final report

Project code: P.PIP.0484

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Date published:

PUBLISHED BY
Meat and Livestock Australia Limited
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Energy awareness, monitoring and controls program

This is an MLA Donor Company funded project.

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government and contributions from the Australian Meat Processor Corporation to support the research and development detailed in this publication.

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Executive Summary

Western Meat Packers Group (WMPG) commenced a journey to reduce energy costs at its deboning/cold storage facility in Osborne Park while maintaining WMPG's existing world-class production practices. A grant was provided through the Meat Livestock Association (MLA) to implement an energy awareness, monitoring and controls program.

The following items describe the main activities of the program and its outcomes:

- **Benchmarking:** Performance benchmarking and energy management planning was conducted through a One2Five assessment. This resulted in a one star rating, actions were provided on how to progress to a two star rating. After the roll out of the project a second One2Five assessment was conducted which resulted in WMPG progressing to a two star rating indicating they now align with their industry peers.
- **Energy Procurement:** Electricity contracts were analysed through a procurement review; this process considered both bundled and unbundled rates. Electricity offers were analysed using an external procurement team. The difference between the best unbundled and bundled offer was 34.5%, which represents significant savings. This resulted in the largest cost saving for the project.
- **Monitoring:** Energy metering was installed. This assisted in understanding electricity usage; however, the data was better utilised once it was made more accessible through a centralised control system.
- **Business Case Development for a centralised control system:** Assessment of a centralised control system was conducted which then led to the development of a business case. Deciding on selection criteria for the centralised control system, coupled with a staged roll-out process assisted with the business case for implementation. Implementation has resulted in increased energy awareness, better energy management, reduced electricity and maintenance costs, better temperature control and increased engagement from staff. This resulted in greater engagement of staff members on the need for improved energy management.
- **Energy Management Program:** Momentum for a site-wide energy program was achieved after implementation of the centralised control system because of the increased energy awareness.

The red meat industry could benefit from the above process if:

- Energy is poorly understood onsite: benchmarking assisted in recognising a problem; however, access to online live data also increased energy awareness and management.
- Electricity contracts are bundled: it is important that meat processors consider bundled and unbundled contracts to determine what will deliver the lowest electricity costs for their facility.
- There is no centralised control system: this is key in achieving a range of benefits, most importantly is being able to maintain product temperature whilst simultaneously decreasing energy costs.

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1 Background

Western Meat Packers Group (WMPG) commenced a journey to becoming more energy efficient at its deboning/cold storage facility in Osborne Park. The purpose of this journey was to reduce energy costs while maintaining WMPG's existing world-class production practices. Energetics was engaged to conduct a high-level energy audit of this facility. The audit outcomes were workshopped by WMPG to investigate energy saving options, resulting in a focus on operational energy management, employee education and increased operational control.

WMPG decided to progress with development of an energy program for the site. The works involved technology, organisational and behavioural changes within the organisation. The first phase of this project included benchmarking energy consumption and energy management practices, installing energy metering, investigating unbundling electricity rates, creating a business case for a centralised control system and activating a site-wide energy program. After completion of this phase (Phase I), WMPG was to implement the control system, train staff in using the control system and then assess effectiveness of the control system. Note that the MLA grant funding only covers milestones from Phase I.

2 Projective Objectives

The Phase I objectives were:

1. Develop an initial energy awareness program with the site staff for input into an optimal control strategy plan.
2. Design an optimal control strategy plan for the site based on specific product management needs.
3. Assess opportunities for process optimisation to decrease energy use across the three sites.
4. Conduct a One2Five energy management diagnostic session with employees before and after the program. This diagnostic tool provides a one to five star energy management ranking based on a series of questions. The output measures the change in energy management systems.
5. Conduct a brief employee survey to obtain feedback/opinions from staff. The survey results measure the employee awareness/engagement in this program.

After Phase I, the WMPG was to decide if they would go ahead with Phase II. Based on the business case of the centralised control monitoring system WMPG decided that they did want to implement the control system. Phase II goals of the project include:

- Implement the control system.
- Train staff for effective use of the system to optimise energy use and ultimately reduce costs.
- Assess effectiveness of energy management system.

Note that the MLA grant application only covers Phase I of the project.

3 Methodology

3.1 Milestone 1 – Benchmarking and energy management planning

3.1.1 One2Five© benchmarking and energy planning

In order to establish the level of development of site energy management systems, a diagnostic tool (One2Five® energy) was used. This approach was accepted by the MLA/AMPC PIP Program.

One2Five® is an online tool that awards an Energy Star Rating based on the company's approach to energy management. The tool provides a report which includes benchmarking based on a five star scale against industry sector and the other One2Five® users. One2Five® also recommends critical actions to help you become more energy efficient and benchmarks your organisation against a worldwide database, so you can better understand how you compare to your peers.

This process provided a baseline of the company's maturity in energy management. A report of the results is provided in Appendix A – One2Five report. The process will be repeated at the end of the first year to measure progress.

Results from the One2Five® session are being used to tailor the behavioural component plan for employee awareness and engagement with energy management. This includes engagement of personnel at all levels of the business, e.g. operators, cleaning staff, maintenance, managers and executive.

