

final report

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Review of Hardwicks Stage 1 CISP & design of Stage 2 Co-Innovation Program

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Executive summary

The purpose of this project was to evaluate the impact and outcomes of the Hardwick's/MLA Collaborative Innovation Strategies Program (CISP) Stage 1, as well as provide recommendations for development of a proposed Stage 2 Co-innovation Program.

Key Performance Indicators (KPIs) were reviewed and revised in conjunction with Hardwicks Innovation Manager to ensure that they incorporate measures that demonstrate past success, as well as measures that indicate future success.

The developed KPIs and the major projects which have been identified and are now underway are expected to have the potential to deliver significant business benefits to Hardwick's. The estimated benefits for Hardwick's, presently being achieved (or potentially available) from Stage 1 of the CISP total \$7.98M per annum with a net present value (NPV) of \$84.6M. Conservative estimates of economic benefits potentially available to the broader industry from Stage 1 of the CISP total \$20.8M per annum with a NPV of \$217M.

It is considered that the collaborative project has delivered innovation above that which would have been delivered by Hardwicks on a standalone basis. It is noted that additional potential innovation projects have also been completed or commenced by Hardwick's during the period of Stage 1 without MLA involvement. The CISP has therefore assisted in the development of the innovation culture more broadly within the organisation. It is further noted that it is apparent that all Hardwick's senior staff and management are heavily involved in this innovation culture on a day to day basis. It is not considered necessary that a formal process be established in this regard. This may also be the case in similar mid-size meat processors. However it is recommended that this be assessed on a case by case basis based on the structure and management of each business.

The changed (vertically integrated) business model adopted by Hardwick's during Stage 1 has benefitted from the projects and business sustainability has been significantly improved during this period. It is expected that further business benefits will be achieved during an improved process envisaged under Stage 2. In addition, further significant broader industry benefits are expected to be provided during Stage 2 based on the benefits achieved by the program to date.

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1 Background

The purpose of this project was to evaluate the impact and outcomes of Hardwick's Collaborative Innovation Strategies Program (CISP) Stage 1 as well as provide recommendations for development of a proposed Stage 2 Co-innovation Program.

Hardwick's have engaged with MLA in a CISP over the past 3 years. One of the key outcomes of the program has been to develop and manage initiatives to build innovation capability within Hardwick's business operations. In June 2017, MLA and Hardwick's agreed to progress to Stage 2 of the Collaborative Innovation Program. The design of this program will take into account the proposed activity areas within MLA's new Co-Innovation Program.

The new Co-Innovation Program will align with Hardwick's business growth strategy. To establish strategic direction for the program, a joint Hardwicks-MLA executive Steering Committee will be formed to match innovation activities with business and industry priorities.

A requirement of the program was to report on the outputs, outcomes and impacts to Hardwicks and industry. Therefore this project provides an independent evaluation to help measure the outputs, outcomes and impacts of the Stage 1 program, and builds the case for investment in the new Co-Innovation Program.

This project has measured the success of the Hardwick's Collaborative Innovation Strategies Program (CISP) Stage 1 by quantifying the effectiveness of Hardwick's Innovation Manager (IM), dedicated work groups in the specified innovation focus areas and the company as a whole in developing a platform for innovation across the company.

This project has gathered evidence of the impact various activities initiated by the IM and specified innovation champions have had across the company including the areas of operational performance, financial impact and skills and capability development to foster a culture of innovation.

2 Project objectives

The Project Objectives are as follows:

- 1. Identify the extent to which Hardwicks has added value to the Australian value chain through the CISP program;
- 2. Provide insights around opportunity areas that could be further developed by Hardwicks under the new Co-Innovation Program;
- 3. Identify areas or weaknesses in the Stage 1 program resulting in missed opportunity including recommendations on how to engage differently in the future for increased benefit to Hardwicks and industry.

3 Methodology

In order to deliver the Project Objectives, meetings and discussions with MLA & Hardwicks innovation managers were held to:

- list the collaborative investment areas and projects completed with MLA;
- review and refine KPIs and ensure they are measureable, appropriate and provide business value;
- establish baselines for the refined KPIs and evaluate and report the present KPI position ;
- review quantitative and qualitative data from past and present Hardwicks projects to identify benefits and impacts achieved during CISP Stage 1, and review and comment on any projects not completed or unsuccessful, including learnings and any potential for future considerations; and,
- identify value created and how the program has created new value. In particular establish views on whether the collaborative project has delivered innovation above that which would have been delivered by Hardwicks on a standalone basis.

This report details outputs (items, products, etc.), outcomes (what has been delivered to the business financially) and impacts (including potential benefits to industry) of projects achieved during CISP Stage 1. Where outcomes have not been achieved, what potential may still exist for a modified approach has been discussed, and what learning benefits were achieved have been detailed.

The report further details:

- Recommendations for a Stage 2 approach including a suggested program;
- Recommendations on what focus areas would be appropriate for Hardwick's (considering Hardwick's Strategic Plan as well as the 17 modules in the MLA *Insights2Innovation* program);
- Appropriateness of involving Hardwick's at a higher level in the program; and,
- An outline for a potential Stage 2/Stage 3 development program from larger capex/opex investments through to potential business model changes in a Stage 3.

4 Developed KPIs and Estimated Economic Benefits

The following KPIs were refined during the project in conjunction with Hardwick's IM and other senior staff. Measures have been populated where data exists or will be progressively monitored from this time. Some measures are noted where business model changes have initially impacted the KPIs but which are expected to show improvements in future.

