Schering Plough

AIR CHANGE REDUCTION

Schering Plough is one of the leading pharmaceutical corporations in the world, with net sales of $10.6 billion (2006) ranking it in the world's top 20. Its areas of research include: cardiovascular disease, central nervous system disorders, immunology and infectious disease, oncology, respiratory diseases and women's health. The corporation employs approximately 50,000 people in facilities located in over 50 countries throughout the world, with 4 facilities in Ireland; one of which is Schering Plough, Rathdrum.

THE BIG PICTURE

The Rathdrum, Co. Wicklow facility employs approximately 350 people and produces up to thirty active pharmaceutical products using multi-step synthesis. It is considered a strategic site worldwide in the company's operations.

In 2007 Schering Plough, Rathdrum reduced the Air Changes Per Hour (ACPH) in the general areas of their production buildings. This resulted in electricity savings, due to the reduction in air quantity being pumped by the air handling units. Heating and humidification requirements were also reduced, resulting in further savings.

This project was driven by Schering Plough's policy to reduce energy consumption and CO_2 emissions. The reductions achieved were as follows:

Energy consumption	6,800 MWh per annum
CO_2 emissions	1,700 tonnes per annum

The project was part-funded under Sustainable Energy Ireland's Industrial Best Practice Initiative. Based on the energy savings realised and upfront project costs, the payback time for this project is 0.5 years.

THE PREVIOUS SETUP

Schering Plough, Rathdrum use forced air ventilation (full fresh air) for safety, quality and operator comfort. This energy reduction project relates to optimising the HVAC system. Specifically, this means optimising the Air Changes Per Hour (ACPH); defined as, "the number of times each hour that a room's total volume of air is exchanged with fresh filtered air".

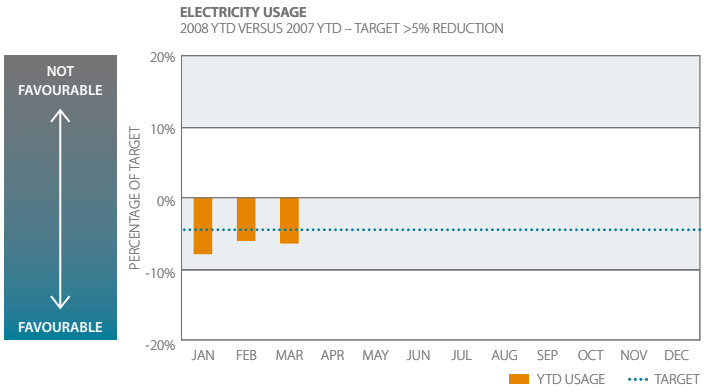
In determining ACPH requirements for a given room type, various standards and corporate guidelines are considered. However the optimum value for ACPH requirements can be best determined by considering a room's specific requirements in terms of safety, quality and user comfort.

The areas affected by this retrofit are the production buildings, with a combined floor area of 5,600 m^2. The production buildings incorporate 3 types of room/area:

- General areas;
- Controlled environment rooms;
- Electrical rooms.

These production buildings are generally classified as hazardous, due to the flammable and explosive nature of some of the materials being processed. In the original configuration, an ACPH of 15 was used in the general areas, while controlled environment rooms use an ACPH of more than 20.

The HVAC system consists of 36 air supply units and 43 extract fans, along with ductwork, filtration systems, and control systems. Steam for heating is produced in a natural gas fired boiler.



THE INVESTIGATION

Schering Plough's first step was to define the scope of the project and to carry out a detailed feasibility study. Safety consultants were also hired to assess any safety risks that might arise as a result of reduced air changes. HVAC commissioning engineers and HVAC consultants were engaged to perform "as is" system testing and assessment. Benchmarking with peer companies and similar industries was also undertaken.

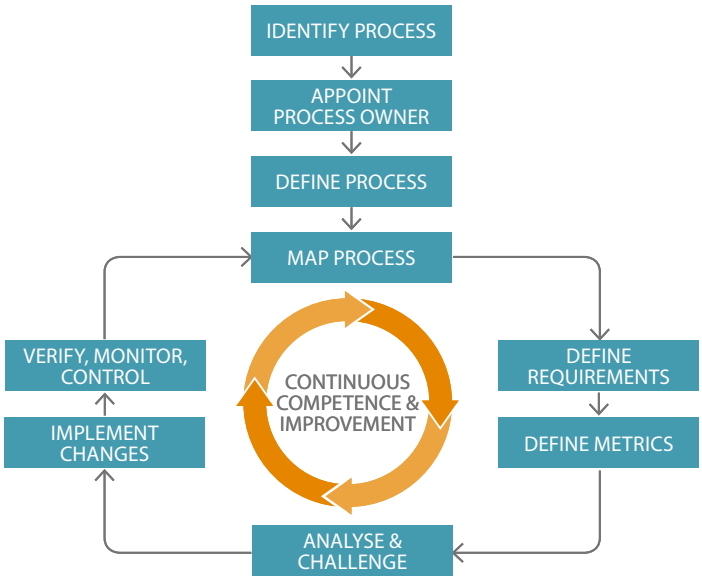
The factors considered in the feasibility study included:

- Managing explosion risks;
- Air quality standards;
- Industrial hygiene standards;
- Operator comfort;
- Room pressurisation profiles to prevent contamination;
- Temperature and humidity control.

From this investigation the following actions were recommended:

- New ACPHs for general area rooms;
- New fan speeds for supply and extract fans;
- Efficient use of Variable Speed Drives (VSDs) where appropriate;
- Rebalancing of the system with new fan speeds.

A 6-Sigma methodology (DMAIC) proved to be very useful in developing and executing the project. During the Define, Measure, Analyse phases, Schering Plough used a heating model to predict the fuel savings, and used airflow readings and pareto analysis to decide which of the 36 systems would give the best payback. This helped in fixing the scope of the project and in selling the project internally to the key stakeholders. The DMAIC process flow is as follows:



ACTIONS TAKEN

Following the feasibility study, the team gained management approval for project implementation.

Key factors during both investigation and implementation phases included:

- Involving stakeholders at a high level;
- Detailed assessment and identification of problem areas;
- Study of issues raised by stakeholders;
- Thorough baseline measurement.

Change proposals were raised and approved by the stakeholders, who were fully engaged from the outset. The following actions were taken:

- New air change rates were specified for each general area room, which were up to 50% lower than previous rates;
- New fan speeds for specific supply and extract fans, serving general areas, were calculated;
- Rebalancing of the system was undertaken with new fan speeds;
- Minor ductwork modifications were implemented where required;
- Documentation and drawings were updated.

It is important to note that all actions taken had to fit in with the existing production schedule, yet the team at Schering Plough managed to implement the entire project in 9 months, without interruption to the busy production schedule.

SAVINGS AND BENEFITS

The actions outlined above result in the following energy savings:

Area of savings	MWh per annum
Natural gas	6,000
Electricity	800
Total	**6,800**

These energy savings have resulted in a reduction of 1,700 tonnes in CO_2 emissions annually.

An additional benefit accruing from this project is increased filter life, which results in further moderate cost savings.

BEST PRACTICE AND REPLICATION

Through this retrofit project, Schering Plough, Rathdrum have realised notable savings with a relatively minor investment in time and money.

This project is easily replicated across many facilities that use mechanical ventilation. In fact, Schering Plough, Rathdrum are already investigating the possibility of optimising the ACPH for R&D labs and offices.

"This project has been widely recognised within the Schering Plough organisation and has received a corporate award."

Jimmy Conlon,
Technical Support Engineer,
Schering Plough

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