



final report

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JBS CISP Stage 3 Innovation Manager: Northern (Graham Treffone) & Southern (Paul Wightman)

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Abstract

JBS Australia and Meat and Livestock Australia (MLA) agreed to progress to Stage 3 of the Collaborative Innovation Strategies Partnership (CISP) program with an expanded focus to encompass the full range of JBS strategic business areas. The expanded Collaborative Program incorporated the full range of JBS and MLA marketing, innovation and R&D activities. The Stage 3 CISP will have a value chain focus through enhancing producer engagement and by increasing their consumer interactions and ability to convert these to innovations.

The scope of the innovation strategy was significantly broader than the previous Stage 1 and 2 programs with a whole of business (on- and off-farm) approach. The primary focus areas were in the key business areas of:

- Operational efficiency (Process focus on energy use, technologies, productivity and materials handling)
- Optimal beef processing including further processing and product innovation
- Innovation resource planning and people capability development
- Sustainability (Environment)
- Feedlot/livestock
- Supply chain innovation (including areas such as eating quality; information management; supply chain alignment; through chain assurance)
- Marketing/product innovation - including integration between CISP and Collaborative Marketing (formerly ICA) programs as appropriate

During the three-year period, a range of strategy development and implementation activities were planned including (but not limited to):

- Documentation of key objectives and innovation initiatives in each of the above key business areas
- Quantifiable innovation performance targets in each of the key business areas, including the development of baselines and measurement systems to monitor progress
- Development of an innovation skills and resources plan to build JBS's capability to effectively implement the innovation strategies
- Initiatives to support the cultural change required across the business to deliver against innovation objectives

The purpose of this project was the development and implementation of a Stage 3 Collaborative Innovation Strategy between JBS Australia and Meat and Livestock Australia. To establish strategic direction for the program, a joint JBS-MLA Executive Steering Committee was formed to provide strategic direction to a more comprehensive approach to improvement across the business. The agreed JBS business improvement priorities including collaborative initiatives were managed by key working groups across the key focus areas.

The current report details the activities of the JBS Innovation Strategies program, which were derived from the outcomes of the following projects:

- P.PIP.0534 – JBS CISP Stage 3 Innovation Manager, Northern (Graham Treffone)
- P.PIP.0535 – JBS CISP Stage 3 Innovation Manager, Southern (Paul Wightman)
- P.PIP.5012 – JBS Collaborative Innovation Strategies Partnership program Stage 3

Table of contents

1	Background	4
1.1	The Company- JBS Australia.....	4
1.1.1	JBS Company.....	4
1.1.2	JBS Australia – A Global Company	4
1.1.3	Products.....	4
1.1.4	Facilities.....	4
1.1.5	JBS Livestock	7
1.2	Collaborative Innovation Strategies Program	7
1.3	Project background	8
2	Project objectives	9
3	Methodology.....	9
4	Achievements.....	9
4.1	Innovation Manager – Roles & responsibilities.....	9
4.2	Position Description & Scope of Work	10
4.3	Set overarching goals, metrics and outline	12
4.4	Objectives & Key Measures of Success	12
5	Discussion – Overall achievements in the project.....	12
6	JBS CISP Independent Evaluation.....	15
6.1.1	Review of Published Information	16
6.1.2	ROI Analysis.....	16
6.1.3	Survey Senior Managers.....	16
6.1.4	Classification of type of Innovation	17
6.1.5	Next Steps	17
7	Conclusions	17
8	Recommendations / Next steps.....	18
9	Appendix – Supporting Documents	21
9.1	Related publications	21
9.2	Snapshot of outcomes of independent review of JBS Co-Innovation program (Stages 2&3)	22

1 Background

1.1 The Company- JBS Australia

1.1.1 JBS Company

JBS as a company began as a small processor of just five head of cattle per day in 1953 in Brazil by Jose Batista Sobrinho (whose initials are now JBS's organization name). The Batista family has established a major global company from a small, homegrown, family-owned operation to the world's largest meat protein producer. The business today has grown from a five-head-per-day company to an organization with more than 140 production facilities worldwide. [Source JBS website]

1.1.2 JBS Australia – A Global Company

JBS Australia is part of the JBS Group with headquarters in Brazil and operations in Australia, United States, Argentina and China. JBS Australia is the largest meat processing company in Australia and a division of JBS, the largest animal protein processing company in the world, working in the areas of food, leather, products for pets, biodiesel, collagen, cans and cleaning products. The JBS Australian operations employs 12,000 people across a network of ten strategically located processing facilities, five feedlots and seven distribution centres on the eastern seaboard. JBS has a daily processing capacity of more than 8,000 cattle and 21,000 small stock.