The following KPI assessment incorporating a baseline at the commencement of Stage 1, and KPI measures as at October 2017 are detailed below. Estimated economic benefits of specific innovation projects for both Hardwick's and the industry more broadly (should implementation proceed) are included in relation to Focus Areas:

Focus Area	КРІ	BASE KPI 2014	KPI AS AT AUGUST 2017
Innovation resource planning and people management	Number of successful innovation projects undertaken (past success) Measure: 1 per year	• Nil	• 3 Projects
	 Number of innovation projects identified, investigated and considered to be worth further development or proceeding (future success) Measure: 1 per 3 years 	• Nil	• Nil
	• Number of new skilled FTEs directly resulting from innovation projects Measure: 1 per year average	• Nil	 5 (upskilled staff, automation maintainers)
Sustainability	 Number of successful innovation projects undertaken which include sustainability as an output (past success) Measure: 2 per year 	• Nil	• 5 Projects
	 Number of successful grants, funding arrangements, or innovation projects identified or proceeding which are based on, or substantially include, sustainability as a focus (future success) Measure: 1 per year 	• Nil	• 7 Projects
	 External utilities energy and water usage (electricity kWh/tETCW, gas MJ/tETCW, water kL/tECTW) Measure: Progressive Reduction* 	 122.5 kWh/tETCW electricity 542.5 MJ/tETCW gas 2.92 kL/tECTW water 	 154.8 kWh/tETWC electricity 733.5 MJ/tETCW gas 3.73kL/tETCW water

	• Trade Waste volumes (kL/tECTW) Measure: Progressive Reduction*		• 2.82kL, Waste (6 month rolling Dec 2013)	/tECTW Trade volume averages June-	 3.98kL/tECTW Trade Waste volume (6 month rolling averages Jan – June 2017)
Operational Excellence	 Introduction of innovative processing systems and equipme provided measurable improvements (eg: lower production yield, improved OH&S performance, reduced packaging iss success) Measure: 2 per year 	ent which have costs, increased ues) (past	• Nil		• 10 Projects
	 Number of production innovations which have been identifiappear to offer business benefits, and are to be further evaproceeding (future success) Measure: 1 per 3years 	fied and which aluated or are	• Nil		• 1 Project
	Other measures (Confidential to Hardwick's):				
	Beef throughput/week (6 month rolling average)				
	• Smallstock throughput/week (6 months rolling av.)				
	Boning Beef carcasses/week (6 months rolling av.)				
	Boning Smallstock carcasses/week (6 months rolling av.)				
	Offal yield as a % carcase weight		(6 month rolling Dec 2013)	averages June-	(6 month rolling averages Jan – June 2017)
Estimated Economic benefits from CISP Stage 1 in relation to Sustainability and/or Operational Excellence	Project	Estimatea Benefits f	l Economic or Hardwick's	Estir Indu	nated Economic Benefits for Total stry

	Kosher Shearing (P.PIP. 0389)	\$140,000 per annum benefits (NPV \$1.4M)		\$900,000 per annum benefits (NPV \$12.4M)		
	Feasibility Study for Anaerobic Digestion and Biogas Energy Generation (P.PSH.0704)	\$1M per annum benefits \$2 (NPV \$10.3M) \$2		\$2M \$20.	И per annum benefits (NPV D.6M)	
	Refrigeration Audit at a Medium Mixed Species Abbatoir (P.PIP.0400	\$6.69M per annum benefits (NPV \$71M) \$142M)		4M per annum benefits (NPV 2M)		
	Industrial Microgrid (ability to operate independent of the electricity grid) (P.PIP.0745).	\$150,000 benefits () per annum (NPV \$1.4M)	\$4.5 \$421	M per annum benefits (NPV M)	
Marketing and Product Development	Marketing and Product Number of innovative flexible marketing and branding system been implemented which have increased sales or increased in (past success) Measure: 1 project per 3 years Number of marketing/branding/packaging innovations which identified and which appear to offer business benefits, and ar evaluated (future success) Measure: 1 project per 3 years Other measures Confidential to Hardwick's Export sales (kg/month) beef Export sales (kg/month) offal Measures: Progressive Increases 		• Nil • Nil (6 month rolling June 2013)	averages Jan –	 1 Project Nil (6 month rolling averages Jan – June 2017) 	
Estimated Economic benefits from CISP Stage 1 in relation to Marketing and Product Development	Project	Estimate Benefits j	d Economic for Hardwick's			
	Product Sales Seasonality Matrix (P.PIP.0391)	\$40,000	per annum			

		(additiona \$60,000 p (additiona sales) Plus increa pricing	nl beef sales) ier annum al smallstock ase in product	
Supply Chain	 Establishment of benchmarks for feedlot operators (loss gain, animal welfare compliance) (past and future success Measure: To be developed Number of supply chain innovations which have been ide appear to offer business benefits, and are to be further exsuccess). Measure: To be developed 	percentages, weight s) ntified and which valuated (future		Yet to be developed: • Weight gain per day • Stock loss ratio.

*NOTES: Adverse increases in Sustainability measures over the three year period are considered to relate to the revised business model which is now being undertaken which involves greatly increased boned and packaged product with increased export requirements, as distinct from the carcase based product in 2013. In addition, recent expansion involved a significant increase in cold store capacity to enable improved marketing management, particularly of exports. KPI's for these items are expected to improve progressively from this point.

The overall business benefits of the business model change are presently better reflected in boned carcase numbers (Operational Excellence), and increased exports (Marketing and Product Development.

5 Discussion

5.1 Studies Reviewed

5.1.1 Collaborative Investment Areas and Projects Completed with MLA

The following studies and projects have been undertaken during the period of Stage 1:

- *Kosher Shearing* (P.PIP. 0389) (Dec 2014). (Successful and implemented). *Focus areas Sustainability and Operational Excellence*;
- Automation Support and Processing Efficiency Capability (P.PIP. 0402). (Partly successful). Focus Area Operational Excellence;
- Feasibility Study for Anaerobic Digestion and Biogas Energy Generation (P.PSH.0704) (March 2015). (Successful and considered to be worth further development). Focus Area Sustainability (Future Success);
- *Product Sales Seasonality Matrix* (P.PIP.0391) (Feb 2016). (Successful and implemented). *Focus Area Marketing and Product Development*;
- *Refrigeration Audit at a Medium Mixed Species Abbatoir* (P.PIP.0400) (Sept 2016). (Successful. Progressive implementation). *Focus Area Sustainability. (Future Success)*;
- Industrial Microgrid (ability to operate independent of the electricity grid) Feasibility (P.PIP.0735). (Successful and led to implementation); **Focus Area Sustainability**; and,
- Industrial Microgrid (ability to operate independent of the electricity grid) (P.PIP.0745). (Commencing). *Focus Area Sustainability (Future Success)*.
- Investigating centralised co-digestion of red meat processing and municipal waste (P.PSH.0945). (October 2017) (This is a direct follow on from P.PSH.0704). Focus Area Sustainability. (Future Success)

5.1.2 Other Projects Undertaken by Hardwick's (No MLA Involvement)

In addition, the following studies and projects have been undertaken during the CISP Stage 1 period where there was no MLA funding involvement:

