



# Meat Industry Strategic Plan (MISP) and Meat Processing

Report on AMPC RD&E  
Outcomes and Investment for  
MISP from 2011-2013

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AUSTRALIAN MEAT PROCESSOR CORPORATION



**AMPC**



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# The purpose of this report



## **Introduction**

This report provides an evaluation of AMPC's Research, Development, Extension (RD&E) and Marketing activities that underpin the Red Meat Industry Strategic Plan (MISP).

During 2013, AMPC undertook to develop its new red meat processing Strategic RD&E and Marketing Plan in accordance with the requirements of AMPC's partnership with the Australian Government. This report is one of the evaluation activities undertaken to underpin AMPC's strategic planning process. This report aligns with the recent initiative of the Red Meat Advisory Council (RMAC), the custodian of the MISP, to evaluate and review the performance of red meat industry service Companies (Rural Research and Development Corporations) and advisory councils against the MISP strategic imperatives.

This report provides a summary of AMPC's contribution to the MISP strategic imperatives, and where possible, provides information about the alignment of MISP to AMPC's Strategic Plan and the delivery of RD&E and Marketing activities on behalf of the processing sector.

The AMPC Strategic RD&E and Marketing Plan is available at [www.ampc.com.au](http://www.ampc.com.au). The Plan takes account of the current Meat Industry Strategic Plan (MISP) imperatives.

## **The Red Meat Industry Strategic Plan (MISP)**

As the overarching strategy for Australia's red meat and livestock industry, MISP provides the strategic framework for activities across the production, lot-feeding, processing and live export sectors of the beef, sheepmeat and goat-meat industries. Unlike the strategies of individual organisations or sectors, MISP defines those objectives with whole-of-industry significance and impact.

The current plan (MISP3) commenced in June 2010 as the key strategic framework for the cross-sector and whole-of-industry aspirations of the industry's peak (policy) councils and levy-funded Service Companies. In summary, the MISP sets out strategic imperatives for the industry with which each Peak Industry Council, GICA, MLA, AMPC and LiveCorp are in broad agreement.

## **About the Australian Meat Processor Corporation**

The Australian Meat Processor Corporation (AMPC) is the national Research & Development Corporation that invests in research, development, extension and marketing on behalf of the red meat processors in Australia. In 2013, AMPC has 126 members operating 157 establishments. This represents over 97% of Australia's cattle, sheep and goat meat processing capacity. We are governed by a Board of Directors, and our national operations are directed from our professional team located in Sydney. AMPC's mandate

is to support Research, Development and Extension (RD&E) and Marketing initiatives towards improving the profitability, sustainability and efficiency of the meat processing sector.

AMPC's vision is for a sustainable, profitable and competitive red meat processing sector that meets national and international customer, consumer and community expectations. Red meat processor levies are strategically invested in RD&E and Marketing programs aimed at delivering improvements to processing businesses and that also will provide significant benefit to the whole of the red meat industry and the broader Australian community.

### Our objectives

AMPC's objective is to maximise the efficiency, viability and sustainability of the red meat processing sector by supporting the development of sound, scientific solutions that will:

- Improve the long term efficiency and competitiveness of the industry;
- Enhance the sustainability of the industry;
- Assist to protect, secure and maintain market access;
- Enhance capability and;
- Enhance overall productivity and performance of the meat processing sector.

AMPC supports projects in a wide range of areas including meat science, automation and technology development, food safety, capability building, extension, education, practice change, environmental sustainability, climate change, animal health, biosecurity and animal welfare, traceability and market access.

Over the next five years, the AMPC will potentially make new investments of \$60 million in research, development and extension (RD&E) and \$33 million in marketing to support a competitive Australian meat processing sector and contribute to the productivity of the broader red meat supply chain.

AMPC participates in joint and core RD&E initiatives through a collaborative Rural Research and Development Corporations (RDC) partnership with the producer body RDC, Meat and Livestock Australia Ltd (MLA), to ensure that activities are delivered for both the processing sector and the wider red meat supply chain. MLA, AMPC and all of the RDCs representing industry sectors are accountable to both industry and government for their expenditure. The RDCs invest in R&E and Marketing to improve the productivity and delivery of high quality products in order to underpin the competitiveness and profitability of Australia's agricultural, fish and forestry industries. This government-industry partnership model has been operating successfully for over 20 years and now provides more than \$470 million in annual R&D expenditure.

### AMPC Corporate Governance

As a Corporation responsible for the investment of statutory levies provided by processors, AMPC must meet and demonstrate corporate planning and reporting processes and requirements. AMPC was declared by the Minister to be the Meat Processor Marketing and Research body under Section 60 (3AA) and 60 (3AB) of the Australian Meat and Livestock Industry Act 1997 (Cth) (Act) in 2007 and entered into a *Deed of Agreement* with the Commonwealth specifying the timing, manner and conditions relation to the payment of Levy funds to those Bodies.

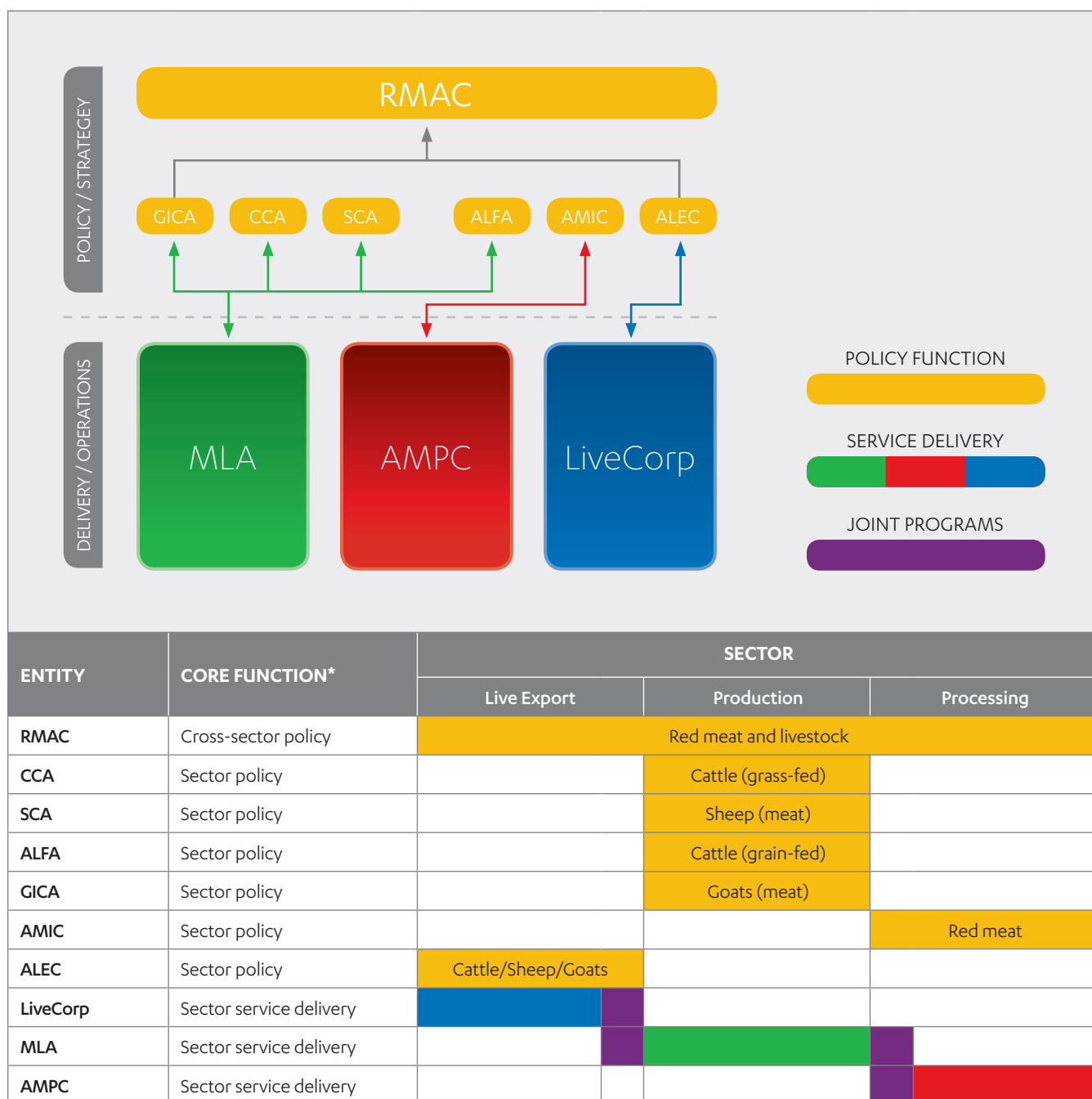
The *Deed of Agreement* (Statutory Funding Agreement) between the Commonwealth and AMPC in relation to certain arrangements under the Act describes the requirements for RD&E delivery and reporting responsibilities. As part of these requirements, AMPC's corporate planning and reporting approach includes:

- a Strategic Plan that sets out the Company's high-level goals, strategies and performance measures for a five-year period, developed in consultation with stakeholders and approved by the Minister.
- an Annual Operational Plan (AOP) that outlines the annual budget, resources and research priorities that give effect to the Strategic Plan during a given financial year. The AOP provides AMPC the opportunity, in consultation with the AMPC Board, Meat and Livestock Australia, Australian Meat Industry Council (AMIC) and Government, to respond to external drivers and changing priorities during the life of the Strategic Plan by providing revised emphasis on research themes
- a Portfolio Budget Statement – as part of the Australian Government budget process – that summarises the planned outputs, outcomes, performance information and financial statements for a given financial year, and
- an Annual Report that provides information on RD&E activities and their performance in relation to the goals set in the Annual Operational Plan and Portfolio Budget Statement for a given financial year.

### The Red Meat Advisory Council (RMAC)

At its highest level, the industry is underpinned by an operating framework in the form of the Red Meat Industry Memorandum of Understanding (MoU) and a strategic framework in the form of the Meat Industry Strategic Plan (MISP). The Red Meat Advisory Council (RMAC) has the overarching custodianship of MISP and is responsible for promoting, monitoring and guiding the progressive development of MISP and assessing its implementation. RMAC was formed in 1998 as a single red meat and livestock industry

(production, processing, exporting) touch-point for the Federal Government when dealing with cross-sector matters. RMAC's Members are the five red meat Peak Industry Councils (CCA, SCA, ALFA, ALEC and AMIC). GICA also maintains a link as an Associate Member. The industry is served by three levy-funded service companies responsible for program delivery (MLA, AMPC and LiveCorp). An outline of the industry structure and organisational relationships is depicted in Figure 1 below.



\* Primary function with respect to the Memorandum of Understanding and Meat Industry Strategic Plan

Figure 1 Red meat and livestock industry structure and organisational relationships, roles and responsibilities.



Within, and in supporting these frameworks, RMAC has four principle functions:

- To provide advice to the Minister on cross-sector or whole-of-industry matters;
- To act as custodian of MISP and the MoU, including overseeing the effective operation and currency of both frameworks;
- To ensure responsible management of a parcel of industry investments, known collectively as 'The Fund', in a manner consistent with an established industry/Government agreement (the 'RMAC Scheme Rules'); and,
- To provide a forum for the five Peak Industry Councils to address cross-sector or whole-of-industry issues.

Recently, RMAC undertook to review the performance of industry against the MISP Strategic Imperatives. RMAC, as custodian of MISP, sought information on how to better identify, deliver, evaluate and report on industry priorities in the future. The objectives of the Mid-Term Evaluation of MISP were to garner an independent, objective assessment of the industry's progress, to revisit and refine industry priorities and to review industry structure and capability as they relate to industry performance. AMPC participated in this independent review.

This report of the AMPC performance against the MISP is one of several activities AMPC undertook as part of its strategic planning processes to develop its Strategic RD&E and Marketing Plan. Other reports developed for this process included:

- The AMPC Demographic Snapshot of the Red Meat Industry, SG Heilbron Economic & Policy Consulting, July 2012.
- Developing the new AMPC Five-year Research and Development Plan 2012–17, survey of priorities. Australian Meat processor Corporation [insert address and website]
- Evaluation Report for Technology and Process Efficiency and Automation, Program 3.2, ACIL Tasman consulting, 2012, Australian Meat Processor Corporation and Meat and Livestock Australia.
- The AMPC Environmental and Future Scan to 2030: Mega-Trends for the Red Meat Processing Industry, Mc Kinna et al.



## Mapping AMPC RD&E and Marketing Programs to MISP Themes

MISP STRATEGY	MISP FOCUS AREAS	AMPC RD&E AND MARKETING PROGRAMS OUTCOMES	AMPC KEY FOCUS AREAS
<b>ENVIRONMENT AND ETHICS IMPERATIVES</b>	ENVIRONMENT AND WELFARE STANDARDS ENGAGE WITH CONSUMERS CLIMATE CHANGE POLICY ACHIEVING SHIFTS IN PRACTICE ESTABLISH BASELINE AND ONGOING DATA	<b>Sustainable and responsible processing practices that meet community expectations</b>	Sustaining the natural resource base and managing climate change impacts  Promoting industry value through improvement in livestock management and supply chain integration
<b>MARKET ACCESS</b>	PARTNERSHIP WITH GOVERNMENT TRADE REFORMS TRADE ADVOCACY ISSUES MANAGEMENT CERTIFICATION SYSTEMS	<b>Markets are efficient, accessible and attractive for investment</b>	Support industry and Government to maintain and liberalise world meat markets  Demonstrating product integrity
<b>OUR INDUSTRY</b>	ONE VOICE RED MEAT ADVISORY COUNCIL PEAK INDUSTRY COUNCILS SERVICE COMPANIES	<b>Continual Business Improvement</b>	Stakeholder consultation and engagement  Corporate Services
<b>OUR PEOPLE</b>	INDUSTRY EMPLOYMENT MANAGE RETENTION LEARNING AND EDUCATION LABOUR PROGRAMS ASPIRATIONS	<b>Influencing industry and community practice change through effective extension, education and capability building</b>	Undertaking and delivering R&D through industry education and extension  Building industry and stakeholder capability and advancing business innovation
<b>INNOVATION</b>	CAPACITY TO INNOVATE PRODUCTION EFFICIENCIES INNOVATIVE PRODUCTS SPEED AND ADOPTION INNOVATIVE COMMUNICATION	<b>Increasing productivity and net value</b>	Developing technologies, systems and processes to improve productivity and processing efficiency  New and innovative products  Building industry and stakeholder capability and advancing business innovation
<b>MARKETING AND PROMOTION</b>	POSITIVE ATTRIBUTES PRODUCT VERSATILITY BRANDED PRODUCTS MARKET DIVERSIFICATION MARKETING TECHNIQUES	<b>Driving demand</b>	Promote and enhance the eating quality and nutritional attributes of red meat  Growing demand for red meat products in the Australian community
<b>ECONOMICS AND INFRASTRUCTURE</b>	TRANSPORT INFRASTRUCTURE QUARANTINE AND BIOSECURITY COMMUNICATIONS INFRASTRUCTURE INPUTS TO PRODUCTION	<b>Sustainable and responsible processing practices that meet community expectations</b>	Promoting industry value through improvement in livestock management and supply chain integration  Stakeholder consultation and engagement



# MISP Theme 1: Environment and Ethics

## OUTCOME

Australia's red-meat and livestock industry – guaranteeing vital food for the nation and the world.



