system features a wall mounted dewpoint monitor.
If conditions fall below the specified dewpoint, the operator is alerted, enabling close controls and strict management of the overall system. A sensor fitted on the return duct ensures conditions remain constant throughout the entire room.

Munters selected an indirect gas burner (compared to a direct gas burner on the previous system) which has contributed to overall energy savings, and heavily insulated ducting assists with heat recovery.
The installation of the new system at QinetiQ was carried out by Munters expert Projects Team.

During commissioning, engineers were able to achieve ultra low conditions of -55°C dpt, demonstrating that this unique design is more than capable of maintaining the required conditions.

The result has been a resounding success. The new system consistently holds the required conditions and close controls and monitors provide reassurance that conditions are not fluctuating, as well as ensuring there no risk of moisture-related damage to the battery components.

Thanks to a clever control strategy and ability to offer a night setback feature, QinetiQ have been able to realise greater than predicted energy savings as demonstrated in Fig. A.

Based on this projection, payback of the system is 3.2 years, with annual savings of 478 tonnes of CO2 and 1376MWh (4130MWh over 3 years).

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