- Options Analysis for Wastewater Management (Collaboration with Regional Development Victoria and Coliban Water (Sept 2014)). (Successful and considered to be worth further development). *Focus Area Sustainability. (Future Success)*;
- Boning Room Automation. (Successful and implemented). Focus Areas Innovation Resource Planning and People Management, and Operational Excellence;
- *Mutton Evisceration Table.* (Successful and implemented). *Focus Areas Innovation Resource Planning and People Management, and Operational Excellence*;
- Upgrade of Beef Evisceration Area. (Successful and implemented). Focus Areas Innovation Resource Planning and People Management, and Operational Excellence;
- Power Factor Correction. (Successful and implemented). Focus Area Sustainability;

- Water and Electricity Usage. (Successful. Progressive implementation). Focus Area Sustainability. (Future Success);
- Relocation of Pet Food System. (Successful and implemented). Focus Area
 Operational Excellence ;
- Upgrade Hot Water System to a Boiler Plant. (To be progressed). Focus Area Operational Excellence;
- Cattle Yard Wash Down Area and Water Collection. (Commencing). Focus Area Operational Excellence. (Future Success);
- *Recycle Wastewater/Biogas Potential.* (Follow on from P.PSH.0704 and under consideration). *Focus Area Sustainability. (Future Success)*;
- Stage 1: Boning Room and Cold Storage Expansion (Funding assistance from Department of State Development, Business and Innovation) (August 2014); (Successful and implemented). Focus areas Sustainability and Operational Excellence;
- Stage 2: Processing Expansion (Funding assistance from Department of State Development, Business and Innovation) (Feb 2015); (Successful and implemented). Focus areas Sustainability and Operational Excellence;

5.2 Review of KPIs

During Stage 1 of the CISP Program, Hardwick's have been focussing on a very broad scope of KPIs which were included for consideration at commencement of the CISP program but have not been subjected to review nor measured in detail up to this time.

5.2.1 Initial Review

The KPIs need to be readily able to be reported on regularly, so that users are constantly reminded of what is important, what is being ignored and what needs to be improved. KPIs are powerful tools that are able to focus management of outputs at all levels in the organisation, and improve accountability and results. Successful implementation involves communicating to stakeholders, and influencing those involved so that they are able to appreciate that the benefits make KPI reporting worthwhile. For the CISP program, they therefore need to be combined into a coherent picture so that they are useful in driving innovation and measuring the benefits achieved.

In order to review and refine the most suitable KPIs, we commenced with consideration of the concept of performance. Performance is typically associated with results or outcomes, as compared to a budget, a trend or other type of benchmark. Assessment of performance can be short- or long-term, can be based on effectiveness or efficiency, and can be considered in financial and/or non-financial terms. It may be quantitative or qualitative, focused on inputs, processes, outputs or outcomes. A common problem with KPIs in many organisations is that they often exist at a level that considers a much broader viewpoint than very specific measures focused on specific tasks or activities within the entity.

KPIs have therefore now been developed for the Hardwick's CISP program, which are a sub set of the broader performance requirements, with a KPI being important and focused on a critical component of the business. In this case with a specific orientation towards innovation. There are many useful and necessary activities occurring within the organisation, but we needed to consider which of these

activities were critical in relation to innovation and could be carefully monitored and were reasonably easy to collate.

There is no single definition for KPIs. Some definitions focus more specifically on financial results, while others consider both financial and non-financial aspects. For the CISP program, following discussions with Hardwick's management and innovation staff, it has been agreed that it is appropriate to use a specific definition of KPIs, incorporating measures that demonstrate past success, as well as measures that indicate future success. Simply, we have refined a small number of KPI targets which we consider to be critical to the success of the continuing development of an innovation "culture" within the organisation.

In order to test the KPIs under consideration, we looked at what the outcome of failing to achieve the desired result in this area would be. If the answer was that it would result in frustration or annoyance, or result in only a slight decline in results, then it was removed from consideration. Where the answer was that if the proposed measure was not achieved, it would clearly indicate a significant adverse financial or quality/market impact and was relatively easy to monitor, then it would be considered further as a KPI.

5.2.2 Characteristics of Key Performance Indicators

A number of characteristics were therefore considered in order to determine the quality of the proposed KPIs, including:

Driving of Innovation Outcomes

Approaches that focus on achieving measurable innovation outcomes.

Practicality/Ease of Monitoring and Collating

Acceptable methodologies and data collection systems and the feasibility of acquiring and maintaining these over time.

Comparability

The implications for using the data to make comparisons over time.

Avoidance of perverse incentives

The potential for behavioural incentive effects including manipulation of data and other counter-productive behaviours.

Quantity

A balance of prudence with comprehensiveness in agreeing on the number of indicators that ensure an even coverage over the Focus Areas.

Balance

Endeavouring to define a range of KPI's that provided a balanced picture, particularly the effectiveness in achieving intended results, and appropriateness for all users.

Accuracy

The ability for each KPI to incorporate consistent data definitions, data standards and collection methods in order to make accurate comparisons

The development of KPIs therefore focussed on:

- What the KPI is intended to show and why it is important;
- The data source;
- Collection arrangements;
- Measurement frequency, and
- Any limitations about the data.

Accountability for data

Staff with appropriate skills have now been assigned responsibility for data collection. The Innovation Manager is responsible for analysis, interpretation of performance results and identification of variations which call for close examination; coordination and reporting in the required formats to the Board; and retaining information for validation.

Management and Internal Stakeholder engagement

Performance information through the agreed KPI's is now being integrated into daily operations reporting and team discussions which will assist with the development of an innovation focussed culture so that managers and staff will identify and act upon innovation opportunities.

5.3 Refining of KPIs

The present KPI outlines have been refined for each Focus Area.

Innovation resource planning and people management

The broad scope items within this grouping were originally detailed as:

- Number of process improvement initiatives sourced by staff
- Number of suitably qualified or experienced professionals
- Number of injuries in process areas
- Number of relationships formed

These draft KPIs were not generally considered to meet the characteristics developed above. In particular they were noted as being somewhat vague and not having a direct relationship to driving innovation outcomes, were not capable of achieving an appropriate balance and could, in some cases, lead to perverse outcomes (eg: drive excess staff numbers, encourage increased initiatives that were wasteful, promote unnecessary relationships).