JBS Australia has developed an enviable reputation as the leading supplier of Australian beef and lamb products around the world. JBS is focussed on maintaining the highest levels of food safety, animal welfare, product quality and customer service to deliver to primarily its global markets, and also local Australian markets. JBS Australia exports to more than 80 countries while also maintaining significant market share in the domestic beef and lamb market. JBS Australia employs more than 12,000 people across Australia in a wide range of specialist roles to ensure JBS's customers enjoy the highest quality and consistency of product every day of the week. [Source JBS website]

1.1.3 Products

JBS Australia is the country's largest beef processor and one of the largest lamb processors, making the company the largest multi-species producer, marketer and exporter in Australia. JBS's product range includes a variety of beef, lamb and mutton produced at JBS's ten processing facilities scattered strategically down the eastern seaboard of Australia (See Figure 1 for operations site locations).

In addition to all meat cuts, the company produces a wide variety of fancy meats (offals), other by-products such as hides, skins, and meat and bone meal, while maximising carcass value through the value add facility at Foodpartners with the capacity to produce additional items such as pepperoni and meat crumble. JBS Australia has a daily processing capacity of 8,000 cattle and 21,000 smallstock. [Source JBS website]

1.1.4 Facilities

Given the vast area that JBS operations occupies across Australia, JBS Australia has an established Southern Division, which includes processing facilities in South Australia, Victoria and Tasmania; and

a Northern Division that has facilities in Queensland and New South Wales. JBS Australia's Southern Division has headquartered in Melbourne and is recognised as having a diverse and complex processing facility capabilities within the JBS operations. The southern operations processes sheep, goats, pigs and cattle at five processing facilities across the southern states of Australia (See Figure 1). The Southern Division has a combined processing capacity of 110,000 small stock and 9,500 head of cattle per week, employing 2,500 employees.

Southern plants are strategically located in key livestock-growing regions with fertile soils and annual rainfall levels that allow for the production of high-quality, grass-fed lamb and grass-fed, British-bred natural beef. Ideally located, the Southern Division has almost unlimited market access to worldwide meat and offal export markets.

JBS Australia's Northern Division operates five strategically-placed processing facilities with access to an extensive network of quality, Australian cattle. JBS's network provides the ability to meet the specific demands of various market segments with an extensive range of grain-fed and pasture-fed products.

As a major player in the Australian beef industry, the Northern Division processes up to 1.4 million head of cattle annually. The dedicated and highly-skilled Northern Division workforce of more than 4,300 people promotes a culture of uncompromising and meticulous attention to detail in every aspect of JBS's business.

JBS Australia operates five feedlots covering more than 10,000 hectares, located in prime grain and cattle-producing regions in New South Wales and Queensland. The feedlots has a one-time feeding capacity of 150,000 head of cattle, with an annual cattle turnoff of more than 330,000 head. JBS maintains a unique, competitive position in Australia through the operation of the only two integrated feedyard and abattoir sites in the country. The JBS Beef City and JBS Riverina beef abattoirs are dedicated grain-fed cattle plants located next to their respective feedlots. This allows for the maximisation of animal performance and optimisation of meat quality and animal welfare outcomes. [Source JBS website]

Both Northern and Southern divisions have a beef hide processing plant with the capacity of processing all hides across all operations.

JBS's operations comprises of:

- Processing Facilities
- Feedlots
- JBS carriers
- Hide processing
- Foodpartners (further processing)
- D.R. Johnston Group
- Cold Stores
- Market access