3.1.2 Employee engagement strategy

The operational management at WMPG believe that tool-box talks are the key vehicle for communication of energy awareness at the Osborne Park site.

Now that sub-meters are in place the site is considering additional KPIs for management and ways to promote competitive spirit between the operating groups on-site.

3.2 Milestone 2 – Install energy metering

Previous to this project, WMPG had only site-wide electricity and gas meters. The energy data was only looked at by finance and accounts to pay the bills. A key part of this project in Phase I was installing site-wide non-utility meters with monitoring software.

Incorporating non-utility meters where operations can access the real-time energy data, allows energy consumption to be reviewed by those using the energy. Operational management can see how energy will increase with decreased door management, increased product loading and other behavioural practices. Development of daily typical consumption and identification of anomalies in consumption can highlight operational energy waste and non-routine events.

This monitoring information allowed for good assessment of potential control system implementation for Phase II.

3.3 Milestone 2a – Electricity procurement to assess unbundled contract

Energetics assisted WMPG with the electricity procurement process. The following steps were conducted:

1. Energetics analysed historical electricity consumption and gathered information on future electricity demands
2. WMPG stipulated specific conditions that were required in the contract
3. Energetics developed a request for proposal and distributed to retailers
4. Energetics performed an analysis of the received offers
5. Energetics provided a report to WMPG on the offers
6. WMPG requested clarifications on the best two offers
7. WMPG selected a retailer to enter into a contract with

3.4 Milestone 3 – Activate site-wide energy program

1. Different methodologies were investigated when looking at how to activate the Energy Awareness Program:
   Community Based Social Marketing (CBSM) – CBSM is a technique developed by Dr Doug Mohr-McKenzie, which can be a powerful tool in achieving sustainable behaviour change. The behaviours that were investigated were:
   a. Refrigerator door management – closing fridge doors when appropriate
   b. Hot-water wash-down – reducing hot water usage
   c. Cooling load management – changing procedures to reduce refrigeration load

   The above behaviours were investigated and alternative technology fixes were proposed, therefore none were appropriate for this behaviour change methodology so CBSM was not used.

2. Energy awareness workshop - once data was obtained through the implementation of Milestones 4 and 5 this resulted in increased understanding and awareness of energy usage. Operations teams could seem improvement in maintaining refrigerator and freezer temperatures which resulted in increased interest. Using the momentum achieved an energy awareness workshop was held with the following agenda:
   - Context
   - Energy Usage
   - Brainstorm Ideas
   - Energy awareness program structure
   - Other opportunities
   - Screen Opportunities
   - Write up project sheets including actions

3.5 Milestone 4 – Assess design of centralised control system

The first step for assessing the design of a centralised control system was deciding on the design criteria. Each of the criteria is discussed further below.

1. Decide on what equipment should be controlled:

a. Lighting: this is not a significant electricity load on site. A new lighting philosophy is being implemented where non-working globes will be replaced by LEDs. Also the current policy is to turning off lights when rooms are not in use; this policy is well implemented. Therefore it was decided that lighting was not important to automate.
b. Doors: there are several doors with clear strip curtains that open to ambient temperatures. Strips are replaced regularly if broken. A longer term plan is to keep doors permanently closed and only have one large entry for forklifts. Therefore automation of doors was not considered important.
c. Refrigeration and freezers: this equipment is associated with critical electricity loads.

It was decided to install a centralised monitoring and controls system on this equipment.

2. Number of temperature points to be monitored/controlled: there are two boning rooms, four blast freezers, the Map Room (5 chillers and one freezer), and the Cold Stores (4 chillers two operational freezers). Based on the cold store configuration 35 temperature points were selected (see Figure 4).
3. Data historian requirements: it was important to be able to record and log measured parameters. This helps WMPG with their Hazard Analysis and Critical Control Points Accreditation. Historically this information has been recorded manually, and with manual entry there was a risk for transcription errors.
4. Ability to perform predicative maintenance and reduction of unplanned maintenance costs: WMPG are able to analyse key variables to reduce unplanned maintenance costs and be able to perform predictive maintenance. This data helps proactively identify issues).
5. Software type of control system: there are many solutions for monitoring and controlling refrigeration systems. Software options range from basic to very sophisticated systems which increase in cost accordingly. Examples of this is listed below and explained further in Figure 1:
    - Rule based decision making: allows two modes of operation, e.g. on/off
    - Statistical reason: simple regression analysis can be performed where a curve is fitted to data
    - Machine learning: this is where data can be classified as required
    - Artificial intelligence: control decides on best path based on classified data