The following KPIs have been developed and refined with Hardwick's staff and management and are considered to meet the required characteristics:

- Number of successful innovation projects undertaken (past success)
- Number of innovation projects identified, investigated and considered to be worth further development or proceeding (future success)
- Number of new skilled FTEs directly resulting from innovation projects

Sustainability

Broad scope items:

- Waste disposal cost
- Compliance level local council for trade waste
- Reduce water use per tHSCW processed by x%
- Reduce energy use per tHSCW processed by x%
- kWhrs of renewable energy generated
- level of animal welfare staff training
- number of community links (eg: sponsorship/donations, training programs etc)

Some of these scope items do not generally reflect innovation actions which improve sustainability and can be simply the result of acceptable "best practice" actions in day to day operations which involve waste minimisation. In addition, measures of waste disposal cost are subject to external factors. Volumes of Trade Waste discharge, gas used, power used, potable water used, etc. are considered more relevant.

Again, these have been discussed with Hardwick's management and staff and the following specific KPIs have been developed:

- Number of successful innovation projects undertaken which include sustainability as an output (past success)
- Number of successful grants, funding arrangements, or innovation projects identified or proceeding which are based on, or substantially include, sustainability as a focus (future success)
- Reduced external utilities energy and water usage (electricity kWh/tETCW, gas MJ/tETCW, water kL/tECTW)
- Increased internal energy generated or produced, or water recycled
- Reduced Trade Waste volumes (kL/tECTW).

Operational Excellence

Broad scope items:

- Cost of production
- Carcase yield recovery increase x%
- Offal yield as a % of carcase weight
- Level of packaging complaints/returns

Similar comments to those for *Sustainability* (above). Some of the above measures can be the result of best practice management and continuous improvement and may not reflect any specific innovation action.

Following consideration and discussions with Hardwick's management and staff, the following Operational excellence KPIs have been defined:

- Introduction of innovative processing systems and equipment which have provided measurable improvements (eg: lower production costs, increased yield, improved OH&S performance, reduced packaging issues) (past success)
- Number of production innovations which have been identified and which appear to offer business benefits, and are to be further evaluated or are proceeding (future success)
- Beef throughput/week (6 month rolling average)
- Smallstock throughput/week (6 month rolling average)
- Boning Beef carcasses/week (6 month rolling average)
- Boning Smallstock carcasses/week (6 month rolling average)
- Offal yield as a % of carcase weight

Marketing and Product Development

Broad Scope Items:

- % volume of product branded
- % of branded domestic food service sales
- Sales growth into existing tier 1 markets
- Sales growth into tier 2 markets

Hardwick's have a high number of "spot business" customers as distinct from market chain supermarkets or large scale export arrangements. This provides a "market niche" appropriate for a medium size private operation as distinct from large operators who are generally large scale public operations, with hierarchical management and approval processes which result in longer lead times in relation to marketing changes.

Hardwick's have the ability to provide specific products to a wide range of customers with product changes possible at relatively short notice due to hands on owner/managers and a small specialist Board.

On this basis, the following KPIs have been defined in relation to innovation associated with marketing and product development:

- Number of innovative flexible marketing and branding systems which have been implemented which have increased sales or increased market share (past success)
- Number of marketing/branding/packaging innovations which have been identified and which appear to offer business benefits, and are to be further evaluated (future success)
- Export sales (kg/month) beef
- Export sales (kg/month) small stock
- Export sales (kg/month) offal

Supply Chain

Broad scope items:

- Number of partnerships formed
- Producer loyalty levels
- Compliance level with market specifications (livestock and carcass)
- Growth of traceability system through supply chain
- Cost of gain in feedlot

As noted in the *Marketing and Product Development* section above, Hardwick's operate within a "niche market" and have a high number of "spot business" customers as distinct from market chain supermarkets or large scale export arrangements.

They have also in recent times concentrated on developing operations covering the complete market chain from stock purchase and feedlot operations, to transport and distribution of fully packaged and branded end products.

On this basis, the following KPIs have been defined in relation to innovation associated with the supply chain:

- Establishment of benchmarks for feedlot operators (loss percentages, weight gain, animal welfare compliance) (past and future success)
- Number of supply chain innovations which have been identified and which appear to offer business benefits, and are to be further evaluated (future success).

However, at this stage, proposed KPI measures for the Supply Chain Focus Area are still under consideration.

5.4 Outputs and Outcomes

5.4.1 Overall Review

Kosher Shearing (P.PIP. 0389) (Dec 2014).

The aim of this project was to:

- reduce the volume of rejected lambs, by improving quality of neck shearing and increasing level of hygiene to meet strict Kosher requirements;
- reduce the physical labour involved in shearing lambs for kosher slaughter, and therefore reduce the production costs, and;
- increase the Company's capacity for domestic and international kosher contracts/orders.

Kosher rejection rates were (historically) consistently high around 75% due to the religious requirements for minimum wool density across the neck and associated hygiene.

The developed outcome was to build a new system to shear lamb necks onsite, in accordance with Kosher religious requirements. The Kosher lamb necks were historically shorn in the traditional shearing shed, which was a very slow and labour intensive process. An idea was conceived to install

a custom designed mechanical cradle, which would restrain each lamb as it ran up the chase, so that they could be easily shorn prior to slaughter. This greatly reduced the physical labour and cost required to meet Kosher obligations and increased the Meatworks capacity for Kosher slaughter. The quality of neck shearing has been improved, leading to increased hygiene and in turn a large reduction in rejected lambs that were considered not to meet Kosher requirements.

The outcome provided a marginal benefit for domestic kosher processing however, the real benefit is for large scale process of kosher (several hundred per day). The ease of shearing decreases the rejections (as less lambs receive cuts to the neck). As the animal is now restrained, the operator is no longer required to physically restrain and position each one in order to do the shearing. To shear 1000 lambs necks required almost 2 days' work under the old system, whereas now that similar volume can be achieved in 1 day. Annual savings of an average of \$ 140,000 have been achieved by Hardwick's. This relates to approximately \$1.9M value to the business on a NPV basis.

An area for future consideration is to incorporate the shearing process to be done immediately prior to the slaughtering. This would mean that the animal is only restrained once, rather than twice in the few hours before slaughter.

Automation Support and Processing Efficiency Capability (P.PIP. 0402). (Dec 2014).

Hardwick's at that time (Dec 2014) operated the fastest running smallstock chain in Australia, with a large variance in stock sizes and cut specifications. Chain speed varied from 3 to 13 carcasses per minute. The project investigated further technologies aimed at handling the variation in the chain speed, including robotic solutions and the operational management of these technologies.