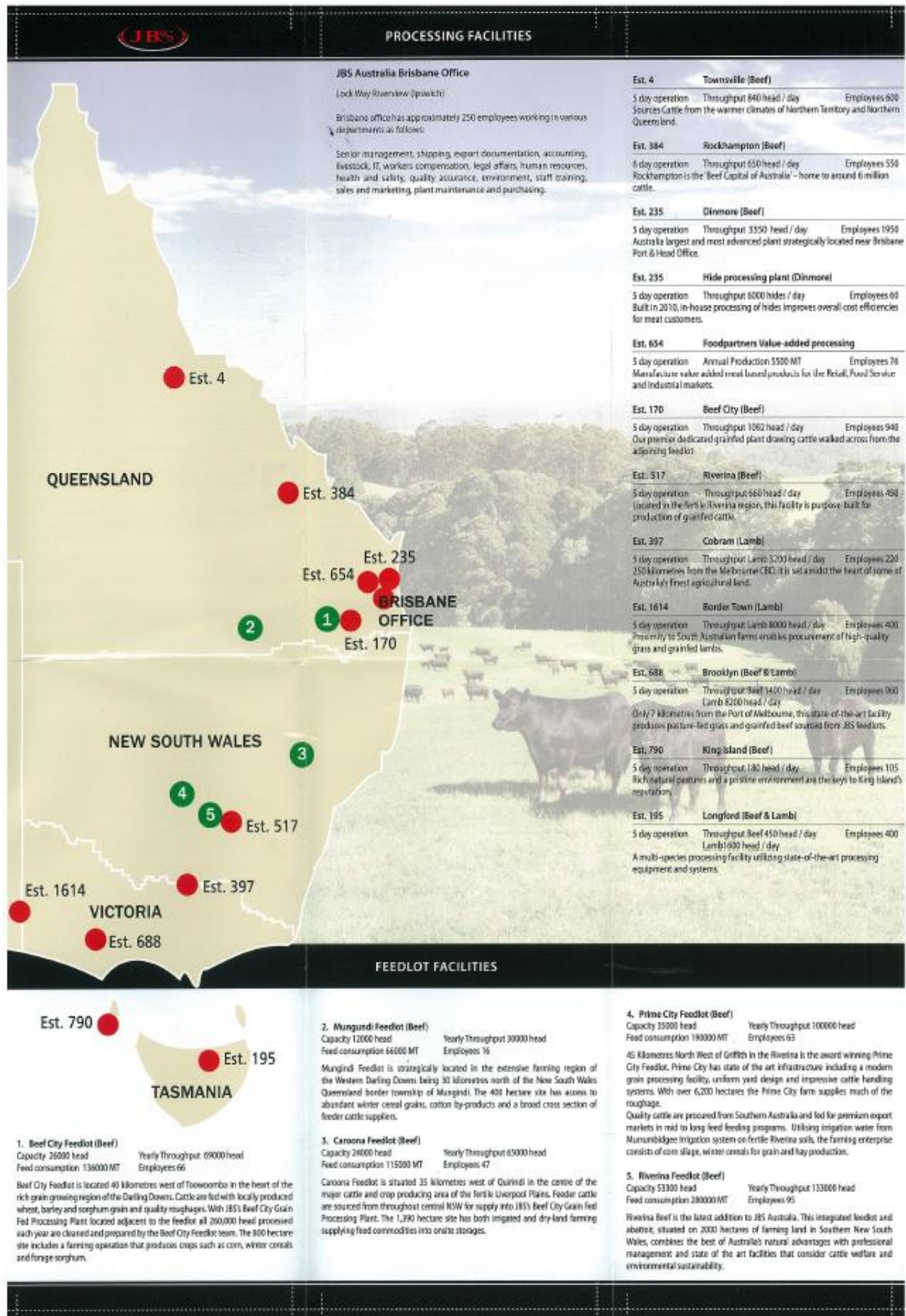


Figure 1: JBS operations, locations and Establishment Numbers.

1.1.5 JBS Livestock

JBS Australia maintains its livestock supply requirements through a network of specialist cattle and sheep buyers located throughout Queensland, New South Wales, Victoria, South Australia, King Island and Tasmania. JBS's livestock buyers are able to develop and maintain strong long-term relationships with their suppliers and the surrounding communities. [Source JBS website]

1.2 Collaborative Innovation Strategies Program

In September 2007, MLA rolled out the red meat industry's innovation capability building program, piloted as the Collaborative Innovation Strategies Partnership (CISP) program. The program involves the co-development of comprehensive innovation strategies with individual enterprises, which meet commercial imperatives in addition to focusing on the implementation of key industry and government innovation priorities. The CISP is a flexible enterprise innovation capability building program that is customised for large and small enterprises throughout the red meat value chain. Enterprise innovation capability within the context of this program is defined as the underlying capacities that enable a firm to be innovative on a sustained basis, rather than producing one-off product innovations from time to time.

Using a structured and collaborative process, MLA partners with companies such as JBS to develop a customised strategic innovation capability building program for a staged three year duration. The program can encompass the entire business (whole-of-enterprise program) or alternatively remain focused on a specific business area in which you identify a need to develop innovation capability (focused program). The partner company can appoint an internal innovation manager, and/or can develop multiple resources to implement and sustain innovation initiatives.

The Stage 3 CISP priorities were integrated into the company's overall business strategy and were continuously monitored against measurable performance indicators throughout the three-year program to identify the contribution of innovation to the bottom line and achievement of key business objectives. Ultimately, the outcomes delivered through the development and implementation of the innovation strategy contributed to development of JBS's long-term capability, and associated impacts on JBS's profitability, competitiveness and sustainability. The scope of the innovation strategy was significantly broader than the previous Stage 1 program with a whole of business (on- and off-farm) approach.

The primary focus areas were in the key business areas of:

- Operational efficiency (Process focus on energy use, technologies, productivity and materials handling)
- Optimal beef processing including further processing and product innovation
- Innovation resource planning and people capability development
- Sustainability (Environment)
- Feedlot/livestock
- Supply chain innovation (including areas such as eating quality; information management; supply chain alignment; through chain assurance)

- Marketing/product innovation - including integration between CISP and Collaborative Marketing (formerly ICA) programs as appropriate

To be effective, the CISP will be aligned and integrated with the company's overall corporate strategy and will be integral in enabling the company to successfully achieve its business objectives.

1.3 Project background

The Stage 3 CISP will have a value chain focus through enhancing producer engagement and by increasing their consumer insighting and ability to convert these to innovations. At the producer end of the value chain the focus will be on the development of Objective Carcase Measures and associated Value Based Payments model, which will involve integrating objective measurements for assessing and providing feedback on carcasses, as per project schedules including P.PIP.0466 - JBS lamb DEXA grading and automated forequarter / short rib middle processing.