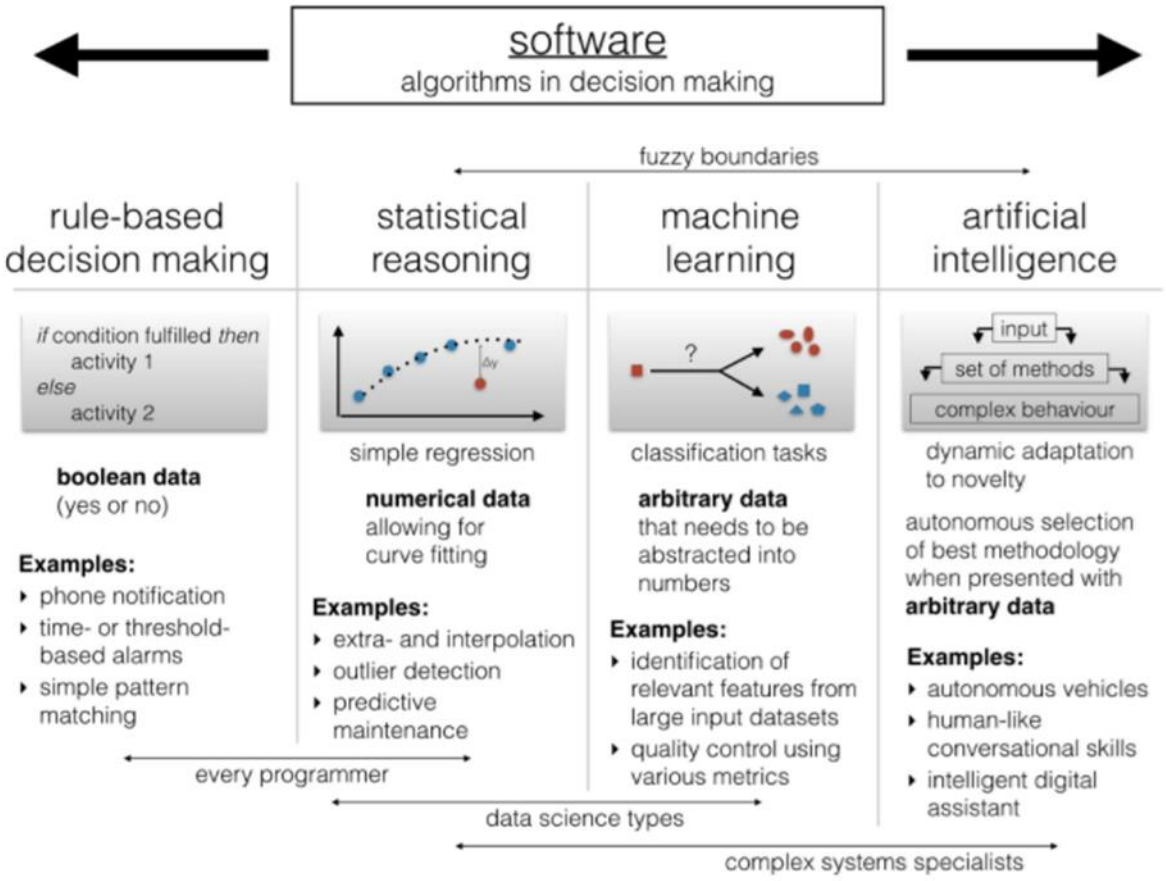


Figure 1 - Algorithms in Decision Making (Image credit: Dr Boris Adryan)

WMPG recognised that the lease at Osborne Park is short term and therefore a simple cost effective monitoring and controls system was preferred compared to the more expensive systems available.

6. Platform requirements:
    a. Number of platforms that monitoring system can be accessed and associated licence fee costs: ideally this would not be limited.
    b. Type of platforms monitoring systems can be accessed on: ideally this could be accessed on computers, laptops, smart phones and tablet devices.
    c. Local connectivity versus remote connectivity: ideally would be able to access information remotely.
    d. Cloud versus site-based information storage: no preference.
    e. Ease of use: user friendliness is important, e.g. remote access via tablet is preferred.
7. Security of the platform and data historian: IT security of the system is important. Only authorised persons should have access. There should be different levels of access (e.g. ability to monitor system only versus being able to turn equipment on and off); and there should be a log of who logs into the system.
8. Alarm systems management: should be able to configure sensible alarms and send email alerts for important alarms.
9. Operating costs of system: ideally keep to a minimum with no annual licence fee for software.
10. Capital cost of system: ideally not too expensive.

After finalising criteria the Maintenance Manager discussed the requirements with the preferred WMPG refrigeration contractor Haywood Engineering Services. From this the design of the monitoring systems was created which met all requirements. The Maintenance Manager decided that this should be implemented in two stages:

- Stage 1 – roll-out temperature sensors to 35 monitoring locations
- Stage 2 – iterative roll-out control for key equipment

This way it meant that WMPG would manage the key equipment that would benefit the most from control. The Maintenance Manager received approval for Stage 1 which was implemented in September 2016. After implementation for six months the Maintenance Manager determined that the defrost cycles were not operating efficiently and needed to have associated controls. The design of this system was developed by Haywood Engineering Services and the Maintenance Manager assessed it against criteria 2, 4-5 and 8-9 above along with the ability of the system to maintain require temperatures. Once the system was designed the Maintenance Manager then discussed the business case for this component with the Chief Financial Officer (CFO) and the Chief Executive Officer (CEO).

3.6 Milestone 5 – Business case for centralised control system

As explained earlier the Maintenance Manager decided that this project should be rolled out in two stages to obtain a detailed understanding of temperature demand on the refrigerators and freezers, and then understand what the major control issues.