The project investigated technology providers, training for staff, adaptation of technology to suit chain speed variations, and ongoing servicing and maintenance requirements. The final report for the case study was required to cover:

- Technical support activities;
- Pre and post system performance;
- Modifications made;
- Indication of updates to operating parameters;
- Production and quality statistics for previous period;
- Staff participation during the case study; and,
- An assessment of the technical capabilities of Hardwick's staff after completion.

Significant effort was made including alterations and improvements to floor and processing flow layouts (horn and head removal, spreaders, and walkway stock access) in an attempt to improve robotics issues such as mis-cutting and other errors and failures. A number of site visits were made by Hardwick's staff to Geelong and Gundagai to inspect other operations.

Despite extensive works and processing flow alterations, robotic technology use on a variable speed chain was shown to be difficult to operate efficiently.

Notwithstanding this, there were high levels of staff buy in/participation in the project, and technical capabilities and increased understanding of the staff was of great benefit to the business going forward.

At this time, it is not considered that there is potential for a modified approach unless there is a significant development in robotic technology and controls.

Product Sales Seasonality Matrix (P.PIP.0391) (Feb 2016).

The aim of this project was to develop a product sales matrix which captured historical marketing options within different markets both domestically and internationally for different products, both beef and ovine.

This tool was intended to inform Hardwick's value adding strategy in assessing the seasonal economic returns achieved for different products in different markets and enable economic analysis to be conducted to determine the feasibility of further processing activities. Developing a seasonality matrix has given a clearer picture of previous sales performance, both domestically and internationally. A key part of this project was to investigate and identify future markets for different boned cuts of meat. The export markets that were analysed were all Tier 1 listed countries.

The analysis resulted in the development of a "Traffic Light" matrix for both beef and lamb cuts in the domestic market which provides a visual representation to help communicate seasonal effects, but, due to data constraints, a complementary export matrix could not be developed. However, the domestic sales matrix clearly demonstrates periods of low and high demand, and highlights the times when additional export sales would assist the overall return for the business.

The outcomes of this project were very beneficial and highlighted which export markets could best handle significant volume during periods of low domestic demand. Increased revenue projections that could be attributed to the strategies developed by the project were estimated at over \$200,000 additional beef sales and over \$300,000 additional lamb sales over a 5 year period. The project also found that there was a significant amount of export potential for more boned and carcass meat within the constraints of a Tier 1 export licence. A further flow through advantage was that this led to a greater level of engagement with customers who serve different markets and ultimately led to a more diversified range of product sales. Following the project, sales of boned beef and lamb were made into Indonesia at prices higher than those that had been achieved previously on the domestic market.

A number of other outcomes were recommendations in regard to associated identified improvements possible in IT systems, other product value adding processes, and a review of the domestic offal market.

Refrigeration Audit at a Medium Mixed Species Abbatoir (P.PIP.0400) (Sept 2016).

The Terms of Reference for this study were to audit the energy usage current at that time as well as collect data on chilling capacities, and use that data to assess plant expansion requirements including budgets and the consequent evaluation of processing options and preliminary CBA modelling.

The evaluation of the existing system resulted in the following findings:

- 1. Hardwick's had the lowest energy consumption figures that the auditor had seen in 40 years;
- 2. The existing plant was very efficient in both energy and water consumption (lowest the auditor had observed); and,

3. The existing refrigeration plant was more than adequate to cope with the then current maximum demand.

Recommendations were made in relation to future plant modifications and future chilling capacity. Innovative options were also assessed which included a low temperature lamb blast chilling system, and a beef spray chilling system.

The expansion and plant modification capital requirements were estimated to cost \$22.16M with a payback period of just over 3 years. (\$6.69M annual savings, NPV \$71M). (On its own, the beef spray chilling system was estimated to have a payback period of 4 months).

Due to the high capital costs, none of these recommendations have proceeded at this time, although some are included for consideration in the 2017-2018 capital budget and beyond.

Feasibility Study for Anaerobic Digestion and Biogas Energy Generation (P.PSH.0704) (March 2015)

This study investigated the feasibility of installing a free standing high rate anaerobic reactor for the treatment of meat processing wastes. A comparison of capital costs and expected asset life between traditional concrete construction and coated steel options was undertaken in order to assess "whole of life costs", including cost benefits and risks, and the beneficial reuse of biogas. The study defined the focus into 6 basic process flow Options.

The study established that the use of steel structures for high rate anaerobic digestion would provide lesser "Whole of Life" cost than concrete structures, and was potentially viable. However, investment in high rate anaerobic digestion is very dependent on the external (downstream) costs for final treatment and disposal, both existing and into the future. In addition, greenhouse gas and energy savings are possible through the associated generation of biogas for onsite use.

The study found that the potential investment in high rate anaerobic digestion would be dependent on issues such as:

- Third party (downstream service provider) costs, or downstream processor costs for further treatment and disposal;
- The assessment and mitigation of future downstream cost increase risks;
- The impact of ambient and process temperature on biogas production volumes;
- Availability and cost of land for plant and downstream assets;
- Government subsidies to reduce the payback period to meet standard processor investment parameters (if required);
- Proximity of neighbours and potential for odour nuisance;
- Ability to beneficially use the sludge rather than dispose to landfill;
- Reduced odour and corrosion issues in the downstream service providers system;

- Benefits from any Government energy or greenhouse gas policies (the roll out of direct action programs under the Federal Government Emissions Reduction Fund ("ERF") are now underway), and;
- Benefits or costs associated with any existing site treatment facilities and rendering plant.

The study found that, the value of biogas produced for other site use did not, in itself, provide a sufficient enough cost benefit to warrant the investment at that time. However the cumulative qualitative environmental benefits including:

- Greenhouse gas/carbon price savings;
- reduced operational risks associated with rendering; and,
- Beneficial reuse of digested sludge,

should be considered when assessing the investment. Future disposal of undigested sludge from DAF units was considered to increasingly become more difficult and costly which may also drive the investment at a later date.

The key messages from the study were that progress in development of lower cost anaerobic digestion process design and construction, including developments in mixing methods and equipment to address issues with difficulties with fats, oils and greases,("FOG's") should continue to be assessed. Increasing environmental requirements and disposal costs mean that alternative options need to be reassessed progressively to ascertain the best investment approach.

Disposal of DAF sludge (which is not digested and is odourous) is becoming increasingly difficult due to environmental regulations. The use of anaerobic digestion for processing of a total meat processing waste stream without pre-treatment via a DAF would provide digested biosolids which can be beneficially reused. The potential process impacts of FOG's on the anaerobic process may now be overcome with appropriate design and appropriate mixing equipment, however further proof of performance was required.