JBS partnered throughout Stage 3 of this program with MLA and various service providers to undertake a suite of large transformational projects such as Objective Carcase Measurement (OCM) and associated yield based payments model(s). Part of this portfolio is designed to extract additional value from carcasses and potentially deliver a better return to producers and grow red meat demand. Further, JBS wish to develop their producer engagement strategy (i.e. development of a differentiated offering both supply and demand side) following the implementation of Livestock Data Link (LDL) and other feedback systems in the previous CISP stage (i.e. Stage 2).

The timeframe for development and implementation of the Stage 3 Collaborative Innovation Strategy was three years, although agreed innovation and R&D projects may be implemented and supported to address short, medium and long-term time horizons outside of this three-year period. The outcomes of an independent review of the JBS CISP stage 2 (refer to P.PIP.0500 that was completed in June 2016) were used to inform the Stage 3 strategy and priorities. Tentatively JBS has indicated key priorities and projects across their expanded whole of business focus areas. The Stage 4 program was focused on extending work through the supply chain.

It was anticipated that in Stage 3, the scope of the innovation strategy was significantly broader to include initiatives in the key business areas of:

- Processing efficiency / processing automation
- Environmental sustainability management
- People, culture & capability building
- Strategic marketing & product innovation
- Insight to innovation program with customised implementation plans being developed to reflect JBS market specific strategies
- Real-time business decisions from data

A range of current and new strategy development and implementation activities were planned during the three-year program period. It is noted that where external expertise is required to undertake any of the above activities, these will be treated as separate projects and will be contracted under individual schedules in the same way that other innovation/R&D projects are managed.

2 Project objectives

The purpose of this capability building initiative was the development and implementation of a Stage 3 CISP program between JBS and MLA. The Stage 3 CISP priorities were integrated into the company's overall business strategy and were continuously monitored against measurable performance indicators throughout the three-year program to identify the contribution of innovation to the bottom line and achievement of key business objectives. Ultimately, the outcomes delivered through the development and implementation of the innovation strategy contributed to development of JBS's long-term capability, and associated impacts on JBS's profitability, competitiveness and sustainability.

3 Methodology

The Collaborative Innovation Strategy program will be overseen by a joint JBS/MLA Steering Group comprising of John Berry (Director JBS), Anthony Pratt (COO JBS Northern), Sam McConnell (COO JBS Southern), Christine Pitt (CEO MLA Donor Company), Sean Starling (GM Value Chain Innovation MLA), and implementation will be managed by a team of JBS/MLA Innovation Managers including Graham Treffone, Paul Wightman, Doug McNicholl, Dean Gutzke, JBS Innovation Theme Leaders to be appointed, MLA Marketing Manager and MLA technical experts (with additional internal and external resources as required). This project provides support for one of the two full-time JBS Innovation Managers (considered necessary to support the volume and complexity of R&D/innovation projects covering Stage 1 and Stage 2 of the program).

4 Achievements

4.1 Innovation Manager – Roles & responsibilities

The primary focus of the JBS Innovation Managers were the implementation of the agreed JBS/MLA Innovation Strategy across the JBS northern and southern operations. The Northern Innovation Manager focused specifically on the JBS Northern Division and also co-ordinated the operational efficiency and new technology areas across the business (i.e. northern and southern operations). The Southern Innovation Manager focused primarily on the JBS Southern Division's R&D priorities covering beef, lamb and goat initiatives.

The major activities to be undertaken by the full-time JBS Northern Innovation Manager include:

- Develop an agreed suite of R&D/ innovation projects.
- Develop, monitor and report against key performance indicators and other measures of impact as agreed.
- Instigate and co-ordinate the generation of innovation ideas and filtering and feedback processes with a specific focus on the Northern Division and operational efficiency and processing technologies. Manage and monitor the JBS spreadsheet to manage expenditure and track benefits from outcomes generated from JBS R&D/innovation projects and activities.
- Participate in the development and implementation of a JBS innovation skills and resources plan.

- Support the co-ordination of site-specific project teams by identifying the skills required for site based innovation teams.
- Participate in the development and implementation of cultural change initiatives required across the business to deliver against innovation objectives.
- External relationship management with research partners, research providers, equipment suppliers, processing sector and value adding sector as appropriate.
- Active participation in the MLA Innovation Managers Network meetings (in March 2019).
- Active participation and technical input in the industry strategy initiatives, such as MLA's automation beef strategic workshop in 2018, annual Objective Measures ALMTech workshops)
- Active participation in MLA's Innovation Managers Network meetings (e.g. in March 2019).
- Attended local and international technology tradeshow and industry workshops including Fine Foods, IFFA 2016 & 2019, etc
- Participate in other innovation skills development activities as agreed.
- Prepare regular project reports and quarterly innovation reports.
- Review and provide input into JBS CISP independent review and the assist JBS implement any agreed recommendations.

Ongoing support for this role by MLA will be contingent upon:

There is clear evidence that the role is a dedicated full-time Innovation Manager role.

- The joint JBS/MLA Steering Group is satisfied with progress and agrees to continue the program at each of the annual decision points.
- The Innovation Manager satisfactorily undertakes the full range of activities as described above (or as varied and agreed by JBS and MLA).