The Maintenance Manager discussed the business case for implementing the Centralised Monitoring System with the CEO and CFO. The key criteria the decision team were interested in were:

- Ability to maintain and improve product quality, including ability to record and log temperature to assist with product quality requirements: there is a drive to have a strong audit trial to assist with Hazard Analysis and Critical Control Points Accreditation which is critical to WMPG.
- Ability to manage temperatures more effectively and maintain refrigeration equipment: holding temperatures is critical for ensuring product quality is maintained
- Trust and confidence in the selected contractor to know the unique site Osborne Park requirements and be able to implement the system effectively: the WMPG Osborne Park site is unique and complex. Long historical relationships are important for the success of the business. The preference was to go with a trusted provider.
- Cost effectiveness of solution: an over engineered solution would not be appropriate for the length of the lease of this facility, a smart cost effective solution was required.
- Ability to reduce energy costs: being able to reduce energy bills will assist with the economics of implementing this solution

As explained earlier the key driver for this decision was associated with maintaining product quality and refrigeration temperatures and ability to record and log temperatures which resulted in approval of Stage 1.

The temperatures of Stage 1 show significant fluctuations in temperatures for the east and west freezers as seen in Figure 2 and Figure 3.

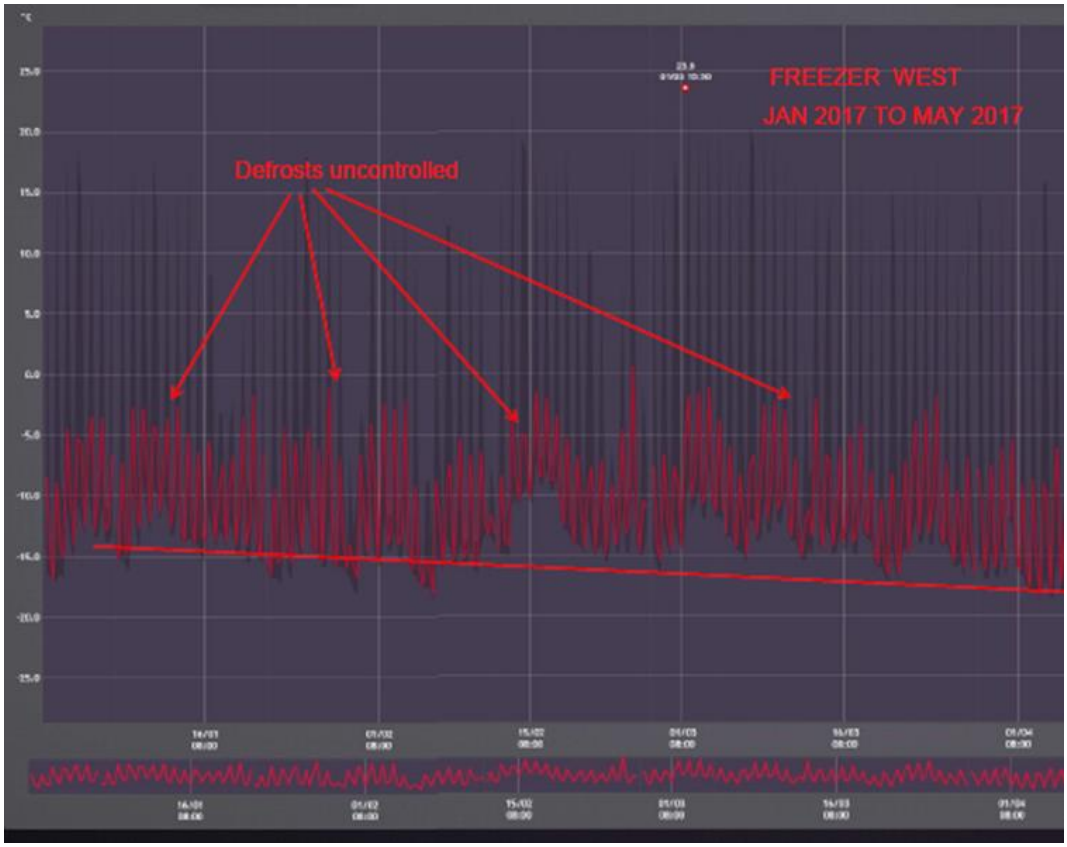


Figure 2 - Freezer West Temperature - showing uncontrolled defrosts.

