CASE STUDY

IDENTIFYING ENERGY AND WATER REDUCTION STRATEGIES AT A VACCINE MANUFACTURING FACILITY

CLIENT / LOCATION

Global Pharmaceutical Manufacturer / UK

PROJECT BRIEF

EECO2 was commissioned to examine, quantify and report on the opportunities for energy and water usage reduction at a UK vaccine manufacturing facility.

Key objectives included:

1. Identify and prioritise 'quick win' improvements that could be implemented immediately;
2. Identify, evaluate and prioritise significant energy and water improvement projects that could be implemented over the next 2-3 years (includes energy savings estimate and budget cost);
3. Engage with key site stakeholders (QA/Validation/Engineering) to develop the structured approach and documentation requirements to support proposed changes;
4. Transfer of knowledge to site on the risk-based approach and current best practice for implementing energy reduction opportunities without compromising product quality;
5. Ensure output was action based with stakeholder agreed action plan, action owners and timelines.

METHODOLOGY

$EECO_2$ delivered a full site energy and water focussed assessment - a proven process that guides the site team to identify and prioritise significant energy, carbon and water projects that have been discussed in detail and are viable for implementation. This assessment was supported by detailed data analysis undertaken by $EECO_2$ off site prior to the workshop. The off-site analysis involved creating a bespoke site energy and water model which was then verified during the site visit. This enabled the $EECO_2$ team to rapidly identify and quantify realistic energy and water reduction opportunities on a whole site basis, to a tolerance of +/-30% cost and savings.

OUTCOME

The solutions below are based on 24 developed projects for the site:

- Biomass Boiler
- Fresh Air Pre-treatment
- HVAC optimisation - air change rates in areas are higher than needed to maintain air cleanliness/classification
- Condensing Economiser for Fuel Oil Boilers
- New RO to treat waste streams

SOLUTIONS

The data analysis, supplemented by on-site observations, showed that HVAC (air movement, heating, cooling & dehumidifying) was the largest user in terms of energy consumption at 55% of site energy consumption and cost. The main areas of opportunity identified were:

- HVAC optimisation - air change rates in areas are higher than needed to maintain air cleanliness/classification
- Fresh air optimisation
- Demand based ventilation
- BMS Optimisation set point and deadband control
- HVAC set back (or turn down) during non-operational times
- Steam systems optimisation
- Chilling and refrigeration systems optimisation
- Water usage reduction, reuse and recycling

The energy and water assessment involved key stakeholders from Engineering, Quality Assurance and Validation teams. Potential projects were presented, discussed in detail and risk mitigation was integrated into the project proposals.

RESULTS

23% Site Savings

Annual energy savings identified:

4,283 MWh (23% site reduction)

Annual energy cost savings identified:

£332,000 (29% site reduction)

Annual CO_2 savings identified:

1,445 tonnes (25% site reduction)

Annual water savings identified:

13,674 m^3 (52% site reduction)

Annual water cost savings identified:

£17,500 (52% site reduction)

The energy savings identified have an overall simple payback period of 2.4 years. The water savings have a 3.3 year simple payback period.