Undertaking studies into alternative full or part treatment options for waste streams, could also be critical in negotiating reduced third party (downstream) costs where those services are provided by monopoly service providers. This could form the basis of a pseudo competitor position to ensure third party prices are commercially acceptable.

The preferred option developed during the study was for a steel anaerobic digester and associated treatment and disposal infrastructure. The Capital cost was \$5.2M with a 4+ year payback period (benefits \$1M per annum, NPV \$10.3M).

Industrial Microgrid (ability to operate independent of the electricity grid) Feasibility (P.PIP.0735).

This project was a technical and economic and feasibility study of an integrated battery storage and solar farm at Hardwick's site. The aim of the study was to ascertain the potential for the following outcomes:

• Reduced greenhouse gas emissions;

- Securing long term electricity cost control;
- Ensuring increased security of the power supply;
- Strengthening of business sustainability.

In addition, the use of innovative funding arrangements was investigated.

The outcomes included:

- How to integrate a large scale solar installation into the plant and ensure operation as a microgrid in the event of an external power grid failure;
- The use of an Environmental Upgrade Funding Agreement to facilitate funding for the project;
- A concept design for a solar array that will allow sheep holding and grazing underneath the panels;
- Modelling of power production and system design which would minimise peak power demands from the power grid, and solar generation is maximised; and,
- Demonstration of how Tesla battery incorporation could assist to balance supply.

Industrial Microgrid (ability to operate independent of the electricity grid) (P.PIP.0745).

This project is just commencing and involves the demonstration of a 'microgrid' as a means of enabling operation independently of mains electricity grid as well as the use of a commercial battery and advanced operating control systems to optimise and manage electricity usage and tariffs. This project is a consequence of the successful feasibility study (P.PIP.0735) outlined above. A 'microgrid' is defined as a small energy system capable of balancing captive supply and demand resources to maintain stable service within a defined boundary.

The project will include detailed design, installation, and optimisation of the microgrid over a 5yr period. A full cost benefit analysis is to be included with the final report.

The aim is to reduce greenhouse gas emissions resulting from their processing operations, attain long-term electricity cost control, ensure security of electricity supply, and strengthen business sustainability.

The estimated capital cost of the solar based microgrid system is \$4.07M. Hardwick's plan to invest virtually all of their PIP levies towards the R&D elements contained within this project (totalling \$1.6M), to maximise the chance of success and pioneer microgrid and distributed generation in the Australian red meat industry.

The project objectives are to:

- incorporate innovative project funding options.
- Demonstrate an industrial microgrid as a means to enable off-grid red operations, including system integration with the mains electricity grid;
- Design a microgrid that will enable grazing of sheep under the solar panels;
- Establish an electricity tariff optimisation procedure to allow Hardwick's to request a demand reset from electricity suppliers.
- Develop a grazing management plan for grazing of sheep under the solar array; and,
- Consider future additions to the microgrid following the installation of the project.

An important factor contributing to the success of the project will be the project finance solution. Hardwicks are using an Environmental Upgrade Agreement (EUA) as the funding vehicle, which has recently been established by the Melbourne City Council. This will include a financing agreement between Hardwicks, a lender and the local council for the microgrid. The Council will collect repayments through their rates system and returns the property charge to Hardwicks. The longer term (10 years) and lower interest rates makes this more attractive than the standard 7 years from the major banking institutions.

The estimated economic benefits of this project to Hardwick's are \$150,000 annual savings with an NPV of \$1.4M.

Investigating centralised co-digestion of red meat processing and municipal waste (P.PSH.0945). (October 2017)

This project has additional funding assistance from Loddon Mallee Waste and Resource Recovery Group and Macedon Ranges Shire Council (MRSC)). The study includes cooperative Anaerobic Digestion and biogas energy generation with MRSC incorporating MRSC green and organics waste. (This project is a direct follow on from P.PSH.0704).

The outcomes will include potential biogas production for use within Hardwick's plant (or more broadly to external industry if quantities are in excess of Hardwick's requirements), and the production/marketing of an end composting product for use in surrounding agricultural areas. The objectives are:

- evaluate waste treatment options (including anaerobic digestion and composting) for combining paunch and biological wastes from a Hardwicks with residential organics and green wastes from the Macedon Ranges Shire Council (MRSC);
- understand the quantity, value and quality of potential biogas production for use within Hardwick's plant and/or surrounding facilities;
- understand the production and marketing of a composting product(s) for use in surrounding agricultural areas;
- understand the commercialisation strategy for a centralised waste treatment facility treating waste from multiple independent sources.

5.4.2 Summary of Economic Benefits to Hardwick's

The following table summarises the economic benefits either estimated to have been achieved, or estimated to be available after implementation, from CISP studies to date. The estimates for each study are noted in the project overviews above and further detailed information is available in each of the published reports:

Project	Estimated Annual Savings	NPV of Annual Savings
Kosher Shearing	\$140,000	\$1.9M
Refrigeration Audit	\$6,690,000	\$71M
Anaerobic Digestion and	\$1,000,000	\$10.3M
Biogas Energy Generation		
Industrial Microgrid	\$150,000	\$1.4M
Totals	\$7,980,000	\$84.6M

In addition, the Product Sales Seasonality Matrix study delivered an estimated \$40,000 additional annual beef sales and \$60,000 annual smallstock sales, as well as other pricing and customer benefits. The economic benefits associated with this on an annual value basis were not estimated, and would be difficult to assess.

5.5 Broader Industry Benefits

5.5.1 Overall Review

The collaborative projects completed during Stage 1 have provided significant industry benefits through the publication of the associated reports. These benefits are summarised as follows:

Kosher Shearing (P.PIP. 0389) (Dec 2014).

This study demonstrated that there was marginal benefit for smaller operations (although still of value). The real benefit demonstrated is for larger scale process of kosher involving a minimum of several hundred per day. This can be of significant benefit to larger or specialist operations.

Approximately 1% of Hardwick's small stock processing is for the kosher market. This is expected to be greater than for the meat industry as a whole (only three processors provide kosher product in Victoria).In addition, the kosher market may be greater in Victoria than in some other States. Assuming a conservative figure of a kosher market of 0.25% on an Australia wide basis the potential value to the industry as a whole should the outcome be incorporated by the industry more broadly, the total potential average annual savings would be in the order of \$900,000 per annum, or approximately \$12.4M value on a NPV basis. (Assuming a total small stock processing of 30 million animals per year).