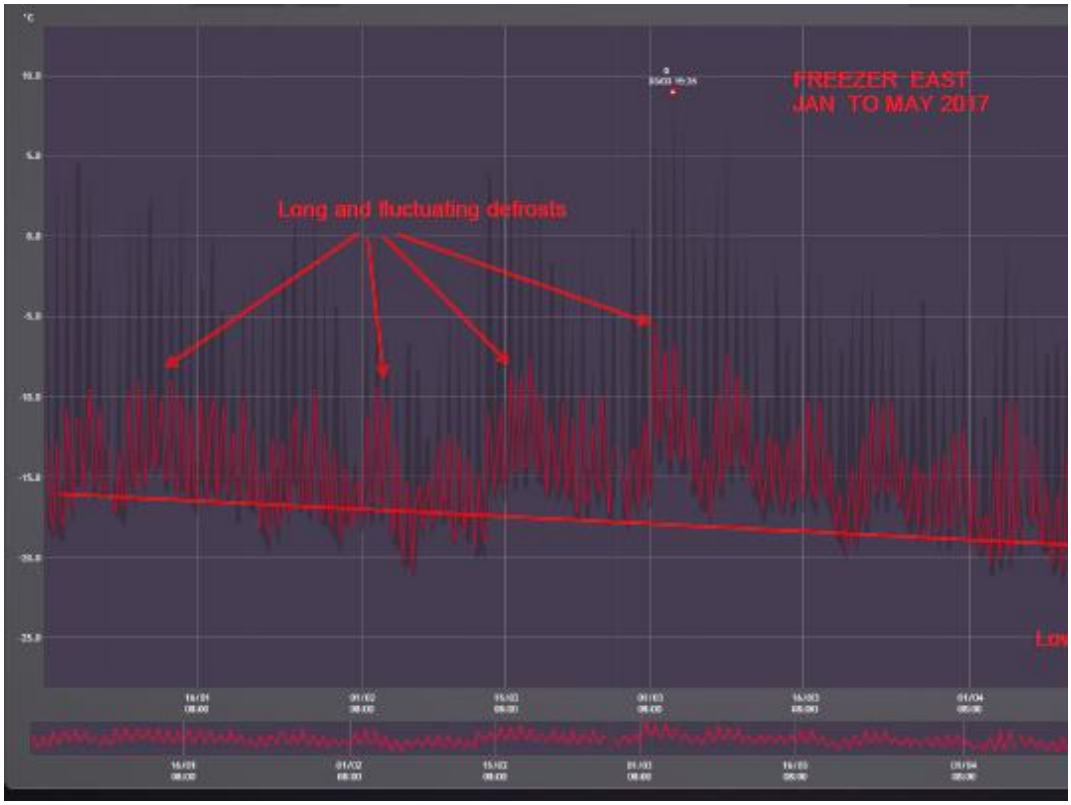


Figure 3 - Freezer East Temperatures - showing long and fluctuating defrosts.

From this information the Maintenance Manager decided that it was critical to get appropriate defrost controls. After discussing a design with the Haywood Engineering Services the Maintenance Manager decided to do an iterative rollout where controls were implemented at one section at a time; this allows for controls to be rolled out where they are most needed. The business case was discussed with the CEO and CFO.

The Maintenance Manager also identified that he would be able to access the Control System remotely which would:

- Reduce the number of times he needs to go to site outside normal working hours to troubleshoot refrigeration performance issues: currently if there are critical issues that happen the Maintenance Manager is sometimes required to go to site to troubleshoot issues.
- Reduce the number of times the ammonia refrigeration contractor needs to visit site to help keep temperature requirements: when the refrigerators/freezers are not performing properly personnel can call in refrigeration contractors to optimise the system. Each call out costs $700.

To ensure product temperatures are maintained and to reduce maintenance costs Stage 2 of the business case was approved. The defrost management system was implemented in early April 2017.

3.7 Benchmarking assessment post project roll-out

A second One2Five assessment was conducted to determine the progress achieved by the site.

4 Results

4.1 Milestone 1 – Benchmarking and energy management planning

The successes of this milestone are indicated by:

- Completion of a One2Five session with four key management staff
- Provision from Energetics of a One2Five Report (see Appendix A – One2Five report)
- Provision from Energetics of a One2Five Benchmarking report with a rating of 1 star (see Appendix A – One2Five report)
- Creation of a list of key actions for next steps to energy management (see Appendix A – One2Five report)
- Provided ownership of key actions to WMPG personnel with timelines (see Appendix A – One2Five report)
- Brainstormed actions for implementation of Employee awareness program

4.2 Milestone 2 – Install energy metering

The completion of this milestone resulted in the installation of meters onsite

4.3 Milestone 2a – Electricity procurement to assess unbundled contract

Electricity consumption was modelled based on the previous 12 month electricity usage. The total costs of the contract under bundled and unbundled contract structures were modelled based on the quotes received from retailers. The difference between the best unbundled and bundled offer was 34.5%, which represents significant savings to WMPG. WMPG selected an unbundled contract.

4.4 Milestone 3 – Activate site-wide energy program

A number of projects were screen for further investigation. This summarised in Figure 4 and Table 1 below.

