

## ENERGY EFFICIENT REFRIGERATION AT ABATTOIRS

### BACKGROUND

GM Scott, located at Cootamundra NSW, employs 200 staff who process 3,500 lambs and 200 cattle daily. The refrigeration systems at GM Scott consist of a newly built ammonia plant and a separate plant operating on R-404a. The ammonia refrigeration plant consists of a single stage arrangement for the medium temperature loads and an economised across-line arrangement for the low temperature loads. The plant serves various chiller rooms, the load out, plate freezers and a freezer store. The R-404a refrigeration plant operates in a single stage economised arrangement and provides



cooling to other chiller rooms, a carton chiller and a packing and boning room.

### OPPORTUNITIES

The opportunity existed to improve the energy efficiency of the existing refrigeration systems at GM Scott by installing smart controls to a newly built Ammonia refrigeration plant and R404A refrigeration plant.

### IMPLEMENTATION MEASURES

The facility undertook a \$180,000 project involving the installation of condenser fan variable speed drive (VSD) and evaporator fan speed control technology to enable the refrigeration system to operate more efficiently. A condenser fan (VSD) was fitted to the Ammonia Plant along with the implementation of an intelligent control logic to minimise the power consumption and stabilise the operation of the refrigeration plant. In addition to

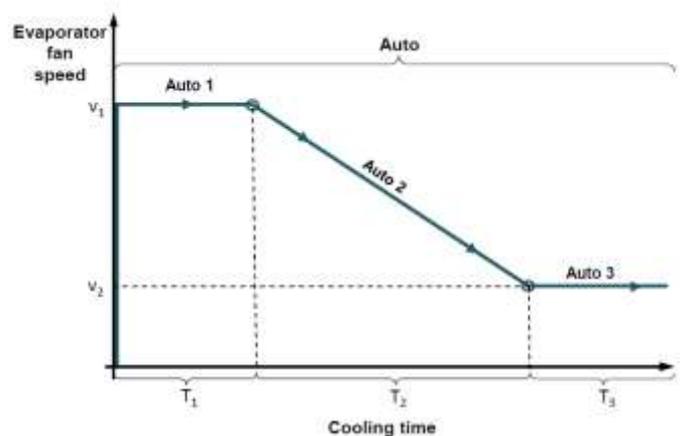


Figure 1 - Evaporator fan speed before and after the implementation of speed control logic.

this, evaporator fan speed control technology was fitted to the Ammonia refrigeration plant and R404A refrigeration plant.

The evaporator fans in both freezer rooms and carcass chillers were fitted with VSD's and a suitable speed control logic is implemented. The control logic was specifically designed for each room, in an effort to minimise fan speeds, as shown in Figure 1, without compromising production and meat quality. Lowered

fan speeds significantly reduce fan power consumption and reduce the overall heat load in the room.

### OUTCOMES

The project is expected to deliver 155 megawatt hours of energy savings annually. This will reduce energy costs at the site by \$36,000. In addition, the smart controls will enable the refrigeration plant to operate at reduced pressure ratios which will reduce stress on parts and prolong the operating life of the plant.