

Energy Efficiency Checklist

Meat Processing

Cost saving measures, productivity enhancements and optimisation opportunities

The Energy Efficiency Checklist is a practical guide to help maintenance teams within the meat processing sector establish energy efficient opportunities. It has been developed as part of the Sector Decarbonisation Programme, which is a joint initiative between the Energy Efficiency & Conservation Authority (EECA) and Meat Industry Association of New Zealand (MIA).

This checklist sets out both low-no cost* and medium-cost** energy efficient opportunities to assist with decarbonising your processing facility. There are five sections within the checklist focusing on:

1. Measuring Energy
2. Staff Engagement
3. Energy Maintenance
4. Process Changes
5. Equipment & Plant upgrades

Before you start this guide, you can set the foundations and start with purpose by:

1. Putting in place a climate action plan with regular feedback from stakeholders and staff around how to improve your performance
2. Assign energy management responsibilities to staff
3. Maintain an updated action list of energy efficient opportunities
4. Meet regularly and report on actions – provide the opportunity for staff feedback

Checklist for Meat Processing

TASK & DETAIL	COMPLETE?
MEASURE ENERGY USAGE	
Monitor energy consumption (electricity, diesel, petrol) as well as water usage regularly to identify any unexpected increases.	
Use the 'Energy and Water Benchmarking Tool' to measure and keep track of emissions.	
Compare monthly energy consumption data to the same month a year prior and on a rolling 12-month basis to identify trends (i.e., increasing/decreasing energy consumption).	
STAFF ENGAGEMENT	
<p>Educate staff about the importance of being as energy efficient as possible, managing hot water use and turning off equipment when not in use.</p> <ul style="list-style-type: none"> Run an introductory session to update staff about why it's important to save energy. You can also integrate information about your energy programme into your sites induction training. Create a mechanism for contractors and staff to share their suggestions with you. Make sure you respond to comments and act on recommendations when feasible. You may even offer a reward for the best energy-saving ideas. 	
ENERGY MANAGEMENT & MAINTENANCE	
Choose the best power tariff that best suits the electricity load profiles in the plant. Similarly, reduce peak electricity loads by rescheduling processes so that they do not coincide with peak times.	
Turn off lights, heaters, conveyors, and other electrical equipment when not in use. Put time switches on lighting and heating.	
Ensure good door discipline in cold rooms. Keep doors on cold stores, chillers, and freezers shut when not in use for loading.	
Implement appropriate scheduling to regularly perform basic energy maintenance by a qualified technician.	
Check insulation is in good condition on refrigerated process lines, pipes, and equipment.	
Review and inspect the condition of seals on cooler doors.	
Check for leaking utilities (hot water/refrigerant/air).	
Check lights are clean and free from dust.	
Minimise air flow into cool rooms by maintaining seals around cool room doors and installing rapid roller doors or air locks with inter-locked doors.	
Maintain and service motors used for refrigerators, air conditioners, pumps and conveyors to save energy and reduce wear and tear.	
Reduce heat losses. Lag all hot pipes. Avoid long pipe runs.	
Shed peak heat loads. Operate the minimum number of boilers needed and reschedule heat loads so that the capacity of those boilers is not exceeded.	
PROCESS CHANGE	
Optimise material flows through the factory. Linear processes may reduce production time, energy and cost.	
Position heat exchangers for refrigeration systems correctly to maximise efficiency and away from heat sources where cool fresh air is available.	
Size boilers and heaters according to their use. (A correctly sized boiler may operate at 85+% efficiency compared with 60-70%. A second-hand boiler may cost more than a new one due to inefficient operation).	

Equipment & Plant Upgrades

TASK & DETAIL	COMPLETE?
Allocate budget for preventative maintenance to save energy and prevent disruptions from breakdowns and unscheduled maintenance.	
Recover waste heat from processes which use large amounts of heat such as: <ul style="list-style-type: none"> • Rendering processes • Main Refrigeration Plan • Hot Water Skid • Abattoir wastewater if possible 	
ASSET REGISTER	
Develop asset register capturing key details, such as: <ul style="list-style-type: none"> • Make • Model • Type of unit (i.e., screw or reciprocating) • Age/ year of install • Power rating • Efficiency • Operating temperatures 	
Implement asset replacement strategy focusing on more energy efficient replacements.	
PUMPING	
Review pump load management & ensure the most efficient pumps are scheduled to give the load.	
REFRIGERATION	
Select appropriate refrigeration evaporating temperatures and maintain the condensing pressure at the lowest achievable level.	
Modulate freezer fan speeds by setting to the minimum speed required to achieve the freezing specifications.	
Install a second refrigerant storage tank to increase buffer capacity.	
Review fan design in condensers and consider if centrifugal fans could be replaced by axial fans which can be more efficient.	
Install automatic purge to remove contaminant in refrigerant line.	
Install variable speed drives on refrigerator, refrigerator compressors and fans.	
Install automated compressor staging and capacity control.	
COMPRESSED AIR	
Review minimum required air pressure set point for production & reduce compressor set point.	
Identify and repair leaks in compressed air systems.	
Ensure intercoolers are clean & maintained.	
Review inlet air intake & ensure air is drawn from the coolest possible location.	
If multiple compressors are present, review compressor schedule to optimise for load profile.	
Install a variable speed drive on compressors.	