### MISP Focus Areas

#### ENVIRONMENT AND WELFARE STANDARDS

Develop, implement and verify a set of robust, credible standards for environmental stewardship, animal welfare and ethical behaviour acceptable to the community.

#### ENGAGE WITH CONSUMERS

Engage with customers and consumers to engender community trust that our industry is an ethical and responsible custodian of livestock, land and resources.

#### CLIMATE CHANGE POLICY

Achieve industry agreement on a total supply chain response to climate change.

#### ACHIEVING SHIFTS IN PRACTICE

Establish an effective whole-of-industry process for consultation, education and awareness of the requirement for and benefits of change relating to the environment and animal welfare.

#### ESTABLISH BASELINE AND ONGOING DATA

Establish baseline and ongoing data to measure and monitor the impact of our industry on environmental sustainability and ethical custodianship of animals and resources.

## Summary of AMPC key focus areas under MISP theme 1: Environment and Ethics

The red meat processing industry is committed to maintaining high standards and highest levels of animal health, traceability, animal welfare and to protecting industry from the risk of biosecurity incursions. These activities are important, not only to maintaining market access, but in order to address the expectations of customers, trading partners and the community. Activities under this program relate primarily to livestock management practices, including the continual review of animal welfare and livestock handling practices, establishing extension tools for livestock transport practice, developing biosecurity standards for industry and measuring and monitoring community attitudes. Other activities will include emergency management training, enhancing disease surveillance tools and improving traceability systems.

AMPC developed the Red Meat Processing Climate Change Strategy which focused on key activities towards understanding the effects of climate change on the red meat processing sector and developing measures to reduce the industry's contribution to greenhouse emissions.

Activities in the broader environmental and sustainability area also included benchmarking resource utilisation, developing tools, processes and technologies to improve resource use efficiency and manage waste and establishing alternatives to current waste management including recycling, value adding from waste products and producing and utilising waste products for alternative purposes.

## AMPC ACTIVITIES UNDERPINNING MISP STRATEGIC IMPERATIVE 1: ENVIRONMENT AND ETHICS IMPERATIVES

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
Environment and welfare standards	Sustainable and responsible processing practices that meet community expectations	Sustaining the natural resource base and managing climate change impacts	<ul style="list-style-type: none"> <li>• Examine processes for wastewater treatment and nutrient recovery for recycling and more efficient nutrient management and retention systems;</li> <li>• Examine efficient waste systems and investigate practical options for wide adoption of waste management practices.</li> <li>• Investigate and implement waste to energy and nutrient recovery technologies and practices that minimise impacts and maximise value add opportunities of solid and liquid waste streams;</li> <li>• Development of tools for determining suitable technological approaches for future integrated wastewater treatment systems and processes;</li> <li>• Continuation of the experimental approach to developing optimal design and operational parameters for covered anaerobic lagoon and engineered organic waste digestion technologies;</li> <li>• Minimising inorganic solid waste in the meat processing industry.</li> <li>• Investigation into environmental R&amp;D gaps and needs for future investment on behalf of the meat processing industry;</li> <li>• Development of a wastewater information resource and extension program for the meat processing industry.</li> <li>• Development of energy and water efficiency initiatives whilst maintaining food safety standards;</li> <li>• Participation in the Australian Centre of Excellence for Water Recycling program to examine options for water efficiency and re-use.</li> <li>• Addressing customer and regulatory requirements with evidence-based science that will facilitate informed policy decisions.</li> </ul>	794,800.00
		Promoting industry value through improvement in livestock management and supply chain integration	<ul style="list-style-type: none"> <li>• Examine behavioural and physiological responses of livestock to interventions;</li> <li>• Literature examination of stunning parameters and livestock handling;</li> <li>• Improving animal health, welfare and biosecurity through best practice.</li> <li>• Investigate gaps in knowledge relating to biosecurity, traceability and animal health and welfare practices;</li> <li>• Develop livestock management related training and extension programs that integrate best practices;</li> <li>• Enhancing surveillance programs through collaborative projects / supply chain practices.</li> <li>• Invest in development of best practice standards to address key endemic and exotic disease, biosecurity and traceability risks;</li> <li>• Investigate supply chain integration, yield measures and other traceability and feedback systems that enhance processor efficiency and profitability;</li> <li>• Continue disease surveillance and monitoring programs to support industry and Government biosecurity;</li> </ul>	27,000.00

## AMPC ACTIVITIES UNDERPINNING MISP STRATEGIC IMPERATIVE 1: ENVIRONMENT AND ETHICS IMPERATIVES

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
Engage with consumers	Driving demand	<p>*Nb. The 2013-2014 AMPC program now “delivering to customers and consumers”</p> <p>Promote and enhance the eating quality and nutritional attributes of red meat</p> <p>Growing demand for red meat products in the Australian community</p>	<ul style="list-style-type: none"> <li>Utilise the feedback from customers and the marketplace towards the development of future RD&amp;E initiatives and projects.</li> <li>Investigating, understanding, monitoring and managing customer and change to the red meat industry and supply chain.</li> <li>Deliver and report on a collaborative project to identify, measure and monitor community expectations and attitudes;</li> <li>Develop information material that communicates red meat processing practices in relation to livestock management to the general community.</li> <li>Produce an extension tool for biosecurity and residues for meat processing.</li> </ul>	138,918.18
Climate change policy	Sustainable and responsible processing practices that meet community expectations	Sustaining the natural resource base and managing climate change impacts	<ul style="list-style-type: none"> <li>Improving industry knowledge and capability to achieve sustainable resource management and adapt to climate change</li> <li>Investigation into R&amp;D gaps and needs for future investment on behalf of the meat processing industry;</li> </ul>	446,773.89
Establish baseline and ongoing data	<p>Influencing industry and community practice change through effective extension, education and capability building</p> <p>Continual business improvement</p>	Promoting industry value through improvement in livestock management and supply chain	<ul style="list-style-type: none"> <li>Promote adoption of new processor animal welfare standard and measure implementation;</li> <li>Establish publications on new regulation for purposes of extension to processors and the supply chain;</li> <li>Environmental performance review and benchmarking;</li> <li>Determination of R&amp;D priorities relating to climate change and environmental sustainability;</li> <li>Determination of best practice environmental performance monitoring and reporting.</li> </ul>	566,490.86

## Highlights and outcomes from AMPC research, development, marketing and extension activities

### Environmental performance review

Recent activity across a range of projects has focussed on developing tools to measure, benchmark and report on resource management and the overall environmental performance of the meat processing sector. A study aimed at compiling this information into a national performance review has since commenced to capture data that demonstrates changes in water and energy use, waste management and overall efforts towards reducing emissions. The study will develop targets for water, energy and greenhouse gas use and it is intended that the data be combined with a similar study underway with MLA in feedlots and production, such that whole of supply chain information and measurement can be quantified. The study will also account for energy, water, waste and greenhouse gas data relating to components of the processing establishment, as well as specific product outputs such as hides, offal and whole, part and primal

cuts and carcasses. A baseline will be established in order to measure change over time and comparisons will be made against previous data collected as well as performance data for other primary industry sectors. Site visits will enable direct measures to be taken as well as an industry-wide survey to validate data capture and compare with the results of previous studies and NGERS outputs.

### Economic and technical potential for cogeneration

This work investigated and quantified the economic and technical potential for cogeneration in red meat processing. Cogeneration is the combined production of electricity and thermal energy (heating and/or cooling) from the one fuel source. Thermal energy can be produced as hot water, steam or cold water via absorption refrigeration. Cogeneration is ideally suited to the red meat industry as it uses heat and electricity at the same time and requires



only low pressure steam (800- 1200 kPa) for rendering. This can be provided by a gas engine or gas turbine cogeneration system. A cogeneration plant can be designed to meet site requirements in terms of electricity and heating/cooling, but can also be designed to provide backup power in the event of electricity supply grid failure. Cogeneration plants are most economic when the electricity and heating/cooling is required at the same time and when this occurs during peak electricity tariff periods. The primary benefit of cogeneration is reduced energy supply costs, but it also substantially reduces the total site greenhouse emissions from energy use by 40-70%. The benefits of adopting cogeneration are:

- Reduced on-site energy costs;
- Increased reliability and quality of electricity supply;
- Reduced greenhouse gas emissions;
- Reduced sensitivity to future electricity price rises;
- Promotes liberalisation and competition in energy supply market;
- Opportunity to use renewable fuels, such as biomass and biogas.

Cogeneration utilising renewable fuels has significantly lower emissions intensity than grid supplied electricity. This can include biomass using a boiler and steam engine or turbine system or biogas from ponds in a gas engine or turbine system.

### **Domestic Processors Energy Efficiency Program**

A significant proportion of small-to-medium sized processors have limited capability, capacity and resources to proactively manage energy cost and consumption. In recognition of these needs, AMPC has developed the Domestic Processors Energy

Efficiency Program. The program comprises two phases; phase one has involved collecting and analysing real energy consumption data from eight meat processing facilities, developing a range of energy use benchmarks based on processing lines or site specific operating parameters, and providing a series of common energy efficiency initiatives which meat processing facilities could implement along with expected estimated energy savings. Phase two of the project will involve demonstration of the most innovative and replicable energy efficiency initiatives within a small number of plants. It is envisaged that this project will be replicated in other states, commencing with the Queensland Country Meat Processors Association members. Phase two of the program commenced in early 2013.

### **Energy and nutrient analysis of individual waste streams**

This project intended to identify key contributors to waste stream loads and resources, including thermal, energetic, and chemical. This is partly driven by two factors; firstly, the introduction of the Carbon Pricing Mechanism which puts a price on greenhouse gas emissions from waste water treatment systems at permit liable facilities; and secondly, a lack of knowledge in the area of energy and nutrient analysis area required to guide informed decisions into building wastewater infrastructure. Project activities included a literature review, three site visits, and detailed chemical, biochemical and statistical analysis. Five major sources of wastewater were identified during the site visits including cattle yards, slaughter floor, paunch handling areas, boning room and rendering operations. Paunch waste water and rendering stick water were concentrated streams with high volumetric loads and were therefore the most significant sources of chemical oxygen demand (COD) and total solids.



This project revealed that wastewater strength has increased to around 10,000mg COD L<sup>-1</sup> and subsequently total organic loads were estimated at 2-4 times greater than expected. Current scope 1 greenhouse gas emissions from waste water at two processing sites were also high in comparison to the default value of 0.35 t CO<sub>2</sub> t<sup>-1</sup> HSCW under NGERs. However, at one of the sites, where separation units are used to recover oil and grease for recycle to rendering, the estimated scope 1 greenhouse gas emissions was lower than the default NGERs value. Anaerobic biodegradability and methane potential of all wastewater samples tested was high, with very low indications of inhibition or toxicity, suggesting a very good potential for anaerobic digestion, energy recovery, and greenhouse gas emissions reduction.

### **High rate aerobic treatment combined with anaerobic digestion and annamox**

The outcome of this project will be the evaluation of a novel, innovative technology to maximise the chemical oxygen demand (COD) and nutrient removal performance while minimising the energy demand for the treatment of meat processing waste water. While this project will focus on the development and demonstration of the process at the laboratory scale, it will identify major design and performance parameters that will be essential for the evaluation of the possible suitability and economics of the process once implemented at full-scale. Therefore, this project will have as a key output the design, operating and performance parameters for this innovative technology that could provide an economic alternative to current treatment options in situations where nutrient removal is important and/or space availability is limited and hence anaerobic lagoons plus sequencing batch reactors (SBRs) are not an ideal option. A high-rate aerobic process has been evaluated by varying the sludge retention time (SRT) between 2-4 days and hydraulic retention time (HRT) between 0.5-1 day in an SBR. This process is most effective under operating conditions of 0.5 day HRT and 2-3 days SRT, with >80% of carbon and phosphorus removal and >50% nitrogen removal. Anaerobic degradability of waste activated sludge generated from the high rate process has been determined using batch tests and model analysis. Results showed the sludge can be successfully digested (>70% degradability) to release the carbon in the form of methane through either mesophilic (37°C) or thermophilic (>55°C) processes. Assessment of dewaterability of the digested sludge showed that the free water content was generally <10%, indicating solar drying could be a suitable dewatering method in practice.

This project forms part of the three year collaboration with the Advanced Waste Water Management Centre at the University of Queensland. The focus of the next stage of the project is to link up the two separate evaluated processes (high-rate aerobic treatment and anaerobic sludge digestion) together with a newly established Anammox-type process (for N removal in the sludge dewatering liquor) as one system under continuous conditions to form a treatment train for red meat processing effluent. This project is continuing and further updates can be sought from AMPC.

### **Integrated agri-industrial wastewater treatment and nutrient recovery**

Covered anaerobic lagoons (CALs) and uncovered anaerobic lagoons (ALs) are widely used for treatment of wastewater from Australian abattoirs. However these systems, ALs in particular,

result in a greater release of methane into the atmosphere from the anaerobic degradation of organic matter in ALs, have a greater whole of life cost, and poorer nutrient and energy capture efficiency compared to engineered high-rate anaerobic systems. High-rate anaerobic systems offer a smaller footprint and almost complete elimination of odour, providing key advantages to urban or peri-urban processors. One of the lead emerging contenders for high-rate anaerobic treatment of abattoir wastewater is anaerobic membrane bioreactors (AMBRs). These offer advantages of effluent quality, with renewable energy production, and the potential to manipulate operational conditions for optimal nutrient recovery. However, there is very little information on design or selection of processes for AMBR design or operation on abattoir wastewater, and in particular the role of fats on membrane fouling is unknown, particularly under operational conditions. There is also a very high process risk due to a lack of industrial references. This project will address these limitations in a staged approach, with initial analysis and laboratory scale assessment (200L on mixed natural wastewater) in the first year, followed by pilot implementation (including nutrient removal/recovery) in years two and three.

### **Anaerobic lagoons; review of design & operational aspects for red meat industry applications**

Covered anaerobic lagoons (CALs) are popular in the red meat industry overseas and also in a number of Australian industries, where land is available. While uncovered anaerobic lagoons (ALs) are common, the covering of these lagoons provides the opportunity to collect gas, control odours, reduce greenhouse gas emissions, and optimise energy recovery.

However the red meat industry remains somewhat apprehensive about covering ALs, citing issues such as; accumulation of greases under the cover and impact on treatment and maintenance if not removed prior; access to ponds and ability to desludge, and safe use or release of the generated biogas. There is a significant technical knowledge gap in design, operation and maintenance of CALs and therefore the aim of this project is to generate useful, industry specific data on the rationale behind alternative CAL technologies and what makes them viable. Appropriate design criteria, cover types, and how to operate and maintain CAL's are to be included in the guidelines. The project involved collection of information from a large number of journals and research projects from both Australian and international sources on application and performance of ALs and CALs. The project outputs include preparation of guidelines for application of CALs for the red meat industry, citing issues, and design/operational practices. Costs of CALs are site specific, however the average simple payback period is typically over 7 years. Although it should be noted that access to government grants, such as the Clean Technology Investment Program, or other project finance initiatives can reduce this to an acceptable level.