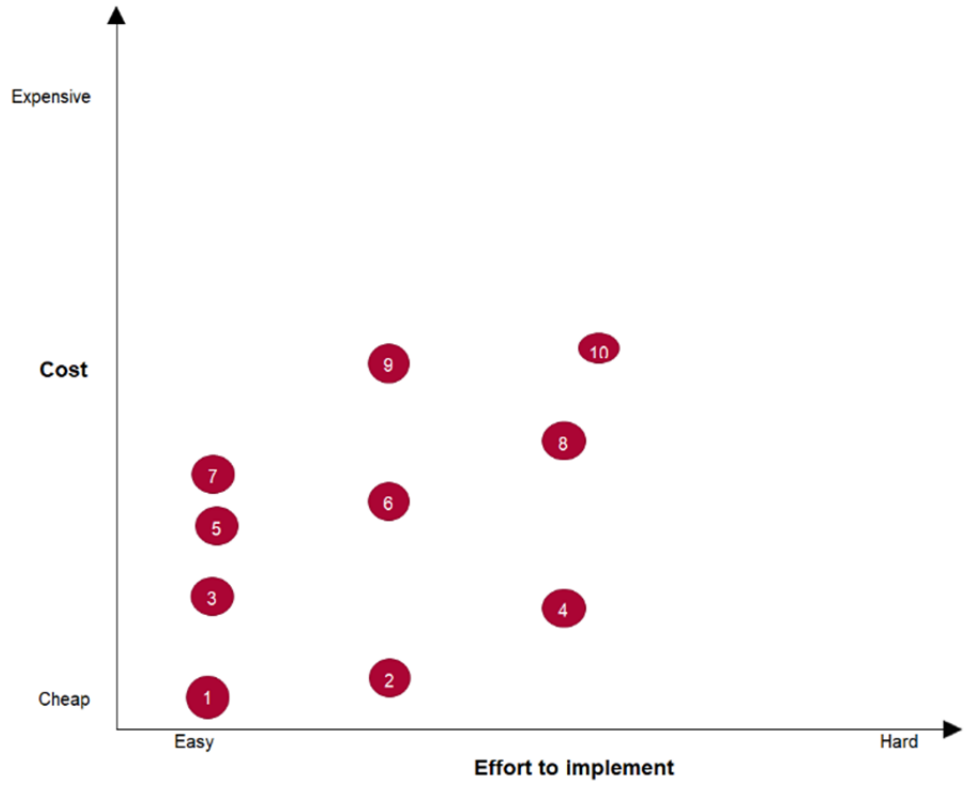


Figure 4 - Workshop ideas screening

Table 1 - Workshop ideas and status at 30 June 2017

Idea No	Project Description	Completion Target Date	Status	Comments
1	Review energy use at weekly meetings	Ongoing	-	
2	Review Air Conditioner - times and switching off at night via checklist	May/June	Complete	Cleaner will switch off after cleaning. Unit switched off during weekend on a timer.
3	Display energy data in SharePoint to make more visible	July	-	
4	Weekly energy consumption targets and rewards for staff (Brett's Team)	Aug/Sep	-	Cold store is very busy during EOFY
5	Reduce boiler hot water temperature on weekends	July	-	
6	Time clocks on compressed air	August/ October	Complete	
7	Use high pressure low flow nozzles for cleaning	May/June	On Hold	Current device is not safe
8	Install VSD on Cooling Tower Fans	July	On Hold	The Maintenance Manager looked into it more and believe it's not beneficial for the company overall.
9	Replace broken lights and high wattage lights (e.g. floodlights) with LEDs	Ongoing	-	
10	Power Factor Correction on power supply	EOY	-	

The fact that some projects have already been implemented is evidence of the interest of staff to reduce energy usage. While some projects have been put on hold, they have been investigated to determine if they are practical to implement: previously ideas may have been ruled out without proper investigation which again is evidence that site is willing to implement practical ideas.

4.5 Milestone 4 – Assess design of centralised control system and Milestone 5 – Business case for centralised control system

The successes of milestones 4 and 5 are indicated by:

- Installation of the temperature monitoring points and installation of the defrost management system.

The successful implementation of the controls can also be seen in the graphs - below. From this it can be seen that:

- The compressor power shows that the compressors are running more consistently.
- The average power for January was 14.4 kWh whereas the average daily power for end of May was 11.7 kWh; while daily ambient temperatures have played a small part in the reduction in power usage, the product temperatures have been consistently much lower.
- There has been a fall of almost 20% in power usage for the compressor with a 15% reduction in product temperature.

In addition to this the call-outs for the Maintenance Manager to go to site outside work hours has been reduced. Also the need for the ammonia refrigeration contractor to attend site has reduced, reducing unplanned maintenance fees. These were benefits were not considered at the design stage but have been gladly realised.

Figure 5 - Freezer compressor 1 and 2 temperature trends.

4.6 Benchmarking assessment post project roll-out

The second One2Five assessment showed that WMPG progressed from a one star rating to a two star rating. WMPG Osborne Park site now aligns with other Meat and Meat Product Manufacturers worldwide.

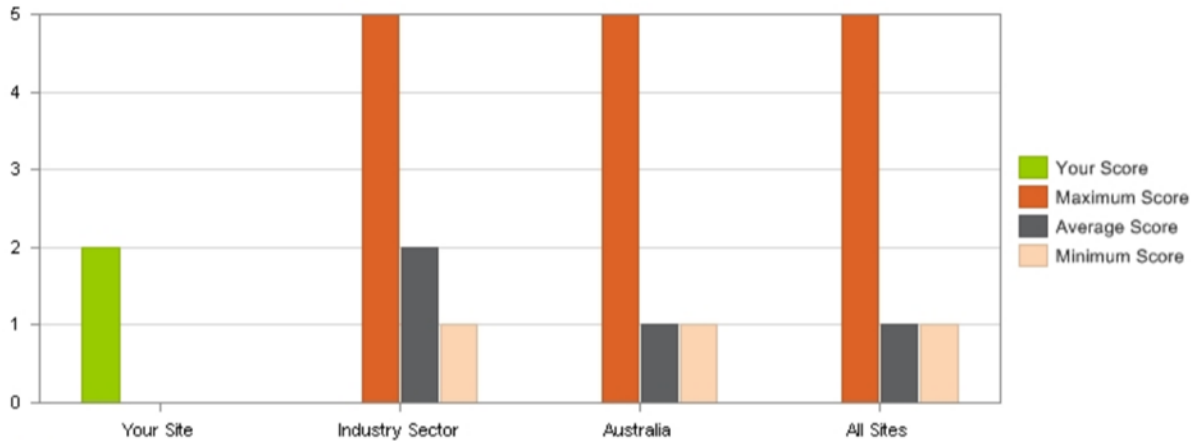


Figure 6 - WMPG energy benchmarking post project roll-out

The benchmarking report for this exercise is included in Appendix D.