This study proposed an area for future consideration by industry would be to incorporate the shearing process to be carried out immediately prior to slaughtering. This would mean that the animal is only restrained once, rather than twice in the few hours before slaughter.

Automation Support and Processing Efficiency Capability (P.PIP. 0402). (Dec 2014).

The project investigated further technologies aimed at handling the variation in the chain speed, including robotic solutions and the operational management of these technologies.

Significant effort was made including alterations and improvements to floor and processing flow layouts (horn and head removal, spreaders, and walkway stock access) in an attempt to improve robotics issues such as mis-cutting and other errors and failures

Despite extensive works and processing flow alterations, robotic technology use on a variable speed chain was shown to be difficult to operate efficiently. There are important learnings for other meat processors in relation to present difficulties with robotic use with highly variable chain speeds.

Feasibility Study for Anaerobic Digestion and Biogas Energy Generation (P.PSH.0704) (March 2015).

The study provided significant value to industry in relation to construction costs, operational risks, and potential benefits of anaerobic digestion in the meat processing industry, including the following:

- The use of steel structures for high rate anaerobic digestion would provide lesser "Whole of Life" cost than concrete structures;
- Investment in high rate anaerobic digestion is very dependent on the external (downstream) costs for final treatment and disposal, both existing and into the future;
- Greenhouse gas and energy savings are possible through the associated generation of biogas for onsite use. However the value of biogas produced for other site use may not, in itself, provide a sufficient enough cost benefit to warrant the investment (at the time of the study);
- Progress in development of lower cost anaerobic digestion process design and construction, including developments in mixing methods and equipment to address issues with difficulties with fats, oils and greases,("FOG's") should continue to be assessed.
- Increasing environmental requirements and disposal costs mean that alternative options need to be reassessed progressively to ascertain the best investment approach;
- Disposal of DAF sludge (which is not digested and is odourous) is becoming increasingly difficult due to environmental regulations. The use of anaerobic digestion for processing of a total meat processing waste stream without pre-treatment via a DAF would provide digested biosolids which can be beneficially reused; and,
- The potential process impacts of FOG's on the anaerobic process may now be overcome with appropriate design and appropriate mixing equipment, however further proof of performance is required.

These findings provide a basis for others in the industry to undertake further assessments for their particular sites and conditions, as energy prices increase, and digester design and proven performance in relation to FOG's improves.

As far as the broader industry is concerned, local factors will have a significant influence on potential implementation, however estimated broader economic benefits have been assumed based on implementation at two similar sized operations (benefits \$2M per annum, NPV \$20.6M).

Hardwick's are now proceeding with a follow on study as noted in section 4.1 above, which is a Waste to Energy Feasibility Study which includes cooperative Anaerobic Digestion and biogas energy generation with a local Authority incorporating their green and organics waste. This study involves external partners (Loddon Mallee Waste Resource and Recovery Group and Macedon Ranges Shire Council). In addition, MLA is expected to be a collaborative investor. This further study is expected to have substantial industry benefits in relation to providing an exemplar of cooperation with external partners which potentially can provide increased scale, operational benefits, and a more attractive investment.

Product Sales Seasonality Matrix (P.PIP.0391) (Feb 2016).

The project has industry benefits which could be applied by some other meat processors (somewhat dependant on their business model). The outcomes from a broader market perspective included:

• The development of a "Traffic Light" matrix for both beef and lamb cuts in the domestic market which provides a visual representation to help communicate seasonal effects. The domestic sales matrix clearly demonstrated periods of low and high demand, and highlights the times when additional export sales would assist an overall return for a business;

- Highlighting which export markets could best handle significant volume during periods of low domestic demand; and,
- That there was a significant amount of export potential for more boned and carcass meat within the constraints of a Tier 1 export licence.

Refrigeration Audit at a Medium Mixed Species Abbatoir (P.PIP.0400) (Sept 2016).

This study provided significant comparative information for industry in relation to energy use for refrigeration. The benchmark figures audited provided the lowest energy consumption figures that the auditor had seen in 40 years, and the existing plant was very efficient in both energy and water consumption (the lowest the auditor had observed).

Recommendations were made in relation to future plant modifications and future chilling capacity. Innovative options were also assessed which included a low temperature lamb blast chilling system, and a beef spray chilling system. These recommendations and innovative options have relevance to other industry operators involved in these areas.

From a broader industry perspective, the recommendations are considered to provide benefits generally in relation to considering options in relation to refrigeration and product chilling. Estimated economic benefits are proposed conservatively at potential implementation by two similar size processors. (Capital \$44M, NPV \$142M).

Industrial Microgrid (ability to operate independent of the electricity grid) (P.PIP.0735 and 0745).

This project has the potential of very significant industry benefits at this critical period in relation to energy reliability. It involves the demonstration of a 'microgrid' as a means of enabling operation independently of mains electricity grid as well as the use of a commercial battery and advanced operating control systems to optimise and manage electricity usage and tariffs.

The aim of the project is to reduce greenhouse gas emissions resulting from their processing operations, attain long-term electricity cost control, ensure security of electricity supply, and strengthen business sustainability.

The project also involves an innovative project finance solution which will be of interest to others in the industry. Hardwicks are using an Environmental Upgrade Agreement (EUA) as the funding vehicle, which has recently been established by the Melbourne City Council. This will include a financing agreement between Hardwicks, a lender and the local council for the microgrid. The Council will collect repayments through their rates system and returns the property charge to Hardwicks. The longer term (10 years) and lower interest rates makes this more attractive than the standard 7 years from the major banking institutions.

It is expected that up to 30 other processors may consider implementation of a similar microgrid which would result in broader industry benefits of \$4.5M in annual savings and a NPV of \$42M.

Investigating centralised co-digestion of red meat processing and municipal waste (P.PSH.0945).

This study will include the development of preferred option(s), including viability of solution(s) and potential cost sharing arrangments between the joint parties (Hardwick's and MRSC). A

commercialisation plan for a centralised waste treatment facility treating waste from multiple independent sources will also be produced.

Significant benefits are expected for the broader industry in relation to the potential development of larger scale joint venture arrangements which may provide economies of scale and subsequent economic viability.