### **Biogas Safety Guideline & Manual**

The introduction of the Carbon Pricing Mechanism coupled with rising energy costs is compelling processors to consider ways of reducing greenhouse gas emissions (GHG) from waste water treatment systems. GHG emissions from anaerobic waste water treatment accounts for around half of Scope 1 GHG emissions



from large meat processing facilities. Consequently, there has been an increasing amount of research into anaerobic waste water treatment technologies especially covered anaerobic lagoon (CAL) technology with biogas capture and combustion systems, that enable capture of GHGs (contained within the biogas) as well as energy from waste applications such as biogas boilers. Eight CALs have been installed at red meat processing facilities across Australia to date, with a similar number likely to be installed in the next three years. Many are large capacity and produce huge volumes of biogas which contains, among other gases, combustible methane and sizeable quantities of corrosive and toxic hydrogen sulphide. AMPC and MLA are funding the development of an industry specific guideline for the safe installation, capture, transport and use of biogas from anaerobic wastewater treatment technologies based on CALs. In addition to this, a more general biogas manual will be developed which outlines the range of anaerobic technologies appropriate for use in the meat industry and their main features, biogas properties, the range of uses for biogas and relevant considerations.

### **Wastewater manual & workshops**

AMPC commissioned MINTRAC to undertake the development of a Waste Water Management Manual for operators at red meat processing plants. The guide incorporates the outcomes of the RD&E investment already made by AMPC in this area as well as the input from current operators and technical experts. The manual provides a resource for accredited and in-house training, provides a catalyst for up-skilling existing operators and trainers, as well as being a day-to-day operating manual for waste water treatment systems. Over the past few years, AMPC and MLA have undertaken a considerable body of research around waste water treatment in the Australian meat industry, including nitrogen management, quantitative risk assessment of microbial emissions, review of waste treatment and energy from waste technologies. This research has been published in a number of kits including the Environmental Best Practice Guidelines for the Red Meat Processing Industry, the Eco-Efficiency Manual for Meat Processing, and the Red Meat Processing Industry Energy Efficiency Manual. This has now been synthesised into a simple 'how to' manual for personnel responsible for the day-to-day management wastewater treatment systems. The Waste Water Management Manual was recently made available to Industry and forms the basis of a series of waste water management workshops held in October and November 2012 in Victoria, Western Australia, New South Wales and Queensland.

### **Alternative processing procedures to improve water and energy efficiency**

Increasing costs of water, coupled with tightening environmental regulation have led meat processing businesses to focus on utilities management to maintain legislative compliance, profitability, competitiveness. However, current scientific research in this area lacks detail concerning food safety management issues, in particular regarding re-use of both hot and cold water from cooling towers, defrost water, viscera tables and steriliser water for cleaning of meat processing systems involving edible and/or inedible product lines. The project will involve a number of water efficiency research activities at a number of meat facilities, involving covering steam sterilisation of viscera trays, dry cleaning of chillers, and the re-use of cold and hot potable water from the beef viscera table and the viscera table sanitation cycle. Once the processes have been

completed through trials, standard operating procedures will be developed and engagement with the relevant food safety regulator and authorities. The first sequence of these projects are aimed at investigating alternative sterilisation and sanitation processes which enhance water and energy efficiency and accelerate the adoption of viable alternatives able to achieve current food safety targets and standards. Current projects include the application of lower water temperatures at higher emersions times, steam sterilisation of viscera tables, tripe wash water re-use and more energy and water efficient chiller cleaning. The projects seek to ensure that the development of alternative practices meet the current process enabled by the legislation to seek approval and provide for targets and standards to be met. The project is supported by an industry working group providing guidance on the options and alternatives that could be examined through RD&E trials.

### **Delivering Livestock Handling training to meat processors**

This project sought to develop and implement cross sectoral livestock handling training for red meat processors, with the view of establishing a baseline package that could further be extended to other sectors, including feedlot, transport and production. The development of livestock handling training materials to support the delivery of the Unit AHCLSK205A Handle livestock using basic techniques to abattoir workers is part of a broader industry initiative to standardise the delivery of training to stock handlers throughout the red meat supply chain. During 2011-2012, the project involved forming an industry working group to review the



new training and assessment materials. These materials will be able to be applied to the broader supply chain and provide the basis for e-learning and DVD support materials for pilot with engaged RTOs and enterprises. The next steps will involve extending the training further across the processing sector, integrating the materials with other previously funded projects in this area and engaging with other red meat organisations to deliver a broader coordinated whole of chain livestock handling initiative.

### **Traceability**

The National Livestock Identification System (NLIS) is Australia's system for identifying and tracking livestock for food safety, biosecurity, market access and industry-related purposes. Recently, AMPC and AMIC identified a need to consider a framework for further training on NLIS systems for the meat processing industry. Staff turnover, technological developments and the need to increasingly demonstrate compliance and validate traceability are all obvious drivers for further training. To this end, discussions were held with three State jurisdictions (DEEDI Queensland, Industry and Investment New South Wales and DPI Victoria) regarding the need for a project covering NLIS training for processors. AMPC and AMIC have established a project to develop an e-learning package for the red meat processing sector for NLIS. Alignment with the existing NLIS database and agreement, the Extended Residue Program (ERP) and the NLIS device and PIC based status systems will be included. The outcomes for industry and collaborating organisations will be the improved application and compliance with NLIS and traceability requirements and the improved understanding and use of the

ERP, PIC and device based status that will deliver product integrity, protect businesses and ensure the potential market failure as a result of residues is minimised.

### **Revising the National Processing Industry Animal Welfare Standards**

In 2005, the Australian Meat Industry Council, in collaboration with the Animal Welfare Science Centre (AWSC) and DPI Victoria, developed and launched National Animal Welfare Standards for Livestock Processing Establishments (the 'AMIC Standards'). The AMIC Standards were designed to reflect the legislative and commercial requirements for animal welfare in Australia, relevant scientific literature and current best practice. AMPC supported the development of these Standards.

As part of the livestock processing sector's continued commitment to animal welfare, AMPC initiated a review in 2009 to ensure the Standards continue to be relevant, practical and deliver good animal welfare outcomes. The review was designed to address changing industry practices, new scientific findings, changes in national and international legislative and commercial standards and changes in community expectations. Further, the review aimed to assess the uptake of the Standards in industry and consider improvements in the extension and training delivered to the industry for animal welfare. This year, another review has commenced, to further enhance the application of the standard, investigate options for accreditation, benchmark performance, and establish a national communication program and to develop minimum regulations in collaboration with Government.

The Australian Livestock Processing Industry Animal Welfare Certification System (AAWCS) is our Industry's latest initiative in driving best practice animal welfare outcomes for livestock processors. The AAWCS is an independently audited certification program used to demonstrate compliance with the Standards. The program is an initiative of the Australian Meat Industry Council with support from the Australian Meat Processor Corporation and is administered by AUS-MEAT on our behalf.

### **Industry biosecurity standards**

AMPC, with members, has established a project to develop and implement industry biosecurity standards. For the meat processing industry, it is recognised that there is a need to develop operational standards to underpin the EADRA and assist industry in preventing and responding to future biosecurity risks. A national advisory committee, including members of AMIC, AMPC, Governments (State jurisdictions, AQIS and DAFF) and scientific organisations, will develop the standards for managing biosecurity in the processing industry.

A national advisory committee, including members of AMIC, AMPC, Governments (State jurisdictions, AQIS and DAFF) and scientific organisations met to commence the development of the standards and additionally, to revise the meat processing operational manual that underpins AUSVETPLAN. A training program, including a CD of endemic and exotic disease tips and tools will be produced. The training module will be combined with both the Animal Health Australia training programs for industry as well as the livestock related training packages delivered by MINTRAC. Further information is available from AMPC.

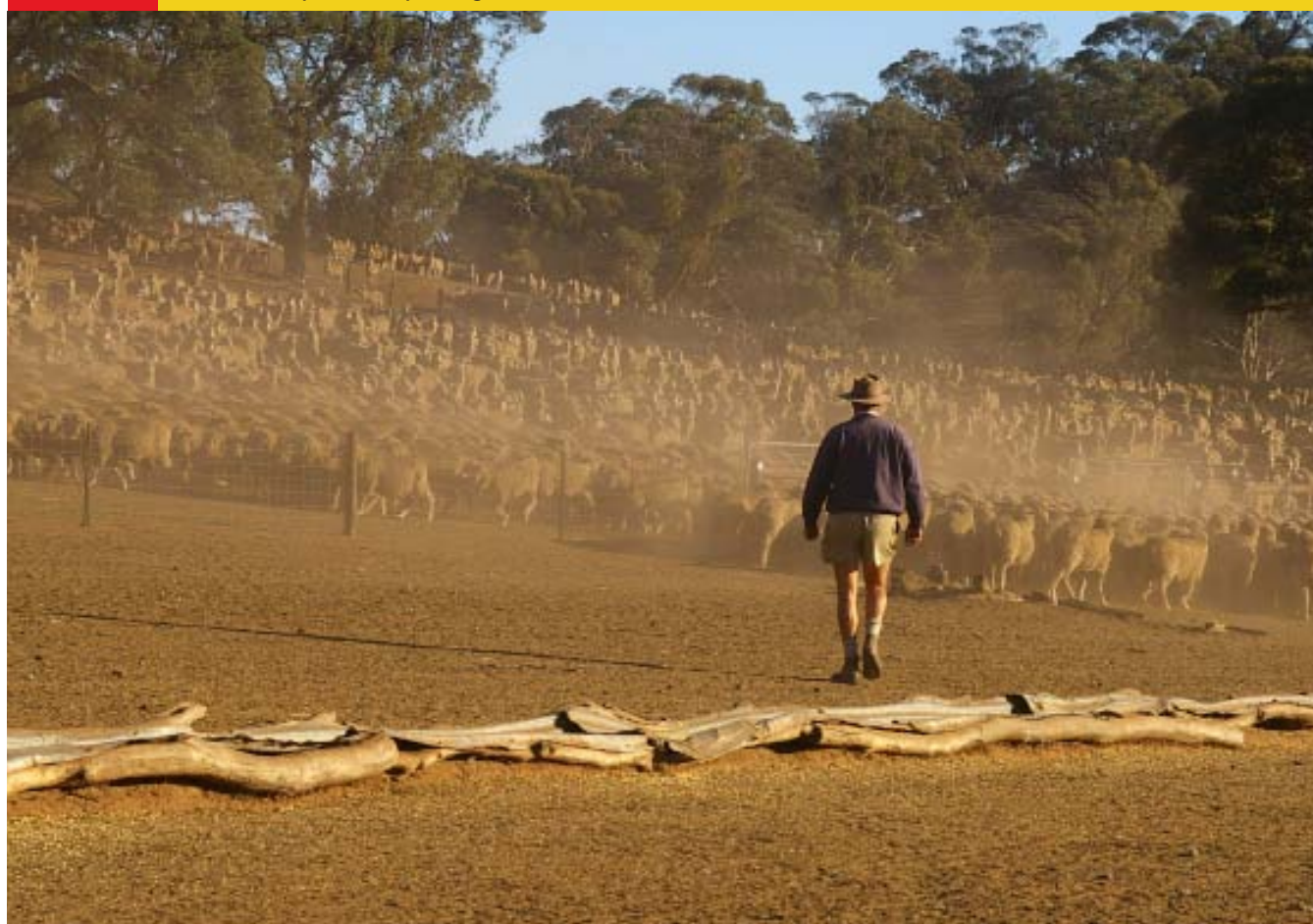




# MISP Theme 2: Market access

## OUTCOME

Maximise, in partnership with government, effective trade facilitation.



### MISP Focus Areas

#### PARTNERSHIP WITH GOVERNMENT

Establish a whole-of-industry/government approach to deliver the partnership necessary for effective trade facilitation.

#### TRADE REFORMS

Strengthen the push for trade reform through multilateral, bilateral and regional agreements.

#### TRADE ADVOCACY

Enhance trade advocacy activities at all levels of our industry and across the supply chain to achieve optimal trade outcomes.

#### ISSUES MANAGEMENT

Reinforce the importance of Australia's overseas posts by working with government to ensure adequate resourcing for red-meat and livestock market maintenance, the facilitation of trade and appropriate issues management programs.

#### CERTIFICATION SYSTEMS

Ensure our government's certification system is modern, flexible, and world's best in terms of efficiency.

## Summary of AMPC key focus areas under MISP theme 2: Market Access

Australia's red meat exports continue to face market access challenges when supplying overseas countries. As a major exporting industry, changes in access to overseas markets affect the profitability of industry. Complex international markets require an ongoing effort to defend our access in order to supply meat and meat products. A large number of Australia's overseas markets are subject to some form of entry barrier and efforts are required to secure improvements to export conditions via trade reforms and manage the impacts of tariffs, quotas and non-tariff barriers

including unfair competition in the form of subsidies, technical imposts, and exports from countries that support their domestic industries. On the domestic scene, there is an increasing need to ensure nutritional aspects of red meat remain underpinned by rigorous research that is effectively communicated to consumers. Additionally, it remains important to build consumer trust, desire and awareness of red meat attributes, eating quality and adaptability as the superior and most suitable protein of choice.