5 Discussion

5.1 Milestone 1 – Benchmarking and energy management planning

5.1.1 One2Five diagnostic results

WMPG achieved a One Star rating on the One2Five star rating scale. The diagnostic process revealed the five most critical action items to focus on for progression to the next star level. These items and the recommended course of action for each are presented in section 6.1.

5.1.2 Benchmark summary

The following points summarise the benchmarking results:

- Manufacturing industry division benchmarking: WMPG's One Star rating is lower than the manufacturing industry average rating of Two Stars. Of the 1,921 sites in the manufacturing industry division, just below 450 are rated at One Star whilst approximately 1,150 are rated at Two Stars.
- Meat and meat product manufacturing benchmarking: WMPG's One Star rating is lower than the meat and meat product manufacturing average of Two Stars. Of the 183 sites in the meat manufacturing division, approximately 50 are rated at One Star whilst almost 120 are rated at Two Stars.
- Australia country benchmarking: WMPG's One Star rating is lower than the average of Two for all sites within Australia. Of the 531 sites in the Australia country category, just under 150 are rated at One Star whilst slightly over 300 are rated at Two Stars.

5.2 Milestone 2 – Install energy metering

Installing the energy metering assisted in understanding energy usage, however integration of the meters into the centralised control system resulted in increased access and visibility of the data which improved energy management across the site.

5.3 Milestone 2a – Electricity procurement to assess unbundled contract

Unbundled contracts are more complex than bundled contracts and can be difficult for internal procurement teams to understand electricity costs. Because of this complexity, bundled contracts had been selected historically. Using consultants who could model both bundled and unbundled electricity contracts is important in understanding price difference. The significant savings from unbundled contracts costs resulted in significant electricity savings. This was the biggest financial success of the whole MLA project.

5.4 Milestone 3 – Activate site-wide energy program

Overview: A Professor of Leadership at the Harvard Business School (Kotter 2011, 4) explains that the first step in business transformation is to "establish a sense of urgency". Garvin and Roberto (2011, 17) describe this step as setting the "stage for acceptance". Based on this it was difficult to create the "stage for acceptance" when there was little energy data available; and therefor energy usage was poorly understood, resulting in poor energy management. Several attempts of program activation were attempted, but it was not until the centralised control system was implemented that stakeholders saw the value in prioritising

energy management. Use of the centralised control system resulted in increased energy awareness. Timing is important to get staff buy-in on any behaviour change project or program. Fortunately due to the framework of the MLA grant funding there were multiple opportunities to activate the energy program and create momentum.

CBSM: CBSM techniques may have been successful, however the technology fixes that do not require human behaviours are more effective because it takes out the human element. For each of the suggested behaviours alternative technology fixes are being considered:

a) Refrigerator door management - closing fridge doors when appropriate: a plan is to permanently close doors
b) Hot-water wash-down – reducing hot water usage: high pressure nozzles were investigated
c) Cooling load management – changing procedures to reduce refrigeration load: a room was created in a refrigerated area to sort meat rather than this happening briefly in ambient conditions

5.5 Milestone 4 – Assess design of centralised control system

It is important to decide on the selection criteria when assessing requirements for a control system. The criteria for each meat processing facility will be unique. For WMPG the criteria considered included: which equipment should be controlled, number of temperature points, data historian, ability to perform predictive maintenance, type of software, platform requirements, security, alarm system management, operating costs and capital costs. It is noted that there are more sophisticated software options available on the market, however this typically results in increased costs.

5.6 Milestone 5 – Business case for centralised control system

Once site agrees to the selection criteria for a control system this assists in decision makers having ownership over the control system. WMPG elected to use a two stage process for the roll-out of the control system:

- Stage 1 – roll-out temperature sensors to 35 monitoring locations
- Stage 2 – iterative roll-out control for key equipment

Rolling out the first stage allowed data to be collected to identify the key areas for concern, then implementation of controls for appropriate equipment can be rolled out in the second stage. Implementation of new controls on equipment can be demonstrated and quantified, as improvements are seen this assists in the business case for integrating more equipment into the control system.

Once this system was in place the Maintenance Manager chose to check on the performance of the refrigerators and freezers despite being on annual leave: this is part because he felt that he could enjoy his break better by knowing that everything was under control. The operations manager also was ecstatic that fridge temperatures were being maintained which assisted with his job. Implementation of this milestone resulted in the greatest goodwill and buy-in from site staff.