At the commencement of the program, Graham Treffone was assigned as the JBS IM Northern operations, and Paul Wightman was assigned as the IM to the JBS Southern operations. At the first review point at six months, resourcing of CISP Stage 3 roles and responsibilities were reviewed and IMs were allocated for the remainder of the program based on JBS business improvement priorities and required skills and capabilities.

4.2 Position Description & Scope of Work

The following activities are required to be undertaken by the JBS Innovation Managers during the three-year innovation capability development period:

1. Manage existing collaborative R&D projects specifically in the area of new technologies and processing efficiency including technical support and administration within budgets and timelines. This includes the following projects:
 - P.PIP.0288 JBS Dinmore Plant Beef Rib Cutting Stage 2
 - P.PIP.0403 JBS lamb double tipping saw
 - P.PIP.0456 LEAP VI automated forequarter deboning system— Stage 1 concept development
 - P.PIP.0465 Implementation of the industry's online feedback system Livestock Data
 - P.PIP.0466 JBS lamb DEXA grading and automated forequarter / short rib middle processing
 - P.PIP.0315 Lamb supply chain carcass optimisation & value based payment system
 - P.PIP.0475 JBS beef value chain producer group engagement
 - P.PIP.0485 JBS Northern Integrated Value Chain information system
 - P.PIP.0534 JBS CISP Innovation Manager, Northern (Graham Treffone)
 - P.PIP.0535 JBS CISP Innovation Manager, Southern (Paul Wightman)

- P.PIP.0500 Review and design of the proposed JBS's CISP Stage 3 program
- P.PIP.0432 JBS Innovation Development Program
- P.PIP.0555 Polyarthrititis risk-based evaluation of disposition judgement criteria used for lot fed cattle
- P.PIP.0548 JBS Primo evaluation of beef snack concept
- P.PSH.1158 JBS digital strategy and Digital Marketing Manager
- P.PIP.0564 JBS LEAP suite monitoring and reporting
- P.PIP.0736 DEXA Lamb Eating Quality and Supply Chain Grading - DEXA Live - Phase 2
- P.PIP.0765 Neural network algorithms
- V.RDP.2102 JBS animal disease
- P.PIP.0749 JBS Automated rib cutting - detector upgrade
- P.PIP.0560 - JBS insights innovation Manager (JBS Andrews Meats)

Completed Projects (during CISP Stage 3)

- P.PIP.0288 - JBS Dinmore Plant Beef Rib Cutting Stage 2
 - P.PIP.0315 - Lamb supply chain carcass optimisation & value based payment system (Viascan project)
 - P.PIP.0320 - JBS McLaren iFrench water racker
 - P.PIP.0323 - JBS Beef loin saw MK II (to be reviewed)
 - P.PIP.0324 - JBS Beef O.P. rib saw (Cube Roll)
 - P.PIP.0327 - JBS LEAP III & IV Ovine primal & middle processing
 - P.PIP.0345 - JBS Lamb loin deboning with additional chinning and tenderloin removal
 - P.PIP.0363 - JBS Screw compressor testing
 - P.PIP.0370 - Technology and automation syndicated study tour to IFFA
 - P.PIP.0390 - JBS Manual assist in beef & lamb processing (Torras lifter)
 - P.PIP.0396 - JBS development & commercial proving of liner-less cartons
 - A.ENV.0137 - JBS Tripe water treatment (AMPC industry-funding)
 - P.PIP.0403 – JBS lamb double tipping saw
2. Review and provide technical input into new R&D proposals by liaising with JBS operations, MLA, industry technical committees and service providers, with specific focus on:
 - Brooklyn Leap lamb robotics stage I, II & III
 - DEXA/CT Beef / Lamb OCM lean & saleable meat yield calculator (DEXA/CT)
 - Lamb Producer/processor feedback, "whole of supply chain", and
 - Objective carcass measurement and associated yield based payments
 3. Review and develop a plan for priority R&D areas for beef and lamb processing as either JBS collaborative or industry funded projects.
 4. Ongoing update of JBS R&D priorities using JBS projects spreadsheet to facilitate the planning of JBS's R&D expenditure from input provided across the company in the key focus areas of operations. This information will be used to establish objectives and potential projects areas within this component of Stage 3 of JBS Collaborative Innovation Strategies program.
 5. Annual R&D site visits to support ideas collection and management under development by JBS. Visit operations and provide ongoing support to collect and collate ideas that are unable to be managed on site.

6. Manage and monitor the JBS projects spread sheet to track benefits and value produced for all outcomes generated from all associated collaborative JBS R&D projects and activities.

4.3 Set overarching goals, metrics and outline

The contribution of the JBS Innovation Manager Northern to the overall success of the Innovation Strategy will be determined by:

- Evidence of effective implementation of JBS innovation strategy in agreed areas
- Evidence of improvement in company innovation culture and capability
- Quantifiable improvements in company innovation measures (as agreed)
- Efficient project delivery in accordance with budgets and timelines
- Quality of reports
- Contribution to Innovation Managers Network meetings (e.g. March 2019)
- Innovation ideas and concepts translated to commercial outcomes in the JBS business

4.4 Objectives & Key Measures of Success

Overall, JBS was able to demonstrate significant progress in the development of R&D processes and systems. A number of R&D opportunities were identified and implemented to enhance JBS's internal capabilities. Specifically, key focus areas were more formal structures around managing ideas and networking within JBS and with external providers.