## MISP STRATEGIC IMPERATIVE 2: MARKET ACCESS

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
<b>Partnership with Government</b>  <b>Trade reforms</b>  <b>Trade advocacy</b>  <b>Issues management</b>	Market Access is Maintained and Enhanced	Support industry and Government to maintain and liberalise world meat markets	<ul style="list-style-type: none"> <li>• WTO work to include monitoring and responding to WTO developments;</li> <li>• Provide representation to government on industry priorities that underpin market negotiations;</li> <li>• Coalition building in key overseas markets and industry missions to Geneva.</li> <li>• Monitor developments in overseas markets; develop networks of industry and government contacts in Australia and overseas;</li> <li>• Provide a response capability when impediments arise;</li> <li>• Representation on the Red Meat Market Access Committee</li> <li>• FTA work to include representations to government on priority countries for FTAs;</li> <li>• Preparing and lodging submissions on industry priorities for each FTA;</li> <li>• Proactive advocacy on FTA negotiations;</li> <li>• Coalition building in key overseas markets.</li> <li>• Research to support trade reform advocacy in WTO and FTA negotiations;</li> <li>• Research on technical barriers to trade.</li> </ul>	4,320,000
<b>Certification systems</b>	Market Access is Maintained and Enhanced	Demonstrating product integrity  *Nb. The 2013-2014 AMPC program now "delivering to customers and consumers"	<ul style="list-style-type: none"> <li>• Continue the support of AUS-MEAT standards division (AUSMEAT);</li> <li>• Continue the support of RD&amp;E that contributes to continual improvement in meat inspection and processor meat safety validation.</li> <li>• Contribute to the development and implementation of new food safety systems.</li> <li>• Ensure that NLIS Ltd is underpinned by sufficient capability to deliver services that enable industry to meet the national traceability standards.</li> <li>• Maintenance of safety and integrity aspects of product;</li> <li>• Development of new techniques for delivering safe and wholesome product;</li> <li>• Monitor developments/develop initiatives in biotechnology;</li> <li>• Develop risk-based post mortem inspection systems for animal health surveillance, and assessment of product safety and suitability (AHA).</li> <li>• Support the secretariat services to SAFEMEAT and contribute to the development of effective industry safety/issues;</li> <li>• Respond to customer and market expectations for scientific information on the safety of red meat products.</li> </ul>	1,108,000

## Highlights and outcomes from AMPC research, development, marketing and extension activities

### **World Trade Organization (WTO) involvement to position the Australian meat and livestock industry appropriately on the international scene**

- › Although the WTO Doha Round made only limited progress in 2011-2012, high level engagement was maintained and industry priorities reinforced with trade officials in Canberra and Geneva;
- › Analysis was completed on WTO trade liberalisation scenarios to ascertain likelihood of commercial access outcomes;
- › Industry assisted government to secure market access into Russia upon accession to the WTO, via access to a shared pool of up to 407,000 tonnes of frozen beef and 11,000 tonnes of chilled beef per annum (with in-quota tariff rates of 15%); an exemption from the quotas for high quality beef and a reduction in the sheepmeat import tariff from 25% to 15%

### **Position industry for Free Trade Agreement negotiations**

- › Partnered government to secure a free trade agreement with Malaysia – our tenth largest market for beef and lamb;
- › MLA on behalf of the red meat organisations including AMPC, worked closely with the Australian Government to ensure trade negotiators were aware of and incorporated industry priorities in all FTAs under negotiation – Japan, Korea, China, Gulf Cooperation Council, Trans-Pacific Partnership, Pacer Plus, India and Indonesia;
- › With the Korea-US FTA resulting in the 40% tariff on US beef being eliminated over the next 15 years, the imperative for securing an Australia–Korea FTA became more urgent in order to maintain a competitive market position for Australian beef;
- › Industry continued its focus on assisting government to secure an AKFTA that will eliminate the import tariff on Australian beef (and sheepmeat);

- › In Japan, FTA advocacy focused on working with Australian Government trade negotiators to continue to promote improved market access for beef as an essential deliverable of the AJFTA. MLA on AMPC's behalf via its office in Tokyo continued to work with trade stakeholders in Japan as well as various departments and ministries within the Japanese Government, in extolling the benefits of trade liberalisation.

### **Strategies to remove market access barriers;**

- › MLA on AMPC's behalf commissioned research on technical barriers to trade (TBT) – in order to identify potential TBT issues, undertake comparative cost analysis, rank each issue and determine priorities for action;
- › MLA collaborated with peak industry councils and Australian Government officials to maintain unimpeded red meat export trading conditions;
- › Import regulations and technical access issues were addressed or are subject to ongoing representations across South Asia, the Middle East/North Africa, Japan, the United States (US) (E. coli and product label approvals) and South Africa (review of sheepmeat tariffs in conjunction with meat importers);
- › Strategic partnerships were maintained with overseas customers (alongside peak councils) including Tri-Lamb, the Five Nations Beef Alliance, the Europe Market Access Committee and the Agriculture and Livestock Industries Corporation of Japan;
- › Data in the Global Meat Industry Model (maintained by the Centre for International Economics) has been updated in order to ascertain changes in trade flows arising from trade reform / trade barrier scenarios;
- › MLA on AMPC's behalf provided expertise to the National Farmers' Federation Trade Committee on multilateral, bilateral and technical trade developments.





## Promoting Australian beef in north asia

This program was developed to maintain a dominant position for Australian beef in Japan and Korea using aggressive promotion in these markets to ensure growth in long-term demand. The discovery of BSE in Japan and threats to overall beef consumption led to the red meat industry organisations, all of whom are parties to the MOU including MLA, Cattle Council of Australia, the Australian Lot Feeders Association, the AMIC, the AMPC and exporters to work together to develop the marketing strategy to respond to Japanese consumer concerns in the key Asian markets of Japan and Korea.

To ensure the dominant market position of Australian suppliers was maintained once US product returned to Japan, an additional \$13.8 million was invested in the marketing budget from 2005-06 to 2008-09 through the Beef Funding for The Future (BFTF) program. Marketing activities highlighted Australia's quality assurance systems including the National Livestock Identification Scheme and Australia's safety and traceability systems, which were promoted through a range of mediums including Aussie Beef Forums. There was increased focus on the mid to high end hotels and chef groups, working closely with Japanese culinary leaders to communicate the positive attributes of Australian red meat through seminars and study tours. As suppliers of US beef gradually improved their safety credibility, MLA promotions shifted gears in 2008, emphasising the nutritional benefits of Aussie Beef to appeal to growing consumer interest in health and wellbeing.

This investment helped to increase recognition of the safety and quality of Australian beef within North Asia and has assisted to maintain a majority market share for beef imported into Japan and Korea, delivering benefits conservatively valued between \$815 million and \$994 million. As a result, Australia's market share in Japan and Korea has increased as a result of greater awareness of, and loyalty to, Aussie Beef/HCW brands and confidence in Australia's meat safety credentials. An independent evaluation by the Centre for International Economics (CIE) found that aggressive promotion of Australian beef in Japan delivered benefits conservatively valued at \$578 million, outweighing the costs at a rate of 5.1 to 1. The evaluation concluded that more than 80% of the reported program benefits from 2000-01 to 2014-15 would have been realised during the period of US exclusion from the Japanese market (2004-2006). The CIE reasoned that without the ongoing program investment and concerted action by industry, Australian exports to Japan would have actually fallen as a result of the US BSE outbreak.

## Demonstrating Product Integrity, Safety and Quality

The approaches taken by the program are based on sound science, risk assessment and new management strategies and focus on three key areas:

1. Consultation with stakeholders on the strategy, direction and themes for the program to ensure it meets industry requirements;
2. Scientific discovery and knowledge generation to find new ways of managing food safety hazards along the supply chain;
3. Using scientific knowledge to facilitate change and further developments within the industry by communicating and collaborating with stakeholders.

Key activities undertaken during 2011-2013 included:

- Scientific research on the safety of Australian red meat, particularly on pathogenic *E. coli* in manufacturing beef;
- New approaches to validating the control of listeria in processed meats were promoted and shelf-life research continued;
- Investigations into post-mortem systems commenced;
- The SAFEMEAT initiatives review commenced to identify program gaps and redundancies, and make recommendations on program enhancements;
- The new SAFEMEAT website was launched and communication activities to support the safety of hormone growth promotants (HGP) were delivered;
- Regular reporting was made to processors on the hygienic quality of product, with comparisons with national results and trends refined and additional training provided;
- Numerous presentations were delivered to overseas government officials, importers, end-users and consumers about the quality and safety issues including traceability, shelf-life, *E. coli*, HGP and chemical residues, generated positive media coverage and maintaining customer confidence;
- Delegations to the US to engage with the FSIS, USDA and various consumer groups were carried out in relation to the new provisions for *E. coli* 0157 and related non 0157 STECs;
- MSA annual analysis of supply chain premiums was delivered to assist processors and operators to evaluate grading data for decision making;
- MSA beef and sheep producer supply chain workshops, trade events with end users and account management with all MSA processors were delivered and plant surveys undertaken to evaluate new processors compliance;
- Three brands launched lines of MSA-graded beef using the MSA logo as an endorsement of quality;
- Methodology and analysis of single day detection for *E. coli* and related non 0157 STECs was commenced;
- Metagenomic analysis of microbial communities that contribute to meat and meat product contamination was commenced;
- The meat inspector currency review project was developed and commenced.

## Analysing the effect of initial muscle biochemical composition on microbiological growth and eating quality of long aged beef, destined for export markets

The red meat processing industry widely uses vacuum packaging to store primal cuts for both domestic and export markets. In order to accurately ascertain best before or use by dates on vacuum packaged product processors require accurate and robust information on the shelf life of their products. These data include TVC and LAB measures, and previous research has suggested that shelf life of up to 20 weeks could be potentially achieved by slowing the rate of bacterial growth. It is proposed that the intrinsic biochemical properties of meat have a direct link to the growth retardation of these microorganisms hence this project aims to investigate the muscle biochemical properties, storage conditions, time of storage and eating quality attributes of the end product.

Samples of Vacuum packaged Beef muscles were collected based on colour, stored at different temperatures in cartons, and aged for up to 20 weeks. Samples were tested at varying times post storage for colour, pH, aroma, state of vacuum, and appearance of meat, with a subset of samples undergoing MSA consumer taste panel testing. This project is in the final stages of data analysis and reporting, with preliminary observations suggesting there are differences in colour, pH and microbiology assessment towards the 20 week aging time period. In addition to the recently completed projects, there are several projects and programs operating within the MLA food safety program, for which AMPC invests towards. This RD&E is directed at ensuring the continued supply of safe and wholesome product to domestic and international markets.

### ***The effect of testing regimes on E. coli O157 isolation***

Current testing for E. coli O157 in the meat industry requires a stepwise approach which involves initial screening of an enrichment broth followed by a process of confirmation for isolating E. coli O157. Many abattoir-based laboratories currently carry out the screening tests for E. coli O157 and if a positive test is detected (potential positive), the sample must be sent to one of two DAFF registered laboratories for confirmation. The US approve (currently up to 4) testing methodologies and laboratories also. In Australia, the potential positive tests therefore need to be transported to the laboratories undertaking confirmation and it is not clear if the conditions under which these samples are transported are having an effect on the ability to isolate and

confirm E. coli O157. It is possible that the failure to confirm an isolate may lead to contaminated meat leaving Australia for export markets and could result in a positive point of entry (POE) detection in the USA. It is therefore important to determine if the types of enrichment broths used, the time between screening and confirmation, and the temperatures that enriched broths are exposed to prior to confirmation are affecting isolation of E. coli O157 from potential positive samples.

The results of this study indicate that the isolation of E. coli O157 from a potential positive enrichment broth stored at 4°C or 10°C is not significantly affected by the type of enrichment broth used; the concentration of background microflora in the sample; the time for which the sample is enriched; or storage of the enrichment broth for up to seven days. The key parameters currently utilised during testing for E. coli O157 by Australian beef producers therefore appear to have minimal negative effect on the likelihood of isolating E. coli O157 from potential positive enrichment broths. It is more probable that the failure to isolate E. coli O157 from potential positive enrichment broths is due to factors such as the sensitivity and specificity of test systems, competition and inhibition of microflora during the isolation phase, and/or combinations of genetic targets within enrichment broths that incorrectly suggest the presence of E. coli O157.

Increasing our understanding of these factors will assist in identifying ways of increasing the conversion of potential positives to confirmed positives.



# MISP Theme 3: Our industry

## OUTCOME

Promote a single co-ordinated voice for our industry to reshape and reinvigorate relationships within industry and with Government.



## MISP Focus Areas

### ONE VOICE

Work together as one industry with one voice.

### RED MEAT ADVISORY COUNCIL

Reinvigorate RMAC as the single touch point between our industry and Government.

### PEAK INDUSTRY COUNCILS

Recognise and support the role and importance of Peak Industry Councils in the red-meat and livestock industry.

### SERVICE COMPANIES

Utilise levy-funded organisations to maximum effect.



## Summary of AMPC key focus areas under MISP theme 3: Our industry

Based on AMPC's independent review (Arche Consulting) there is a need to ensure focus on industry and stakeholder communication and engagement. These activities include the development of materials, forums and tools to communicate the outcomes of RD&E and Marketing programs.

The program focuses on activities that support stakeholder communication and engagement and continual business improvement activities. This program also includes corporate services which are activities relating to AMPC core business responsibilities.

### MISP STRATEGIC IMPERATIVE 3: OUR INDUSTRY

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
One voice	Continual Business Improvement	Stakeholder consultation and engagement	<ul style="list-style-type: none"> <li>Source content and produce nine AMPC circulars that promote the outcomes of RD&amp;E investments to the 136 processor members of AMPC;</li> <li>Develop materials that communicate the partnership and co-investment arrangements, outcomes and results.</li> <li>Develop publications that communicate opportunities for members and meet AMPC governance requirements through the production of a best practice annual report and annual general meeting.</li> <li>Build community trust by providing information via on-line sources and then ensuring it can be easily located on the web;</li> <li>Design and conduct targeted processor forums to identify RD&amp;E priorities and strategies for industry;</li> <li>Revise the AMPC website to become an improved resource for members and develop a business circulars to communicate AMPC activities;</li> <li>Participate in existing industry events to maximise cost-effective interaction with members.</li> </ul>	1,457,125
Red meat advisory council				
Peak industry councils	Continual Business Improvement	Corporate Services	<ul style="list-style-type: none"> <li>Levies are collected and validated in collaboration with Government.</li> <li>The AMPC Board and executive oversee and determine policies consistent with the company's strategic plan and exercise direction and governance over resources and the way in which the strategies are implemented.</li> <li>The provision of accurate, timely and meaningful information to management and stakeholders, managing financial risks, providing support for the budget and planning process and ensuring internal controls are in place while effectively supporting operations.</li> <li>Provide services to realise the potential of investments to deliver value to the industry. Ensure that the service agreement with MLA delivers the agreed collaborative portfolio.</li> <li>Program and project evaluations are conducted in accordance with the requirements of the SFA and related guidelines for RDCs.</li> </ul>	1,042,705
Service companies				

## Highlights and outcomes from AMPC research, development, marketing and extension activities

### **Continual Improvement in Business Practices**

This program supports AMPC's focus on continual business improvement, corporate management and risk management. Demonstrated improvements have been made in the following areas:

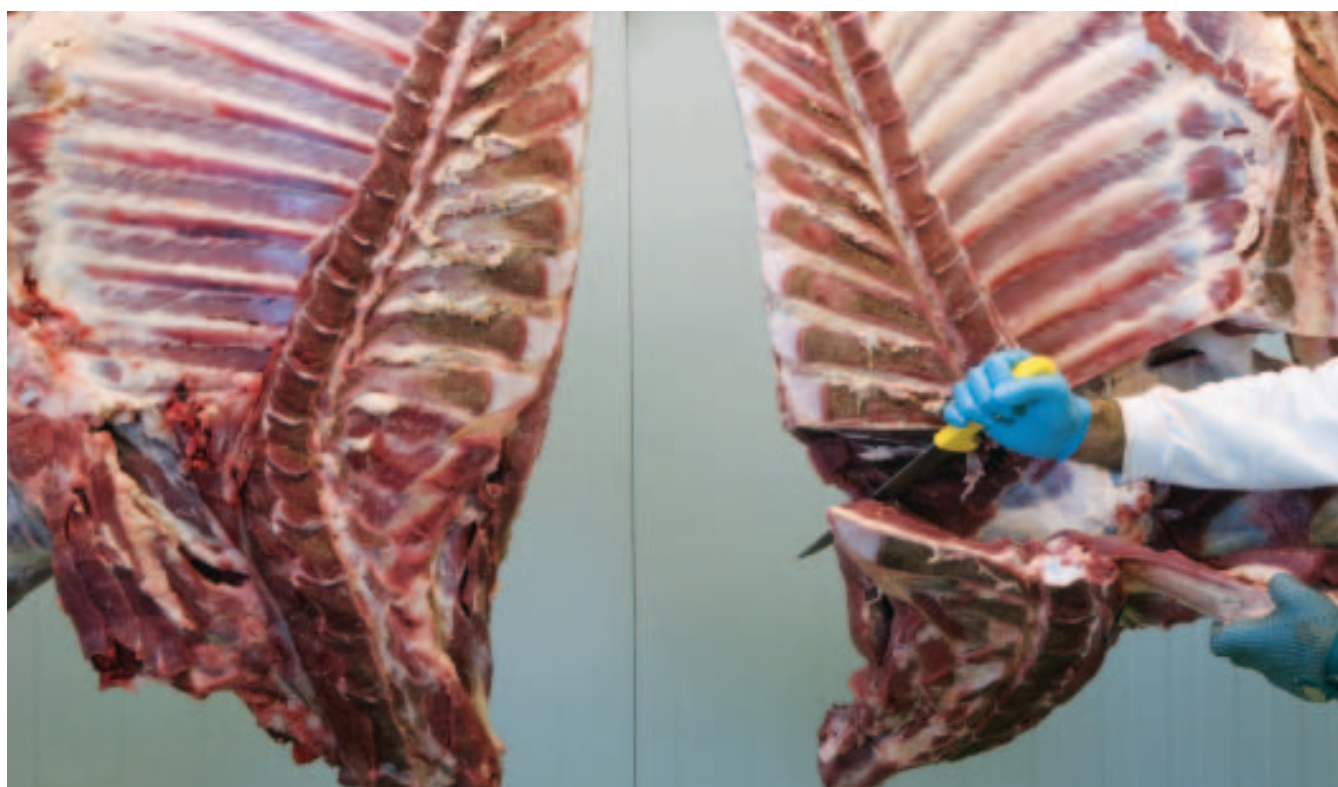
- Enhancing extension of RD&E outputs to industry;
- Creating greater awareness of opportunities created by AMPC for Government and members;
- Enhancing collaboration and co-investment with other RD&E organisations, particularly RDCs and jurisdictions where possible;
- Developing and delivering materials that communicate the partnership and co-investment arrangements, outcomes and results to key stakeholders;
- Designing and conducting targeted processor forums to identify RD&E priorities and strategies for industry and to deliver RD&E outputs for implementation;
- Developing and overseeing policies consistent with the company's strategic plan and exercising direction and governance over resources and the way in which the strategies are implemented;
- Improving and monitoring AMPC's compliance with obligations;
- Demonstrating changes to portfolio balance and refining processes to guide investment decisions, evaluation, management of intellectual property and strategy development;
- Measuring, reporting and improving on the value gained from investments.

The Board of directors continually review business practices of the company and report on the performance of the company as per statutory requirements.

### **Mega trends**

As part of its statutory reporting requirements, AMPC is required to develop a five-year strategic plan. The essence of effective strategic planning is to use research, analysis and insight to identify, filter and prioritise the factors that are likely to impact on the environment in which the strategic plan sits. An effective strategic plan will be structured to respond to these factors. To this end, AMPC sought an independent view of issues that could potentially impact the Australian red meat industry. A common danger of many strategic planning exercises is that they become too inward looking and focus on the issues that are visible here and now, most do not look beyond the immediate horizon.

The foundation for effective strategy is to anticipate what the environment over the planning period will look like, i.e. anticipate the key forces that will influence the industry's direction so that the most appropriate responses can be developed. To achieve this understanding of the environment requires an expansive macro analysis, to identify the global forces that could impact on the Australian red meat industry and how they might do so. The 10 megatrends that will define the face of the Australian red meat industry over the next five years include both opportunities and challenges. These megatrends were reported at the AMPC Conference in May 2012 and subsequently at the AMIC Business Forum in August 2012, where processor input was sought towards the finalisation of the environmental scan for the processing industry. The final Strategic Plan was published in 2013.





# MISP Theme 4: Our people

## OUTCOME

Develop and retain motivated and appropriately skilled people for our industry.



## MISP Focus Areas

### INDUSTRY EMPLOYMENT

Industry will present itself as a preferred and desirable employment option and career destination.

### MANAGE RETENTION

Improve employee retention rates within all sectors.

### LEARNING AND EDUCATION

Increase uptake of learning opportunities and skills education.

### LABOUR PROGRAMS

Influence government support for strategic semi-skilled labour programs.

### ASPIRATIONS

Align individual and industry aspirations.

## Summary of AMPC key focus areas under MISP theme 4: Our people

This program focusses on the delivery of a range of extension programs, including the AMPC/MINTRAC partnered industry network meetings, covering environment, meat inspection and quality assurance and training. This program also includes support of the domestics' networks and other networks of young and upcoming science and agriculture students.

The value of research and development is only delivered when outcomes are taken up and successfully implemented by enterprises along the value chain. A review of the national innovation system in 2008 (Australian Government) recommended the creation of an innovation system as has been proposed in other countries. More attention is now being paid to improving the capacity of the primary industries to apply the products of science and research and to understand how boosting this capacity and improving their business models will better serve market requirements and customer needs and secure productivity

benefits. Attracting and retaining science capability, particularly in regional areas, is a significant issue for industry both present and in the future. At the national level, through the Primary Industries Ministerial Council (PIMC), the National Primary Industries RD&E framework is well underway.

As part of AMPC's contribution to this framework, efforts will be made to enhance collaboration and co-investment towards capability and capacity building in science. In addition, there is a need to continue investigating options for effective extension of key R&D outcomes to industry. In the meat processing industry, it is identified that a range of tools and resources are required to ensure practice change. These include industry networks, forums, conferences, tutorials, training programs, e-learning resources, amongst other mechanisms. It is important to continue examining efficient means by which the latest information, resources and tools can be provided to industry at all levels.

## MISP STRATEGIC IMPERATIVE 4: OUR PEOPLE

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
Industry employment	Influencing industry and community practice change through effective extension, education and capability building	Undertaking and delivering R&D through industry education and extension	<ul style="list-style-type: none"> <li>Engaging industry and encouraging practice change.</li> <li>Support the delivery of the Meat Industry Training Network;</li> <li>Support and delivery with MINTRAC, the Environment Network;</li> <li>Support and delivery with MINTRAC, the Meat Inspection and Quality Assurance Network;</li> <li>Support and delivery with AMIC, the QCMPA Networks.</li> <li>Completion of training manuals and resources – OH&amp;S, animal welfare, biosecurity, engineering and technology;</li> <li>Development of web-based e-learning programs and extension tools.</li> </ul>	1,031,163
Manage retention				
Learning and education				
Labour programs				
Aspirations		Building industry and stakeholder capability and advancing business innovation	<ul style="list-style-type: none"> <li>Continue the Intercollegiate Meat Judging Program and Competition;</li> <li>Develop a benchmarking project on skill base with MINTRAC and evaluate skillset and professional development;</li> <li>Support the Australian Rural Leadership Program;</li> <li>Support the Processor Innovation Awards.</li> <li>Supporting undergraduate and post-graduate programs.</li> <li>Benchmarking of industry and science capability towards developing the new capability program;</li> <li>AMPC undergraduate and post-graduate program support;</li> <li>Review the up-skilling and undergraduate scholarships;</li> <li>Enhancing industry and post-graduate capability in environmental projects.</li> <li>Investment in research capability and collaboration.</li> <li>AMPC collaboration with the Climate Change RD&amp;E Strategy;</li> <li>AMPC collaboration with the Sheep CRC;</li> <li>AMPC collaboration with the Animal Welfare RD&amp;E Strategy.</li> </ul>	1,406,893

## Highlights and outcomes from AMPC research, development, marketing and extension activities

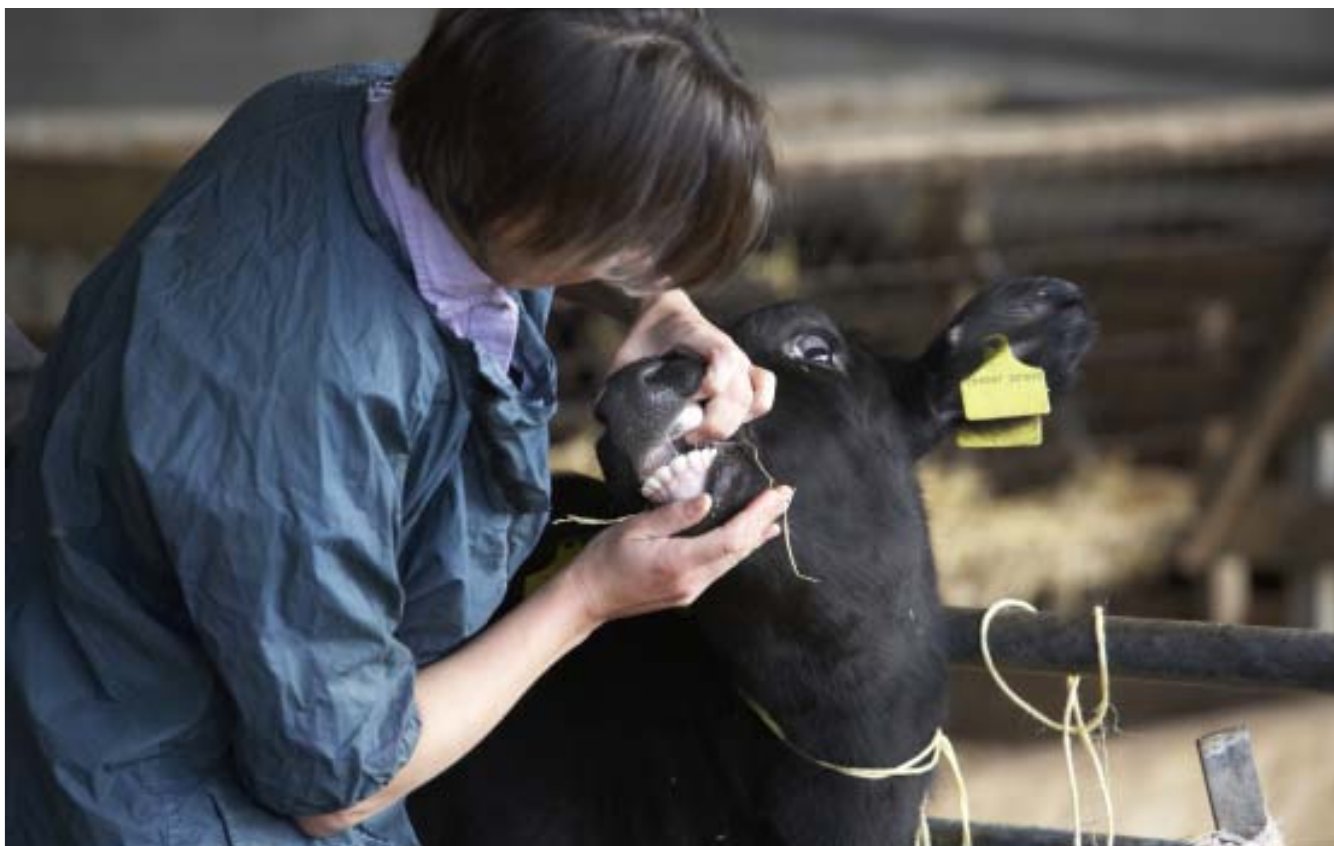
### **Benchmarking audit of meat industry current and projected trainer capacity**

In January 2012, AMPC and MLA contracted MINTRAC to undertake an audit of current industry training capacity in the context of key industry strategic directions as identified in the concurrent AMPC/MLA benchmarking Project. The audit requirements included:

- estimation of trainer numbers and qualifications required to address key industry strategic directions for the next ten years
- assessment of current and projected RTO scope of registration
- audit of age, qualifications and industry experience of the current trainer workforce
- assessment of current trainer recruitment and up skilling practices

- mapping of existing capacity to future industry requirements
- gap analysis
- recommendations for strategies to address identified gaps.

The audit comprised both an on-line survey of all RTOs, and then interviews with twenty-one key RTOs operating in the meat processing sector. The results of this audit overwhelmingly indicate that the industry is well serviced by RTOs who demonstrate evidence of forward planning, awareness of industry priorities, and attention to ensuring organisational responsiveness to industry requirements. One of the unexpected outcomes of this audit was that despite the belief of an ageing workforce, there was clear evidence of effective succession planning in all areas except for smallgoods, and furthermore RTOs were actively focussing



on encouraging their trainers to seek higher level training qualifications. There was also evidence of up skilling of trainers with the majority possessing both relevant industry qualifications, (in addition to training qualifications) and extensive industry experience. One of the areas that this audit has provided evidence for is the lack of ability of RTOs in general to recruit and retain good training staff. The area's most commonly cited were, issues related to compliance, availability of funding and competition from other providers.

### ***The Meat Inspectors & Quality Assurance Managers (MI&QA) Network***

MINTRAC facilitated fourteen Quality Assurance Managers' Network meetings during 2011-2012 attended by representatives of 121 different organisations including sixty-four different meat processing companies, seven different regulatory bodies, ten industry associations, four research agencies, 22 Registered Training Organisations (RTOs) and eighteen companies directly servicing the industry. The eighth annual Meat Inspection and Quality Assurance Conference was held in Melbourne and attracted one hundred and two participants from all the States and Territories. Speakers addressed a range of topics from animal welfare through meat science and issues with the National Livestock Identification System. Many of the workshops presented findings from current industry projects or research and then workshopped the implications for the training system.

### ***The Environmental Managers Network & Environment Conference***

MINTRAC facilitated five Environment Managers' Network meetings during 2011-2012 attended by 70 representatives from 21 different meat processing companies, two different regulatory

bodies, four industry associations, research agencies, registered training organisations and other companies servicing the industry. On the 24th and 25th of August, over 45 meat industry environmental representatives, attended the first national Meat Industry Environmental conference in Adelaide. The focus for the conference was "Energy into the future" and this scene was set with the keynote address from Mr Michael McDermott, Clean Energy Regulator. The enthusiasm of the speakers throughout the conference was acknowledged by the delegates as one of the highlights "all presentations were highly informative and relevant to the contemporary issues that we currently face in the meat processing and rendering industry".

### ***The Training Network and Extension***

The Training Networks play a vital role in facilitating the transfer of knowledge from research outcomes to training programs as part of the uptake of innovation in the meat processing industry. They also serve to ensure that the meat industry training system meets the business and strategic requirements of the industry, and that the training personnel of the meat industry have currency of knowledge and skills. Twelve MINTRAC Training Network meetings were held during 2011-2012, attracting strong industry and Registered Training Organisation attendances. The project also included the MINTRAC national Training Conference and the five national meat industry training awards.