5.5.2 Quantification of Industry Benefits

Estimates of industry benefits have been outlined in each study reviewed above. These are summarised in the table below along with the assumptions on which they have been based. The assumptions have been based on advice from Hardwick's senior managers and reflects their extensive industry knowledge. However, it must be acknowledged that these estimates are extremely difficult to quantify:

Project	Estimated Annual Savings to Industry	Estimated NPV of Annual Savings to Industry	Assumptions
Kosher Shearing	\$900,000	\$12.4M	Assuming 0.25% of the Australian market for smallstock provides kosher product and implements changes
Refrigeration Audit	\$13.4M	\$142M	Assumes implementation of recommendations on average by two medium size processors
Anaerobic Digestion and Biogas Energy Generation	\$2M	\$20.6M	Assumes implementation of recommendations on average by two medium size processors
Industrial Microgrid	\$4.5M	\$42M	Assumes installation of similar size microgrid at 30 processors
Totals	\$20.8M	\$217M	

The degree to which broader industry benefits from the projects undertaken under the collaborative program are actually achieved would require a follow up assessment by MLA and detailed analysis.

A potential simple methodology could involve periodic surveys to industry in regard to which collaborative reports have been considered or applied in each business. Alternatively, that

information could be collated directly via MLA staff during regular individual discussions with Innovation Managers at each business. The writer suggests that direct collation may provide more reliable and complete data than undertaking a survey process.

5.6 Development of a Proposed Stage 2 Approach

5.6.1 Stage 1 Review

The effectiveness and overall outcomes of Stage 1 of the CISP have been reviewed in conjunction with Hardwick's Innovation Manager and other senior staff. Learnings from Stage 1 have been incorporated into the design of a Stage 2.

The learnings identified during Stage 1 included:

- The need to quickly amend the timing in relation to focus areas and specific actions when business changes and external factors impacted priorities;
- That Stage 1 of the CISP project has assisted in the development of an innovation culture more broadly within the organisation;
- The developed KPIs are expected to have the potential to deliver significant business benefits and need to be regularly reviewed and outputs monitored.

5.6.2 Recommended Stage 2 Approach and Program

It is understood that Stage 2 is intended to be undertaken over a further 3 year period. Based on the learnings from Stage 1 it is recommended that the program for Stage 2 be undertaken on the basis of:

Initial Action:

Identify focus areas and specific innovation areas known at that time, and incorporate into an Action Plan on the basis of what specific projects/studies will be undertaken within the next 12 months, and what areas/projects will be considered during years 2 and 3.

Process:

Undertake regular reviews of the program and KPIs on a six monthly basis, identifying or amending identified projects for the following 12 months. This will allow early changes to identified projects and/or priorities to be amended quickly to suit business or market changes.

5.6.3 Focus Areas and Identified Stage 2 Projects

There are a number of projects which are underway and which will be monitored and KPIs progressively assessed during Stage 2. These are:

- Industrial Microgrid (ability to operate independent of the electricity grid) (P.PIP.0745). Focus Area Sustainability;
- Upgrade Hot Water System to a Boiler Plant. Focus Area Operational Excellence;
- Cattle Yard Wash Down Area and Water Collection. Focus Area Operational Excellence;
- *Recycle Wastewater/Biogas Potential.* (Follow on from P.PSH.0704 and under consideration). *Focus Area Sustainability*; and,
- Investigating centralised co-digestion of red meat processing and municipal waste (P.PSH.0945). Focus Area Sustainability.

Further areas and projects have been considered by Hardwick's Innovation Manager and other Hardwick's senior staff, including referencing of the 17 modules in the MLA *Insights2Innovation* program. These projects are also considered to have the ability to provide benefits to the industry more broadly. Those with the potential for significant broader industry potential are noted. Specific projects have been programmed during the initial 12 month period.

It is expected that the Stage 2 and 3 process moving forward will progressively identify further areas and projects which can be considered for inclusion. The flexible process proposed allows for projects and priorities to be amended at an early date depending on market conditions/changes, and broader economic issues.

5.6.4 Potential Investments and Business Model Changes in Stage 3

Hardwick's have implemented major business model changes in recent years, including during the period of Stage1 of the CISP. As noted below, it has been concluded that the CISP Stage 1 projects and associated innovation culture development has benefitted the implementation of the present business model.

Further significant development of the business model is continuing and it is expected to take further time to take the model forward and develop additional efficiencies and markets.

The focus areas and Stage 2 projects already identified, underscore the further development of the business model, and the further development of the vertically integrated supply chain.

A three year capital program oriented towards these identified areas is also in place.

A Stage 3 therefore will be oriented further towards innovations which could assist the business and continue the development and efficiency of the present business model. A further change in the business model is not envisaged at this time as the new model is still being bedded down and developed and will continue to be developed in the immediate future.

Any change to the present business model would only occur should significant market changes occur or broader economic issues arise.

As far as a potential process and program for Stage 3 is concerned, we would recommend that the progressive development with 6 monthly reviews for Stage 2, continue into any Stage 3. This will

allow for early and timely changes to projects and priorities, impacted by market or external business drivers, to be progressively made. However, some potential longer term strategic "blue sky" initiatives have been discussed with senior management and some initial focus area initiatives and potential projects have been identified.

6 Conclusions/recommendations

This report has detailed what outputs and outcomes have been achieved for the business to date and outlines what impacts (including potential benefits to industry) of projects have been achieved during CISP Stage 1. Some specific financial impacts have not been assessed as it is not possible at this time to separately assess the impacts of the individual innovation actions from the impacts of the substantial change in the overall business model that has been implemented during the period of Stage 1.

The developed KPIs and the major projects which have been identified and are now underway are expected to have the potential to deliver significant business benefits. In particular, the industrial microgrid development, increasing water reuse, and centralised co-digestion (Waste to Energy) areas.

It is considered that the collaborative project has delivered innovation above that which would have been delivered by Hardwicks on a standalone basis. It is noted that additional potential innovation projects have also been completed or commenced by Hardwick's during the period of Stage 1 without MLA involvement. The overall CISP project has therefore assisted in the development of the innovation culture more broadly within the organisation. It is further noted that it is apparent that all Hardwick's senior staff and management are heavily involved in this innovation culture on a day to day basis. It is not considered necessary that a formal process be established in this regard. This may also be the case in similar mid-size meat processors. However it is recommended that this be assessed on a case by case basis based on the structure and management of each business.

The changed business model adopted by Hardwick's during the period of Stage 1 has benefitted from the CISP projects and business sustainability has been significantly improved during this period.

It is expected that further business benefits will be achieved during an improved process envisaged under Stage 2. In addition, further significant broader industry benefits are expected to be provided during Stage 2 based on the benefits achieved by the program to date.