5 Discussion – Overall achievements in the project

Overall, JBS has made significant progress in development of R&D processes and systems. A number of R&D opportunities have been identified and implemented to enhance capability.

The key focus of the JBS CISP Stage 3 has been operational efficiencies around several fully and/or semi-automated processing solutions, including project lamb automation projects (i.e. P.PIP.0466, P.PIP.0288). Other areas of focus have included:

- Beef automation (labour and yield efficiencies);
- Objective carcase measurement (OCM);
- Operational efficiencies; and
- Environmental sustainability.

Specifically, the following achievements have been made in the course of the three-year innovation development program:

- Whole of company CISP approach with seven agreed focus areas with projects managed by assigned project work groups as required.
- An expanded program has been adopted with project work groups now formed around each of the JBS priority areas.
- Innovation & leadership training delivering transfer of skills to >20 JBS senior & new JBS programs.
- Current projects (>20 contracted) being managed by the JBS Innovation Managers.
- Benefits of the outcomes of all projects either completed or underway in Stage 3 CISP are being monitored and captured using a spreadsheet tool developed by the Innovation Manager(s). Independent third party cost benefit analyses are used where possible. These processes

demonstrated several technology & process developments having been worked on during the course of the program have delivered significant benefits to JBS.

- Company-wide change initiatives successfully implemented using Alchemy.
- JBS evaluated opportunities through discovery exercises, tradeshow, field days and supplier demonstrations including:
 - International study tour (including IFFA trade show – May 2016 attended by JBS's Paul Wightman & May 2019 attended by JBS's Graham Treffone).
 - JBS USA operations & technology scanning exercises (October 2016).
 - JBS attendance at FoodPro, Sydney (July 2016) by Graham Treffone & Tania Shaw.
 - LambEx 2018 (August 2018) by Graham Treffone, Mark Inglis & Steve Chapman.
 - Active participation and technical input in the industry strategy initiatives, such as MLA's automation beef strategic workshop in 2018, annual Objective Measures ALMTech workshops.
 - MLA Innovation Managers Network meetings in March 2019.
 - Local and international technology tradeshow and industry workshops including Fine Foods, FoodPro, LambEx, IFFA 2016 & 2019.
 - Several pilot plant visits to sign off on staged builds of various technology projects, including the lamb automation forequarter & middles build in Scotts Automation NZ.
 - JBS represented and providing technical inputs at several Beef automation strategy workshops with suppliers and MLA.
 - ALMTech & DEXA/Objective Carcase Measurement committee participation by JBS representatives.
- Evaluated propositions and business cases for new solutions across JBS Southern and Northern operations, in particular:
 - Water reduction & recycling, high pressure, low volume water cleaning of viscera tables.
 - Optimal boning and packing design in beef and/or lamb processing.
 - Integrated recycled water system in conjunction with City West Water (Melbourne)
 - Energy and co-generation efficiencies.
 - DEXA/CT/LMY/OCM work in collaboration with Teys, MLA & Murdoch University.

While the program is being expanded to include whole of JBS supply chains, it is anticipated that the Stage 4 priorities will continue the focus areas of Stage 3 and specific targets and measures of success for the Stage 4 will be developed. In addition, the following specific technology projects will also be considered:

- Robotic brisket cutting (beef & lamb)
- Lamb hind shank tipping
- Mutton/goat 6 way processing
- Pre-carton I.D. operator-less labelling
- Vertical plate freezing
- AGV container loading
- Grading probe equipment, such as the Ice-probe for GR fat measurement in lamb. The results of preliminary trials demonstrating the technology is showing promise for carcase measurement.
- CL trim management
- Product pick & pack Cryovac cuts
- Beef middles automation
- Hook tracking of lambs at Brooklyn & Bordertown. In progress
- Robotic pick & palletise brine cured hides.

In Stage 3, JBS expanded Collaborative Program incorporates the full range of JBS and MLA marketing, innovation and R&D activities working across JBS planned key focus areas (Refer to the below Pie chart, Figure 2):