## Meat Science Tutorials for Processors

For nearly two decades, the red meat processing industry and other key scientific organisations have invested in, developed, delivered and published a wide range of research outcome literature including reports, information sheets, manuals and guides as a means of disseminating new research findings to industry. Specifically, AMPC, MLA and CSIRO have supported the Meat Technology Update publication series of research outcomes as a key communication mechanism to industry. However, more recently it was recognised that direct face to face dissemination of findings involving processing plant staff and scientists that carry out the research is a key area of need in order to ensure the uptake, adoption and understanding of research related findings.

On this basis, a project titled “Processing Industry Meat Science Tutorials” was developed, which involved a workshop of mini-tutorials on a range of meat science related topics being delivered by a scientific panel to the industry. Together, AMPC, CSIRO and MINTRAC, developed two forums for the extension of the latest information (meat science, food safety and food science e.g. dark cutting beef, E.Coli, colour, taste, tenderness improvement related processing methods and technologies) and address queries, questions and needs presented by processors on the day. This project also involved reviewing and selecting 14 individual previous publications and disseminating these materials to attendees ensuring resources are continuing to be provided regularly to processors.

## Australian Intercollegiate Meat Judging Association

AMPC has been a major sponsor of Intercollegiate Meat Judging (ICMJ) program since 2004, a not-for-profit association aimed at exposing and encouraging students into careers in the meat industry. ICMJ runs two competitions each year: a schools competition held in Tamworth; and a university competition and training course held in Armidale. The objective of the Intercollegiate Meat Judging Competition is to provide an opportunity for students to learn and to build the pool of intelligent young meat industry representatives who:

will give the Australian meat industry the expertise and drive to compete in the meat quality world of the future. This is done through:

- Exposing students to the fundamentals of meat quality education, meat identification and classification and enabling opportunity to apply knowledge of practical aspects of meat science;
- Demonstrating to students how and why markets perceive meat quality differently and highlighting the various carcass specifications required by these markets;
- Raising students’ awareness of career opportunities that exist in the meat industry;
- Exposing students to the requirements of the end-user (consumer), new technologies within the meat industry, training and a non-threatening competitive environment to assist students develop confidence and communication skills.

The US has various contests each year and students travel all over the US competing. Nowadays many of the top managers in the US meat industry are former contestants.

## Meat Industry Services

The Meat Industry Services (MIS) program has undergone a major revision earlier this year to reflect a new strategic approach and collaboration between AMPC, MLA and CSIRO. The program is now referred to as “Transforming Meat Industry Capability and Co-investment” (TMIC) and focusses on core meat science activities, capability development and specific project requirements of the processing industry. In 2011-2012, effort was directed at improving project direction in many aspects of meat industry. The areas of focus included dissemination of trends in meat science, meat value add processing technology and analytical infrastructure, enhancing awareness of food safety / contamination and troubleshooting, labelling advice. In addition, there was the development of 2 new post-doctoral positions, support for meat scientists in the “omics” research areas and processing engineering with protein chemistry and further facilitation of capability building by supporting 3 PhD candidates in areas of meat shelf life, food safety and muscle biochemistry. This collaborative arrangement underpins the objectives of the National RD&E Framework, by enhancing co-investment and building collaboration and capability in key meat science disciplines, facilitated by defined project outcomes.

Within the new TMIC research program specifically, meat science related research projects are now directed towards establishing new pathways for assuring eating quality, adding value to secondary cuts of red meat and co-products development that are all aimed at producing new, healthy, safe, and nutritious red meat products sustainably. In addition to the fundamental meat science RD&E areas, improved information dissemination methods, strategic planning and communication to industry and capability building via post-graduate support are being integrated into the TMIC program. Since the end of 2013 AMPC is working with MLA and CSIRO towards further enhancing the MIS partnership and delivery of this programmes RD&E outcomes. This includes identifying within our agreement, activities that will be strengthened including the joint development of RD&E projects, a shared strategy and activities that will address future capability needs in research. In the new TMIC program, these areas of RD&E will focus on specific programs designed to build capability, improve information dissemination, and conduct fundamental Meat Science RD&E aimed at producing new, healthy, safe, and nutritious red meat products sustainably.



# MISP Theme 5: Innovation

## OUTCOME

Increase competitiveness and profitability through innovation.



## MISP Focus Areas

### CAPACITY TO INNOVATE

Build capacity to research and innovate.

### PRODUCTION EFFICIENCIES

Enhance production efficiencies through innovation.

### INNOVATIVE PRODUCTS

Place consumers first in developing innovative products.

### SPEED AND ADOPTION

Increase the speed and adoption of innovation.

### INNOVATIVE COMMUNICATION

Implement innovative, rapid and effective communication with all stakeholders.

## Summary of AMPC key focus areas under MISP theme 5: Innovation

Productivity growth and the ability to respond quickly to changing economic conditions are essential to maintaining industry competitiveness. Research and development, coupled with processor innovation and capability building are recognised across industry as underpinning productivity gains. In particular, developing and implementing appropriate technology solutions is critical to improving a processor's financial performance and ensuring the sustainability of the industry. The meat processing sector is currently characterised by high volume, low margin business, therefore improving cost efficiency and productivity is critical in order for industry to remain sustainable, competitive and viable. Processors operate complex businesses in an environment characterised by high variability in both seasons and markets. It is

essential that research and development delivers new tools and technologies that support processors to become more productive and efficient. New and emerging challenges include labour and skills shortage, competition brought by emerging international technologies, climate related challenges including drought, increasing regulatory pressures, the decline in R&D expenditure, slower technology outputs and slower rates of adoption all impact the rate of productivity growth in the industry. Consequently, new technologies, processes and management practices that enhance production efficiency and profitability are becoming increasingly important for all processing businesses. There are opportunities to address these issues through research and development applied at an industry-wide level.



## MISP STRATEGIC IMPERATIVE 5: INNOVATION

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
Capacity to innovate	Increasing productivity and net value	Developing technologies, systems and processes to improve productivity and processing efficiency	<ul style="list-style-type: none"> <li>Investment into the Y-Cutter extension trial to achieve a compliance rate better than 98% on the automated Y-Cut system for both Australian lambs and merino sheep that meets with regulatory compliance as an approved process;</li> <li>Examination of technologies for automated ovine shoulder break up</li> <li>Development of an automated solution to beef Spinal cord removal to increase production efficiency and ensure effective management of SRM.</li> <li>Investigation of automated Container Loading solutions to enhance productivity in materials handling and product traceability</li> <li>Picking, Packing and Materials Handling Review to guide the development of automated solutions to increase productivity</li> <li>Develop Manual Handling Solutions &amp; Design Criteria For Cartons And meat Lumping to reduce WHS risk and increase productivity;</li> <li>Continued investment in the Sheep CRC projects relating to sensing and scanning technologies and genetic traits and information for whole of chain feedback;</li> <li>Investment in the Beef CRC for projects relating to genetic traceability, feedback and value add in terms of yield characteristics.</li> <li>A completed review of current and potential short-term future applicable CT technologies and alternative industrial scanning technologies identifying core strengths and weaknesses and their applicability to the red meat industry;</li> <li>Development of new sensing and visioning technologies, including the Objective Carcase Measurement – CT scanning technology development, the Beef Hock location vision system and 3D-Xray applications for carcass measurement.</li> <li>Develop and implement technologies to improve working conditions and reduce work-related injuries (delivered by Program 1);</li> <li>Develop and communicate new processes and systems that assist the processing sector to manage OH&amp;S risks;</li> <li>Hook Assist Scribing, a mechanical aid for human operators doing scribing that can reduce OH&amp;S issues and increase yield;</li> <li>Develop alternative means of band saw utilisation designed to meet which remove operators from the immediate proximity of the exposed saw blade;</li> <li>Redevelopment of OH&amp;S kit to extend the latest R&amp;D solutions to industry and provide initial implementation training on new technologies that reduce OH&amp;S risks;</li> <li>Research into a saw blade resistant glove alternatives for operators working with cutting and boning technologies;</li> <li>Review and/or benchmark existing configurations to identify where technologies may be applied for picking and packing and within these, what the value add would be for the industry;</li> </ul>	4,131,336
Production efficiencies				
Innovative products				
Speed and adoption				
Innovative				

## MISP STRATEGIC IMPERATIVE 5: INNOVATION

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
Capacity to innovate	Increasing productivity and net value	New and innovative products	• Maintain and develop improved resources to facilitate the commercial evaluation of new product and technology opportunities;	829,000
Production efficiencies			• Raise industry awareness of emerging trends, opportunities in new products and value-adding technologies;	
Innovative products			• Cost benefit analysis and evaluation of value adding opportunities and performance;	
Speed and adoption			• Implement open innovation process to identify and develop novel value propositions.	
Innovative			• Improve the functionality of the top five bioactives in order to differentiate the products in the world market;	
			• Develop more cost effective purification technologies for Australian bioactives.	
			• Develop new technologies to enable transformation and value-adding of low value cuts.	
			• Develop significantly innovative red meat products via the development and application of new processes and technologies;	
			• Develop products and protocols for high connective tissue cuts.	
			• Support enterprises and supply chains implementing value adding strategies with research and technical advice.	

## Highlights and outcomes from AMPC research, development, marketing and extension activities

### Beef Hock Location Vision System

The purpose of this project was to develop a robust Time of Flight vision system capable of locating and tracking the rear hocks of cattle to support further development of beef automation. Operations such as autonomous horn and hock removal may be automated by utilising a Time of Flight vision system to track the both hocks and horns in real time. A robotic manipulator may then be guided into precise locations to detach these features from the carcass. Time of Flight vision technology can assist in the 'pick and packing' process of primal cuts in commercial abattoirs. A Time of Flight vision system would be beneficial over conventional camera systems because they provide 3 dimensional information of the scene, reducing the need to integrate and collate multiple sensors. The Time of Flight camera can directly relay position data to an industrial robot to guide the actuator in for picking. The need for the vision system to produce predictable and repeatable results over extended periods is paramount to ensuring reliability and commercial viability. This project oversaw the successful design, development, and implementation of a bovine hock tracking system utilising state-of-the-art sensing technologies and algorithms. This project has demonstrated the capabilities of the emerging technology of Time of Flight (ToF) vision within dense, unstructured environments. Future work will investigate the potential application of ToF to a range of bovine and ovine automation challenges.

### Bladestop™ Technical Review

AMPC is committed to improve safety and reduce risks and hazards at meat processing plants.

AMPC is working with MLA on the delivery of a band saw safety mechanism that greatly reduces the risks associated with band operations. A technology has been developed which consists of a circuit board that triggers a blade stopping mechanism whenever human flesh is in contact with the blade. The Bladestop™ system acts fast enough to avoid major injury to the operator.

The R&D phase turned out to be a much more complex process than originally expected, with the design of the components requiring several iterations (e.g. need to address reliability issues relating to robustness of the mechanical latching components. It was also found that current industry standard for saw speed has changed during the course of the project from 720rpm to 1440 rpm especially where heavier beef bone cutting work is involved). The typical challenges of any new development have been exacerbated by a safety system that demands stringent requirements and total reliability. The initial plan was to retrofit existing band saws with Bladestop™ kits, but this approach was subsequently found to be too difficult due to the multiple complications arising from integrating the electronics and mechanisms to the wide variety of band saws installed in processing plants plus the poor condition of some saws. Eventually

it was determined that a new system would need to be designed from scratch and integrated into a brand new saw.

Bladestop™ is progressing to enhance the current design based upon the outcome of earlier commercial trials prior to further roll out of Bladestop systems to Australian processors. Three Prototype Bladestop systems are currently undergoing testing at NCMC, ACC and Gundagai. Further Industry Roll-Out planned upon completion of 3 new design saws installed and tested mid-2013.

### **Automated Beef Hock Cutter Project**

This project aimed to successfully automate the beef hock cutting process using suitable sensing technology, a robot and a cutting tool. The sensing aspect of the system was to build off previous work done by Food Science Australia using thermal imaging. The current manual process requires the use of a heavy and powerful hydraulic tool which poses significant OH&S risks. The main motivation for the project thus lay in the potential to increase safety in the industry. There were also expected financial benefits with respect to labour and training. The system has been designed, trialled, installed and commissioned at Swift's Dinmore facility and, in spite of the large number of constraints placed on the system, is operating in full production, completely autonomously with a success rate of over 97%. Although significant challenges were faced, the project has thus proven that it is possible to successfully automate the task of beef hock cutting.

### **Verification and Commercial Proving of Spray Chilling in Australian Beef Plants – Phase 2**

Spray chilling is the intermittent spraying of carcasses with water to minimise carcass weight loss (shrink) during initial chilling. It is widely used in the USA but had not gained wide acceptance in Australia possibly due to the perception that the shelf life of vacuum-packaged meat is reduced. AMPC supported JBS Swift Australia to evaluate spray chilling. A system was successfully installed and operational parameters were devised and tested using a spray system that incorporates nozzles that deliver water flow rates between 19 and 48 litres per minute at 2 bar (200kpi). The water is delivered in a series of spray cycles for a specified time per cycle to reduce dehydration of the carcass during refrigeration (e.g. 8sprays for 24 seconds each / every 30 mins in the first 3.5 hours). The number of spray cycles per carcass is dependent on the expected duration of chilling, the chilling performance, the type of the carcasses and the expected end target. Trials have been successfully conducted to introduce spray pattern variations, based on the type of carcasses being chilled and the duration of the expected chilling. Depending on the length of refrigeration, carcasses have been sprayed across a range of 3 spray cycles to as many as 16 spray cycles. Each spray pattern is delivered for approximately 24 secs. Refrigeration is switched off during spray cycles but does run between spray cycles for 24 – 30 mins. Depending on chiller size water usage per cycle is approximately 400 litres. Water is delivered via a heat exchanger to deliver spray water at 18°C. There has not been any noticeable change in any chilling, shrink or eating quality standard due to the reduction in spray water temperature. Comparative weighing of spray sides against the equivalent opposite sides (conventionally chilled) has again indicated significant reduction in weight loss. There was no detriment to the shelf life, purge or eating quality characteristics of the product.

### **Ovine Shoulder Machine – Stage 1 & 2**

The aims of this project were to develop and trial an engineered solution capable of breaking up the shoulder primal from an ovine carcass into sub primal cuts and to eliminate operator contact with bandsaw operation during this process. The specific cuts required to achieve the first aim involved the separation of the neck in one piece, removal of the shank and brisket segments and the splitting of the remaining piece into two square cut shoulder pieces. These cuts are presently performed using a bandsaw and involves a minimum of 3 bandsaw actions. Eliminating operator contact with bandsaws by defining and building a low cost machine that performs the breakup of the shoulder was a key driver of this project. Measurements of carcass features provided the data for the specification of mechanisms and machine features including sensory functions to perform the cuts required. Further data enabled analysis in order to meet the specification of the end product, deliver the square cut shoulder, and manage issues related to variability in the shoulder primal. Measurements were performed on carcasses between 15Kg to 40Kg in an initial trial. The measurements resulted in demonstrating the degree of variability of the shoulder primal dimensions and identifying the carcass positions important to consider for the design of the technology. The engineering of holding mechanisms and the development of sensing trials for cutting positioning with specific consideration of the features have also been achieved. The second stage involves testing and refinement of the equipment as part of commercial trials.