5.7 Benchmarking assessment post project roll-out

For WMPG to progress to a three star rating the following critical actions need to take place:

- Plans: Develop a process for prompt implementation of actions that cut obvious energy wastage that meet your pay-back criteria.
- Operating procedures: Use equipment manuals and vendor information as an initial source of information on energy-efficient operating procedures.
- Efficiency of existing plant design: Review the cost penalty you are incurring by operating facilities that are below the industry average for energy efficiency.
- Procedures - plant design/retrofit, purchasing/replacement: Develop broad energy efficiency guidelines for the design of buildings and processes, and the selection of equipment.
- Reporting, feedback and control systems: Institute monthly reporting of overall energy meter readings per unit of activity (e.g. kWh per tonne). Examine results wherever they show large cost or usage variance from target or expectation.

6 Conclusions/Recommendations

6.1 Milestone 1 – Benchmarking and energy management planning

The first milestone task of the project created a path forward for the energy management plan and the management and employee engagement. The following recommendations arose from the One2Five diagnostic process:

- Metering and monitoring: Ensuring that the organisation tracks overall load profiles for electricity, natural gas, steam and other energy supplies.
- Reporting, feedback and control systems: Instituting monthly reporting of overall energy meter readings per unit of activity. Examination of results wherever they show large cost or usage variance from target or expectation.
- Understanding of performance and opportunities: Conducting a baseline energy study to establish energy use per unit of output, energy consumption by major users and opportunities for saving energy.
- Accountabilities: Selection of one person to be directly accountable for energy and greenhouse gas management on site.
- Plans: Development of a process for prompt implementation of actions that cut obvious energy wastage that meets payback criteria.

6.2 Milestone 2 – Install energy metering

- Sub-metering should be installed onsite, but is more beneficial if integrated into a centralised control system.

6.3 Milestone 2a – Electricity procurement to assess unbundled contract

- If expertise do not exist on site it is useful to get external support to assess electricity contracts.

6.4 Milestone 3 – Activate site-wide energy program

- Activation of energy programs are easier to implement once a centralised control system has been implemented and staff already see benefits of energy management.
- Buy-in from staff is important for successful energy programs.
- A successful energy program does not result in all energy project ideas being implemented – some ideas may not be implemented but this is an indication of robust processes for ensuring the most beneficial/practical projects are implemented.

6.5 Milestone 4 – Assess design of centralised control system

- Each site should decide on what key criteria is important for them in assessing design of a centralised control system.

6.6 Milestone 6 – Business case for centralised control system

- If it is difficult to prove the full business case for a centralised control system a staged process can assist in demonstrating success then incorporating more equipment that can be controlled.

6.7 Benchmarking assessment post project roll-out

There was value in conducting the One2Five Energy Benchmarking exercise post project roll-out because it helped staff understand the progress that had been achieved throughout the project. The increase in the star rating helped help staff feel a sense of accomplishment that could be celebrated.

7 Key Messages

7.1 Different behaviours/practices that producers/processors should be adopting as a result of the project

- Benchmarking energy usage against other meat producers/processors can assist in identifying the need for changing energy management practices – benchmarking should happen at regular intervals to track progress and celebrate wins, or alternatively focus efforts if energy awareness is stagnating
- Ensuring sub-metering is installed to understand electricity usage, though it is better to incorporate this into a centralised control system
- Recognising that sometimes external assistance in electricity procurement can result in significant electricity cost savings
- Implementing a centralised control system to assist with maintaining fridge/freezer temperatures and reduce energy and maintenance costs
- Implementing an energy awareness program is better to be rolled out after a centralised control system is implemented

7.2 Likely economic, social and/or sustainability benefits to producers/processors from such changes

- Reduced energy costs
- Reduced greenhouse gas emissions
- Reduced maintenance costs (e.g. refrigeration contractor call outs)
- Increased productivity
- Increased engagement from staff
- Improved workplace comfort

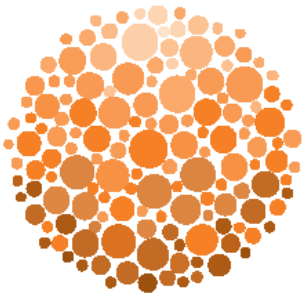
8 Bibliography

Garvin, David Michael Roberto. 2011. “Change Through Persuasion.” In HBR’s 10 Must Reads On Change Management, 17 – 35. USA: Harvard Business School Publishing Corporation

Kotter, John. 2011. “Leading Change: Why Transformations Fail.” In HBR’s 10 Must Reads On Change Management, 1 – 16. USA: Harvard Business School Publishing Corporation

9 Appendix A – One2Five report

Attached is the 23 page report including diagnostic results, recommended actions and benchmarking reports by industry sector and nationally.



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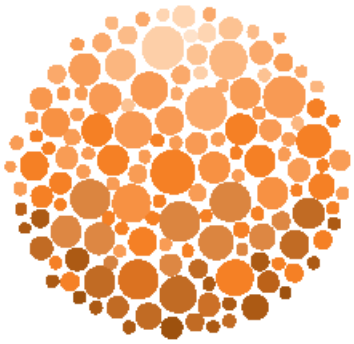
10 Appendix B – Second One2Five benchmarking report



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