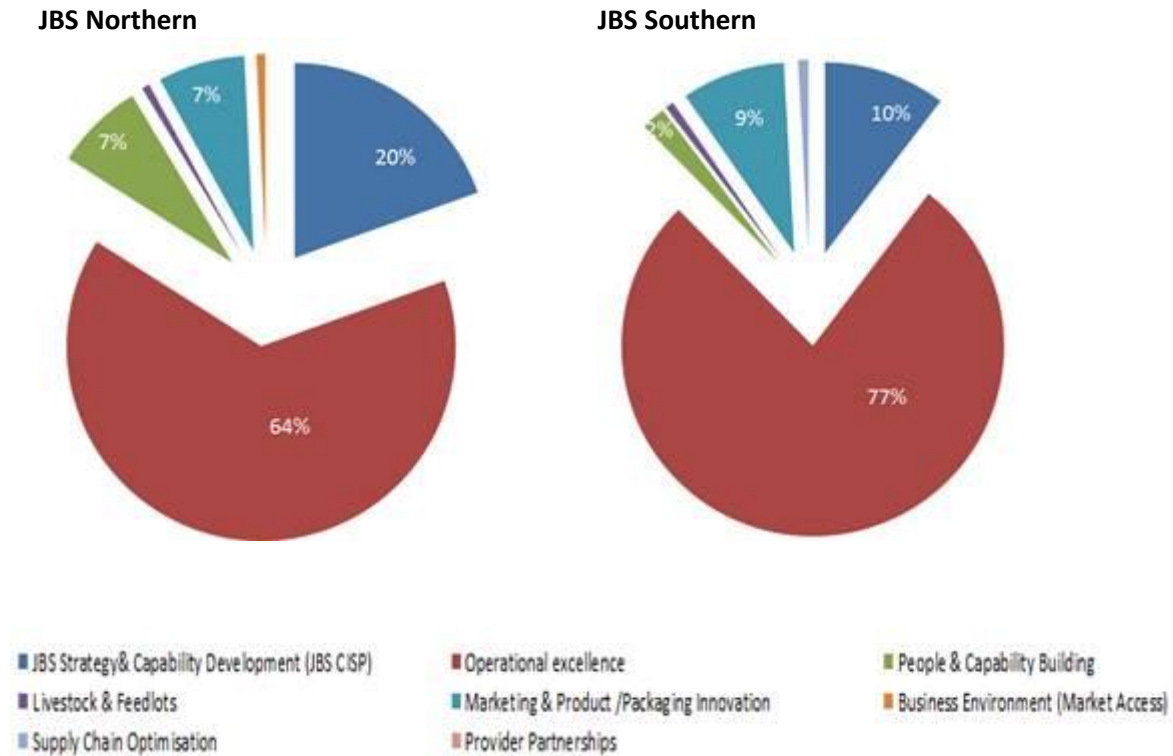


Figure 2: JBS & MLA collaborative R&D focus area, expressed as a percentage of total R&D investment.

The current JBS Collaborative R&D initiatives and activities through the Stage 3 program were on expanding automation solutions through the business. A number of strategy workshops with suppliers & MLA were undertaken to continually refine JBS's automation strategy and alignment with MLA Automation strategy(s).

- JBS & Scott's review of automation solutions at JBS Beef City & Brooklyn Plants to review beef automation options.
- JBS & MLA study tour of the JBS USA beef operations and technology scanning exercise.
- International study tour (including IFFA trade show)
- JBS USA operations & technology scanning exercises)

Working groups were formed across JBS priority areas (seven focus areas). See supporting documents. The key groups are the JBS Northern & JBS Southern R&D teams. In conjunction with KPMG, two separate conferences are held once per month to update our register of internal and collaborative R&D activities from each JBS processing site. JBS has innovation representatives from JBS Northern sites of Dinmore, Beef City, Rockhampton, Townsville & Riverina and JBS Southern sites Brooklyn, Bordertown, Longford, plus the Brooklyn VA involved in monthly conferences with the JBS Innovation manager and the provider (KPMG) to continually update and track all on-site R&D activities.

Beef spray chilling technology – proven successfully, delivered an estimated > \$13 head return across all eight JBS beef sites. Reported daily as part of daily reportable criteria by all plants. Rolled out now to all viable JBS beef processing operations. Beef spray chilling technology – proven successfully, delivered an estimated > \$13 head return across all eight JBS beef sites. Reported daily as part of daily reportable criteria by all plants. Rolled out now to all viable JBS beef processing operations. The latest installation was rolled out in beef processing at the JBS Scone operation in 2016 and delivered instantaneous yield improvement results.

A JBS company wide yield focus initiative is focusing on optimisation and consistency of the spray chilling operations across all beef and lamb operations. Since completing the initial collaborative research with MLA in 2012, JBS has rolled out and commissioned spray chilling to all JBS beef and lamb operations. There was wide variance in the use of water and yield improvements being experienced across all operations. Therefore, a senior leadership directive was for a controlled review and optimisation of each and every spray chilling system. The initiative was led by JBS Innovation Manager (Northern Division, Graham Treffone), with significant benefits starting to be derived from reduction of water and enhancement of yield improvements. Four out of the ten operations have now been optimised, and yield & water usage is being reported across all operations at future Northern and Southern division management meetings (i.e. a reportable KPI).

Fully automated Lamb Leap System X-ray primal and middle cutting machine (at JBS Bordertown) is now proven commercially successful. This X-ray is the first to be upgraded to dual energy to measure cutting lines accurately & in future (research currently underway) be used to provide carcase measurements to be fed-back to producers to assist with continuous improvement (See Appendix, Section 9.1).

Beef X-ray system at JBS Dinmore that provides accurate cutting of a primal bone-in portion of meat called rib set. The equipment is running every day, processing up to 3500 head (7000 sides) with accuracy at 95% and ongoing incremental increases in cutting accuracy.