### **Bandsaw Benchmarking Project**

Band-saw operations remain extensively manual and difficult to manage in the meat industry due to the OH&S risks. Combined with safety issues, the operation of a bandsaw is notoriously difficult to manage given its repetitious nature. Due to recent changes to OH&S legislation bandsaws are no longer able to run unprotected, requiring the machinery to be shut down when the operator is not within the operational vicinity boundaries. The Australian meat industry is aware of the problems and there is a need to ensure that short, medium and long term solutions are developed and implemented in the industry. This project aims to benchmark the available solutions, previous investments, commercial options and future technological development needs for industry. Benchmarking this information against the 20 or more cuts required for individual carcasses is an important step towards ensuring that gaps are identified and that extension and adoption opportunities can be delivered to industry. This project will also benchmark the yield impacts associated with a range of guarding, jigs and other adaptations to bandsaws that are in operation which will be critical to the communication and implementation of these solutions in a range of different processing facilities. The project will include benchmarking and accounting for existing investments in more advanced technologies such as blade stop and other engineered solutions that need to be further researched and engineered for the longer term. A focus group of meat processors is working to identify a range of short, medium and long term solutions to address the challenges presented by bandsaw use across the industry. The initial benchmarking exercise has been completed with data collected on products, process and yield now underpinning the development and implementation of options to further develop, engineer or extend solutions to industry.

## New product development

Red meat products need to be designed and tailored to meet current and emerging needs of consumers and markets, if Australian processors are to remain competitive in the domestic market and on the world scene. A key objective is to increase carcase values and overall profitability by developing new, value-added products for red meat and co-products. Research to develop new and innovative products range from investigating options for tailored ready to eat meals to high value ingredients such as those utilised by the pharmaceutical, nutraceutical and cosmetic industries. Specifically, this program focussed on:

- Maintaining and developing improved resources to facilitate the commercial evaluation of new product and technology opportunities;
- Raising industry awareness of emerging trends, opportunities in new products and value-adding technologies;
- Implementing open innovation processes to identify and develop novel value propositions;
- Developing significantly innovative red meat products via the development and application of new processes and technologies;
- Supporting enterprises and supply chains implementing value-adding strategies with research and technical advice.
- Investigations into bioactives, enzyme and value adding ingredients was also a key area of focus. Activities in this area included the following:
  - Improving the functionality of the top five bioactives in order to differentiate the products in the world market;
  - Developing more cost effective purification technologies for Australian bioactives;
  - Completing an evaluation of the feasibility of developing competitive advantage for bioactives from reduced cost of production;
  - Undertaking a study into the value chains for four blood derived bioactives to increase understanding of requirements for successful entry into the bioactives market;
  - Studies are still ongoing to develop solvent free processes for the production of bioactives BSA and chondroitin sulphate; the potential to enhance bioactive levels from organs and assess feasibility of production of therapeutic proteins in organs;
  - Studies to examine the functionality of the proteins within bovine plasma and serum as food ingredients; the bioactivity of compounds in meat and bone meal as feed ingredients; and alternative value-adding uses of tallow and hides;
  - A review was completed on the Australian blood processing capacity and current capability;
  - Brochures were disseminated on the business cases for the top four blood bioactives for the processing industry;
  - A kinetic study of the potential of seven enzymes to tenderise red meat and their susceptibility to inhibitors was conducted. Further work involved developing products and protocols for high connective tissue cuts, undertaking cost-benefit analyses to quantify industry benefit from increased effort and activity in value-adding and further developing the SmartShape technology for commercialisation. Demonstrations were held to promote these activities to processors, food service providers and technical experts.



## Trial Installations for Sheep and Beef Components – Project Smartstimtm

SmartStim™ is a new development in the electrical stimulation of carcasses, further improving on the earlier stimulation systems installed in many processing plants. Electrical stimulation is a process of applying special electrical waveforms to carcasses to minimise the toughening effect on meat during subsequent refrigeration. Stimulation has been used in a relatively uncontrolled way in Australia since the 1980's, however, beginning in 2000, Industry funded research developed more practical stimulation equipment which could be retrofitted to existing processing plants relatively easily. This new approach to stimulation made it possible to produce consistent and reliable stimulation effects (improved tenderness) across the diversified Australian meat processing environment for the first time. SmartStim™ represents the next generation in the evolution of stimulation technology. It gathers information about each individual carcase by applying a series of carefully selected electrical pulses and measuring the carcase reaction through a load cell. This predicts some key attributes (pH, ultimate pH and tenderness) and the system can use this information to give each carcase the exact dose of stimulation required. Existing equipment can be linked to SmartStim™ with the latter controlling the amount of stimulation provided by the First Generation equipment.





### **The Sheep CRC**

Since 2006, AMPC has been working with the Sheep CRC investing in program 3 'Next Generation Meat Quality'. Now in its 7th year, this program is designed to increase the rate of improvement of lean meat yield (LMY) and meat quality through delivery of genetic and non-genetic tools. These improvements are delivered through specific objectives focussing on LMY, eating quality and nutritional value of lamb and sheep meat. Through the collaborative CRC partnership, Projects 3.3 (LMY and Supply chains) and 3.4 (Application of Meat Processing Technologies) which underpin program 3 are delivering on these objectives with increases in efficiency and productivity and added value to the red meat processing industry.

### **Lean Meat Yield and Supply Chains**

This project involves the sheep CRC providing processing plants with a business value analysis service to help quantify the economic value of implementing processing changes designed to enhance LMY and its measurement. This service has resulted in improvements in boning decisions, enhanced producer feedback delivery, and the development of value based bonus payment systems for superior lean meat yield carcasses. Analysis of growth and carcass data generated from the CRC information nucleus

Flock (INF) has shown high heritability of LMY traits. These data have continued to be collected during 2011-2013 through the use of carcass scanning technology at AMPC member plants.

### **Application of Meat Processing Technologies**

The objective of this program is to contribute to the development and validation of technologies allowing the measurement and improvement of meat quality. These objectives will be evaluated by the adoption of new methods to predict lean meat yield (LMY). Using a range of technologies for carcass measurement that are to be evaluated in the calculation of LMY including Probes to measure GR, C site fat, and eye muscle depth; and Scanning and vision system technologies, It is envisaged that the benefits arising from this research will help identify appropriate in-plant LMY measurement technologies leading to a potential value increase of up to \$10 per carcass. This benefit will vary depending on the ease at which fabrication or retro fitting to existing processing plant layout can be facilitated. The strategic investment in the previous MIS and the future TMIC program has allowed a more direct and effective way of communicating current knowledge in the meat science field whilst simultaneously facilitating the building of capability in the meat science area ensuring suitably skilled and trained scientists will be operating and benefitting the Australian red meat processing industry in the future.

### **Electrical Stimulation Audit**

Electrical stimulation (E-stim) enhances quality of meat by improving tenderness and meat colour parameters. The application of an electrical current through a Medium voltage system is an effective way of controlling the rate of pH decline of carcasses post-slaughter. Furthermore, because the rate of pH and temperature decline of a carcass can significantly affect meat eating quality, Sheep CRC research has shown the percentage of carcasses achieving pH targets of 6 under stimulation between 18–35°C when compared to no stimulation increased markedly to 90% from a baseline 14% re-enforcing the added benefit the process of E-Stim can apply in the meat processing industry.

In addition to the LMY and Supply Chain RD & E work currently underway, AMPC with MLA are investing in a Supply Chain Officer to assist the lamb processing sector to engage in whole of supply chain improvement of LMY and eating quality. This role will assist with providing CRC meat science and carcass measurement findings to develop feedback systems and decision support tools to deliver RD & E outcomes to both producers and the processing industry. AMPC will continue investigating options for the continuation of RD&E outcomes post CRC.



### ***Barriers to adoption of technologies***

There are many factors influencing the adoption of technologies. The barriers present in the red meat processing industry are specific to the individual needs and priorities to the processing plant. This project review hypothesised that cost is not the only barrier and that OHS, labour and efficiency are not the only benefits for plants adopting technology. Economic outlay for the technology or perceived cost can vary markedly from actual cost when all variables are considered. Other variables including training and maintenance requirements, throughput, access to capability and providers, payback period, and installation costs also play a critical role in the decision making process. Furthermore, there may be other competing priorities in the business, and acceptability and perceptions critical in gaining customer acceptance such as cut and packaging specifications, consistency of operation, consistency of product and issues with retro-fitting and skilled labour availability. There is a need to effectively assess barriers to adoption in order to design an effective delivery program to drive the uptake and implementation of RD&E outcomes. For the area of technology and automation, in addition to the economic and product integrity drivers for adoption, there are also practical barriers including floor space availability,

footprint, numbers of personnel on floor (and costs), OHS, hygiene, training, increasing production, processing efficiency and yield improvements, changing specifications for customers, previous experience, flexibility to respond to market changes, inventory management, reduction in waste product, processor beliefs, and the ability to rapidly adapt and respond to market changes. It is with investigating these drivers further that better decision making can be undertaken with regards to investment and delivery in this area. It is also recognised that detailed analysis of the “barriers” to uptake would lend itself to establishing targeted strategies to overcome these challenges with providers and processors and improve current adoption.



# MISP Theme 6: Marketing and promotion

## OUTCOME

Focus on the consumer to continue to achieve profitable growth in demand for Australian red-meat and livestock products.



## MISP Focus Areas

### POSITIVE ATTRIBUTES

Promote the positive attributes of red meat to engender consumer trust so red meat becomes the product of choice.

### PRODUCT VERSATILITY

Promote the versatility of red-meat products to meet the demands of changing consumer eating patterns.

### BRANDED PRODUCTS

Assist with the development and utilisation of appropriately branded products in selected markets to enhance consumer confidence and increase profitability.

### MARKET DIVERSIFICATION

Seek opportunities for commercial expansion into a greater range of markets, and further penetration of existing markets, to broaden marketing choices and more evenly distribute risks associated with market downturns.

### MARKETING TECHNIQUES

Adopt new marketing techniques and encourage retail innovation to maximise efficiency and effectiveness in growing demand for red meat and livestock.

The food market is an extremely competitive environment and there is now a greater demand for convenience and lifestyle solutions and the preparation of cuts for a wider range of meal solutions. There is also strong segmentation in the retail sector between premium, midrange and commodity products from retail and specialist butchers. The plethora of outlets and offerings competing to satisfy consumers' needs and the wide range of often conflicting messages and enticements mean that industry must ensure a coordinated and strategic approach to enhancing demand for meat products. A high level of consumer confidence in product performance is necessary for food-industry category

success. In terms of research, development and marketing, a key aim is to continue the development, delivery and reinforcement of key messages that encourage consumer and end user support for beef, lamb and goat products. This program is directed at promoting and enhancing the eating quality and nutritional attributes of red meat, as well as increasing the demand by consumers of red meat products.

## MISP STRATEGIC IMPERATIVE 6: MARKETING AND PROMOTION

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
Positive attributes	Driving demand	Promote and enhance the eating quality and nutritional attributes of red meat	<ul style="list-style-type: none"> <li>Develop, deliver and implement processing technologies and processes that contribute to optimal eating quality, nutrition and consistency of product;</li> <li>Identify pre-slaughter practices that impact positively on eating quality while also achieving nutritional content and productivity objectives;</li> <li>Determine pre-slaughter practices and measures that correlate with meat quality, nutritional content, product attributes, shelf life and yield;</li> <li>Examine the effects of specific product attributes on consumer acceptability and product quality.</li> <li>Continue investment and communication of evidence on the benefit of healthy beef and lamb diets for meeting nutrient requirements and preventing obesity and chronic disease at key life stages.</li> <li>To manage issues by gaining support from key influences by partnership (e.g. Dietitians Association of Australia) and communications on the role of Australian beef and lamb in a health and sustainable diet.</li> <li>Contribute to the red meat industry issues plans and publications that provide information on role of red meat in the diet;</li> <li>Deliver key health messages to GPs, child health nurses, and nutrition experts through advertising, direct mail, publications, conferences, seminars, on-line and events;</li> <li>Launch a new consumer campaign supporting the nutritional benefits of beef and lamb.</li> </ul>	2,451,022
Product versatility		Growing demand for red meat products in the Australian community	<ul style="list-style-type: none"> <li>Beef promotional campaigns focused on 'summer barbecues' and 'winter meals'.</li> <li>To maintain lamb as a routine habitual purchase by building national pride in lamb and encouraging consumers to buy and cook a wider range of lamb cuts/meals via consumer promotional efforts around specific community occasions throughout the year.</li> <li>Lamb promotional campaigns for spring, Australia Day and Lamb Roast (Autumn).</li> <li>Work with retailers and foodservice operators to raise standards of Presentation, quality, merchandising and promotion.</li> <li>Retailer-specific promotional activities supporting MLA campaigns and/or red meat in retailer campaigns;</li> <li>Foodservice promotional program including publications, promotions and education activities;</li> <li>Support retailer and foodservice initiatives on new products, new merchandising developments and new promotional techniques.</li> </ul>	2,326,000
Branded products				
Market				



## Highlights and outcomes from AMPC research, development, marketing and extension activities

AMPC has worked with MLA and other red meat industry organisations involved in the MOU, to build consumer recognition about the health, nutritional and functional benefits of red meat. Targeted activities included consumer engagement and the development of key messages about taste, enjoyment, health, popularity, convenience and value for money. AMPC invests via MLA to deliver key achievements including:

- Focus on the commercialisation of SmartStim, SmartStretch and New Generation stimulation technologies, and a large heat toughening study was completed;
- Application of Near Infrared and SmartStim technologies to online prediction of carcase attributes delayed due to equipment issues;
- Sheep CRC-generated research breeding values for tenderness and intramuscular fat in sheep and provided the basis for breeding values for iron, zinc and omega-3 content, with new consumer grades;
- MSA sensory testing has been used to commence the evaluation of varying electrical stimulation methods, gene markers for tenderness and extended aging periods;
- Eating Quality Assured (EQA) has been replaced by a single MSA trademark for use in domestic and international markets to enable flexibility within marketing programs;
- Workshops were conducted by Meat and Livestock Australia (with AMPC investment) with experts in early childhood to identify opportunities for future research funding.
- Meat and Livestock Australia, with funding input from AMPC, continued funding 11 studies and funded four new studies into red meat's role in the health of infants and toddlers; young women; the elderly; red meat consumption patterns; and cooking practices;
- Two DAA -hosted symposia were held on early childhood nutrition and weight loss in young women and a "paddock to plate" master class for 18 key media dieticians and influencers;
- Updated beef mince nutrient composition data was supplied to Food Standards Australia New Zealand (FSANZ) for use in forthcoming analysis;
- Information was provided to the National Health and Medical Research Council on environmental programs and evidence on the role of red meat in a sustainable and healthy diet as part of their review of the Australian dietary guidelines;
- The healthcare professional campaign delivered the 'EnergiZn LiFE' GP campaign; held trade exhibition at the dieticians and child health conferences, launched and disseminated 150,000 "How to make every bite count" brochure to child health nurses, dieticians and consumers; as well as Quarterly Vital newsletters ,to 4,000 dieticians.
- MLA, on behalf of the red meat organisations including AMPC, continued the 'Red Meat Amazing Food' campaign including successful sponsorship of Junior Masterchef and cooking advertorials in The Circle, back-to-school point of sale, and secondary advertising targeting mum's with babies;
- A quarterly report was published on emerging value added meat products drawn from international product release monitoring;
- Spring fashion-themed campaign saw average weekly lamb servings rise 8.7% from 21.8m to 23.7m year on year according to Roy Morgan.
- The Australia Day Lamb campaign featuring Sam Kekovich broke records with a 31% increase in lamb sales on Australia day week, and 13% increase in the 4 week period in January;
- (Nielsen Homescan). The campaign also won the prestigious silver 'Effe' for best food campaign at the annual advertising industry effectiveness awards.
- The 'Nothing Beats Beef' campaigns in 2011-2012 focussed on the desirability of beef meals. The summer campaign increasing the perception that beef is 'perfect for BBQs', the launch of a beef cooking iPhone application, outdoor media and a strong PR campaign. The winter campaign re-aired the Beef Curry TVC, the launch of 'foodie' Meat & Co magazine, and the Beefgiving 'Julia and Tony' online video, which attracted over 200,000 views;
- Five intrastate tours and one national tour including a retail expo were conducted, with over 400 independent meat retailers, one international tour to New Zealand with 33 butchers;
- Twenty-four Chef's Tables events focussing on beef and lamb 'Masterpieces' and sponsored various restaurant, hotel and club awards programs were held and fifteen beef 'Masterpieces' master classes with 335 attendees also held;
- On behalf of AMPC MLA has developed 3 more value adding manuals for beef and lamb wilst delivering 23 "counter attack" workshops with 913 participants around the country to encourage increased carcase utilisation focussing on non-loin cuts, since its inception 117 workshops have been held with 3211 participants
- Account management programs in place with major supermarket and foodservice accounts further enhancing the strong presence of beef and lamb promotional programs

A refreshed MSA 'Graded' symbol was launched in October 2011 with supermarkets and 600 independent retail butchers accessing the symbol and new point of sale material, a 30 second "What's New" infomercial and a print media campaign were implemented across the country for 3 weeks from February 2012, consumer awareness of the MSA symbol peaked at 50% before declining slightly to 40% of consumers. MLA supported 30 MSA underpinned brands via the Industry Collaborative Agreement (ICA) program on the Australia domestic market during 2011-12.



### **Improving Beef colour**

The aim of this project is to understand the factors that cause colour variations in beef muscle in order to develop strategies to improve meat colour at grading. The incidence of Dark colour at grading of beef carcasses is one of great economic expense. It is estimated that up to 7% of MSA graded carcasses fail compliance for colour costing between \$5.9 and 9.8 million per annum. The objectives of this project are to investigate slaughter factors that contribute to variations in beef colour, Investigate the influence of beef meat colour at grading on shelf-life, eating quality and water-holding capacity, and to further enhance the development of capability in the meat science area within CSIRO. In addition to a thorough literature review on the subject, factors including category of animal, days on grain feed (DOF), ultimate pH (pHu), temperature at pH 6 and the time from slaughter to grading have been recorded and are currently being analysed. Samples are further destined for eating quality and muscle biochemistry analyses to determine relationships between causative factors of dark colour with processing conditions and meat science measures. Following elucidation of dark colour causative factors, a report will be developed to relay the qualities associated with beef colour variation.

### **Ultrasonics to improve meat texture**

Improvements in the colour and tenderness characteristics of both lamb and sheep meat has long been a strategic industry priority. The effects of soundwaves at sufficiently high power range or ultrasonics can alter the intrinsic properties of foods it is passed through. It is postulated that when applied to meat pre-rigor, ultrasonics can accelerate metabolism and proteolytic activity. It is envisaged that this approach could assist with the tenderness and colour characteristics of hotboned product and reduce cold toughening. This project was a proof of concept and it found different frequency ultrasound, storage, and sample ageing applied to post-rigor muscle under specific combinations of ultrasound applications and sample storage, meat tenderness and colour attributes have been shown to be effected. Data analysis for colour changes and metabolism due to ultrasonic treatment of pre-rigor beef muscle is continuing.

AMPC in partnership with MLA will continue to seek opportunities to apply science to the development of food standards, regulations and approaches that may improve public health and ensure a continued favourable trading position for the industry. The Program will increase focus on RD&E in product, process and systems and adoption activities, as well as communication with public health organisations and the community.

# MISP Theme 7: Economics and infrastructure

## OUTCOME

Foster economic reform and infrastructure investment to enhance the capabilities of our industry.



### MISP Focus Areas

#### TRANSPORT INFRASTRUCTURE

Pursue an improvement in domestic transport rules and infrastructure, including road, rail and port, to facilitate the more efficient carriage of livestock and meat products within Australia.

#### QUARANTINE AND BIOSECURITY

Seek an efficient and streamlined quarantine infrastructure through appropriate consultative structures with government and the broader agricultural industry.

#### COMMUNICATIONS INFRASTRUCTURE

Press for improved communications infrastructure, including rural mobile telephone and broadband services, to enable improved industry productivity.

#### INPUTS TO PRODUCTION

Ensure improved availability and affordability of inputs to food production by pursuing the removal of government-imposed policies that unduly distort agricultural markets.

## Summary of AMPC key focus areas under MISP theme 7: Economics and Infrastructure

AMPC carry out a range of research projects involving economic analysis and related disciplines, tending to integrate these with other more technical research areas, such as environment and climate change analysis, technology and process automation analysis and product development or infrastructure and capital analysis. Certainly, cost benefit analysis and related evaluation methodologies are applied by AMPC across the entire R&D portfolio as these tools are critical towards investment decision making, analysis of impacts to industry and identification of

future opportunities and consequences of both technical, social, political and economic outcomes. These research projects assist the broader R&D strategic planning activities required to ensure an accurate, balanced and effective research and development portfolio underpinning processor priorities.

## MISP STRATEGIC IMPERATIVE 7: ECONOMICS AND INFRASTRUCTURE

MISP FOCUS AREA	AMPC STRATEGIC IMPERATIVE	AMPC FOCUS AREA	AMPC PRIORITIES	INVESTMENT \$
<b>Transport infrastructure</b> <b>Quarantine and biosecurity</b> <b>Communications infrastructure</b> <b>Inputs to production</b>	Marketshare efficient, accessible and attractive for investment Increasing productivity and net value Sustainable and responsible processing practices that meet consumer expectations	Sustain national resource base Promoting industry role Stakeholder consultation and engagement	<ul style="list-style-type: none"> <li>Investigate facility design and establish a resource that consolidates best practice engineering information for livestock facilities at processing works;</li> <li>Yard and lairage design module development;</li> <li>Stunning and slaughter design;</li> <li>Technology and process automation and engineering;</li> <li>Analysis of inputs to processing business efficiency</li> <li>Development of biosecurity standards for meat processors;</li> <li>Development of biosecurity training for meat processors.</li> </ul>	

## Highlights and outcomes from AMPC research, development, marketing and extension activities

### *Analysis of the practices in slaughter, carcase handling and break up, de-boning and end of line operations*

This study reviewed slaughter, boning and materials handling tasks based on a typical medium volume processor in Australia considering improvements and automation opportunities. Concept solutions using robots in a multi-tasking function were presented. In cases where tasks may be combined and paired

together (e.g. hock cutting (before and after hide pulling); belly opening and viscera separation, splitting and spinal cord removal, higher rates of return would be expected. By using robotics where pre-cutting of carcase sides can be done using vision guided systems, yield optimisation becomes practical. Separating main primal pieces whilst keeping each piece still attached to the body of the carcase reduces handling costs and facilitates a cutting room design with minimum number of cutting, trimming and boning stations. Using flow line concepts and track-able bagging provides the means for more efficient case packing and end of line operations. At the same time better yields may be expected. An assessment of returns on investments indicates that single shift operation does not meet 24 month return on investment expectations. Strategies to reduce capital cost or make better use of resource in a 2 shift operation present faster returns as would be expected.

### *Environmental Performance Review (benchmarking)*

Recent activity across a range of projects has focussed on developing tools to measure, benchmark and report on resource management and the overall environmental performance of the meat processing sector. A study aimed at compiling this information into a national performance review has since commenced to capture data that demonstrates changes in water and energy use, waste management and overall efforts towards reducing emissions. The study will develop targets for

water, energy and greenhouse gas use and it is intended that the data be combined with a similar study underway in feedlots and production, such that whole of supply chain information and measurement can be quantified.

The study will also account for energy, water, waste and greenhouse gas data relating to components of the processing establishment, as well as specific product outputs such as hides, offal and whole, part and primal cuts and carcasses. A baseline will be established in order to measure change over time and comparisons will be made against previous data collected as well as performance data for other primary industry sectors. Site visits will enable direct measures to be taken as well as an industry-wide survey to validate data capture and compare with the results of previous studies and NGERS outputs. The study remains underway in 2013.

### *Meat Processing Carbon Tax Economic Modelling – Firm & Plant Analysis*

AMPC commissioned an economic model to be developed that would model the beef and sheep meat processing industry to analyse the impact of the carbon tax on meat processing. The model uses inter-industry analysis, which provides a detailed picture of the economic structure at a point in time and can be used to estimate the contribution or impact of a particular sector of the economy including flow-on or multiplier effects.

Using inter-industry analysis, a model has been developed that estimates the economic impact of the Australian beef and sheep meat processing industries on the Australian, State and four selected regional economies. The output from this model has then been used to measure the impact of the carbon tax on the meat processing sector. The report summarises the economic impact of the Australian beef and sheep meat processing industries on the Australian and State economies. The project analysed the economic issues associated with the carbon tax as it affects the red meat industry and described the results of the modelling that



measure the economic impacts of the carbon tax on the industry. In constructing the model, and now subsequently in analysing the impact of the carbon tax, with the assistance of AMPC, leading beef and sheep meat processors have provided detailed information about their income and expenditure, and also valuable commercial information on the operation and drivers of meat and livestock markets in Australia and internationally.

**Economic contribution of meat processing** The Australian Meat Processors Corporation (AMPC) commissioned an economic analysis of the demographic and financial snapshot of the red meat processing industry in Australia. The assessment is based on primary data gathered from beef and sheep meat processors for the 2009-10 period as part of an earlier study to develop a model of the red meat processing sector. Input-output tables prepared for that study were augmented with the construction of new tables representing the red meat processing sector as a whole. The red meat processing sector makes a significant contribution to the national economy and to the economies of each state. In addition, at a regional level the contribution can be even more noteworthy in terms of the proportion of gross regional product or total full-time equivalent (FTE) employment supported.

### **Processing Industry biosecurity training**

Underpinning the above project to develop industry biosecurity standards and revise the Animal Health Australia (AHA) meat processing manual will be the development of training materials for integration into the meat processing industry training programs as a unit or equivalent. The training will include endemic and exotic disease identification practices, ante-mortem practices and a range of reference material for guidance during an emergency disease incident. This project is still under development (as it underpins the above project) and will commence in 2013.

### **Evaluation of implementation of carbon mitigation clean technology in industry**

Australian Meat Processor Corporation Ltd (AMPC) commissioned an evaluation of the Clean Technology Food and Foundries Investment Program (CTFFIP). The first stage of this study addresses an analysis of the CTFFIP applications submitted by red meat processing facilities to identify the costs and benefits associated with each project. The Clean Technology Food and Foundries Investment Program (CTFFIP) was established by the Federal Government in February 2012. The CTFFIP assists Australian food and foundry manufacturers to invest in energy-efficient capital equipment and low-emission technologies, processes and products. The program is competitive whereby applications must meet eligibility criteria and rate highly against merit criteria to receive a grant offer. As at 7th March 2013, total grants under the CTFFIP of more than \$59 million had been approved, reflecting total project investment in energy-efficient capital equipment and low emissions technologies of \$159 million. Almost \$23 million in grants has been allocated to applicants in the meat, poultry and smallgoods manufacturing sector, equating to total project investment in that sector of more than \$51 million. A total of 25 projects have been approved in the meat, poultry and smallgoods manufacturing sector and these are covered in the evaluation report (underway in 2013).

### **Analysis of slaughter design and operations for future infrastructural investment decisions**

AMPC commissioned an assessment and recommendations for opportunities to advance processes in respect of slaughterhouse operations for beef and lamb production. The project specifically focussed on current practice and hygiene in operational steps including primary operations such as hide or pelt pulling and secondary operations including evisceration; hygiene, contamination, cross contamination and microbial control processes; improvement opportunities through change of practice or management process; improvement opportunities through adoption of existing methods and technologies and possibilities for new practices and technologies to be researched and implemented.

The focus and reporting was primarily on hygiene and contamination or its containment/prevention, however aspects of technology, process efficiency and relevant areas of consideration such as yield, capital infrastructure and environmental issues and energy conservation were included. The report is currently being finalised.

### **eMTC Business and technical development**

Over the last 10 years numerous demonstration projects and commercial trials have been undertaken to develop and provide the value to industry of the use of globally recognized commercially applied information standards. Global information standards refer to numbering, bar coding and electronic messaging (e-Messaging) standards for specific red meat supply chain activities. Red meat industry guidelines have been developed by our industry from the global standards for trade and commerce. GSI Australia manages these global standards. Previously, MLA commenced an industry funded project in collaboration with AQIS to develop the standards to support an electronic version of the MTC. This 2011 project supported by AMPC involved applying and delivering technical expertise for the electronic exchange of regulatory data between companies and AQIS (now DAFF).

The project involved furthering the data management systems to enable continued migration of maintenance of approved standards to AUS-MEAT, building in GSI bar coding and product numbering standards in existing red meat industry training packages, the finalisation and release of the Guide to Information Standards CD, recommendations for the RMSCC Committee on Australian Meat Industry Language and Standards, development of projects for the meat industry bar coding and product numbering standards, finalisation and industry endorsement of the electronic Meat Transfer Certificate (eMTC) and the adoption and roll out of the eMTC. The tasks to achieve the above were undertaken throughout the year. A number of impediments were encountered and strategies are being devised to manage these by relevant industry committees.

### ***Opportunities of using recycled water for sustainable food production and manufacture (CSIRO Center of Excellence)***

This project aimed to identify and enable water recycling opportunities through an integrated systems analysis and technology assessment in the agri-food industry. Effort will focus on addressing current industry challenges, including regulatory and policy pressures, developing strategies to increase acceptance by consumers of water recycling and enhance the sustainability positioning with customers/consumers, economic/ higher value-proposition evaluation and applying new technologies /risk assessments to enable broader and increased implementation. In association with industry collaborators the project team will seek to achieve demonstration of higher-value opportunities to enable the implementation of strategies for water recycling to deliver economic, environmental and social benefits to the agri-food industry and community. The project will have a cross-sector approach with outcomes addressing water recycling interests with stakeholders in meat, dairy, horticulture and broader food manufacturing and retail. Systems analysis will define sources and sinks for recycled water in the dairy, meat, processed food and water utility industry sectors.