6 JBS CISP Independent Evaluation

A third party independent study (by Greenleaf Enterprises) was completed in June 2016 to evaluate the quantitative and qualitative impacts of the CISP Stage 2 (and the commencement of Stage 3) program that MLA and JBS agreed to progress in 2015 (Refer to Appendix, Section 9.2).

There are two aspects of this independent review:

- Is JBS innovative? How is JBS innovative? What is JBS' unique way of innovating?
- Is the CISP program effective in achieving its goals? Is it effective in supporting JBS to increase its rate of innovation? Does the CISP program support JBS' level and unique way of innovating?

In general JBS was found to be a highly innovative organisation with initiatives that are having a benefit to the greater good of the Australian red meat industry.

The review of the JBS CISP with MLA has been established to identify the effectiveness of the program in supporting development of innovation capability within JBS. The review involves both qualitative

and quantitative analysis of benefit for JBS and Australian red meat value chains. The core focus for these milestones was to collect all relevant information and provide the key learnings from JBS & MLA's investment over the past three years. The following summarises the milestone activities and provides a snapshot of the process involved with collecting all relevant information.

6.1.1 Review of Published Information

The correlation of results from R&D projects completed by JBS through the CISP 1 & 2 programs was reviewed. The key learnings and economic benefits for these projects was compiled and correlated with the list provided from MLA. A sample of the reports reviewed, but not limited to, were:

- CISP Milestone reports
- CISP contracts
- R&D final reports
- Other supporting documents completed throughout the CISP program

6.1.2 ROI Analysis

The review found that JBS's investment in innovation has been primarily concentrated in the area of Operational Excellence, with a substantial portion of funding going towards radical innovation initiatives. JBS is also developing a culture that is conducive to innovation, with good support from top management as well as business owners. JBS owner country is clearly sending the message that innovation is important by leading through examples. Some very innovative initiatives undertaken by JBS Brazil include:

- Innovation in communication with suppliers: a dedicated television program for cattle breeders were launched;
- JBS was included in a global report for the first time on animal welfare;

JBS is also strongly focused on developing individual innovation capability as well as finding new ways to create connectivity between plants and with producers.

The total investment from JBS & MLA was compiled into JBS's five core business areas identified at the start of CISP Stage 2. This demonstrated the breakdown investment completed during the five years. This data was then compared to the total benefits identified from published information providing the ROI obtained by industry during the last three years.

6.1.3 Survey Senior Managers

The review of published information identified the documented qualitative and qualitative benefits achieved throughout the program. The next stage of the project was to identify the innovative capacity of JBS's managers and staff. This was collected through face to face interviews including a meeting with the Southern Innovation manager in Melbourne; and surveys (survey questionnaire attached). The following are the key actions completed throughout the CISP program:

- Meeting with innovation managers
- Innovation survey sent out to key managers within the company
- Meetings with MLA's staff engaged with JBS

Due to the fact that the surveys were conducted close to Christmas, the response to date has been extremely low. The surveys not completed during these two milestones will be followed up through face to face meetings with the managers to obtain key details on their innovative culture.

6.1.4 Classification of type of Innovation

All projects completed by JBS over the previous CISP period were classified into Continuous Improvement, Radical innovation and Incremental innovation. This gives some insight into the types of innovation processes being established within JBS and how they have focused their attention on creating new value. This information helped form up some of the survey questions and will support further discussions with managers in the next milestone.

Previously JBS Innovation managers have met with MLA to present the outcomes of CISP3. Greenleaf assisted in compiling this presentation (Greenleaf slides attached). The slides show a change in the way JBS is approaching development of new value and shows a maturing and more balanced approach to investment for innovation.

6.1.5 Next Steps

The next steps in this innovation review are to follow up with the survey recipients and innovation managers to finalise JBS's innovation overview. This will be used to compile a set of recommendations to be included in a JBS commercial in confidence report and an MLA final report.

7 Conclusions

In August 2016, JBS Australia and Meat and Livestock Australia agreed to progress to Stage 3 of the Collaborative Innovation Program with an expanded focus to encompass the full range of JBS strategic business areas. The expanded collaborative program incorporated the full range of JBS and MLA marketing, innovation and R&D activities. To establish strategic direction for the program, a joint JBS-MLA Executive Steering Committee was formed to provide strategic direction to a more comprehensive approach to improvement across the business. The agreed JBS business improvement priorities including collaborative initiatives were managed by key working groups across the key focus areas.

The scope of the innovation strategy was significantly broader than the previous Stage 1 and 2 programs with a whole of business (on- and off-farm) approach. The primary focus areas of CISP Stage 3 were in the key business areas of:

- Operational efficiency (Process focus on energy use, technologies, productivity and materials handling)
- Optimal beef processing including further processing and product innovation
- Innovation resource planning and people capability development
- Sustainability (Environment)
- Feedlot/livestock
- Supply chain innovation (including areas such as eating quality; information management; supply chain alignment; through chain assurance)

- Marketing/product innovation - including integration between CISP and Collaborative Marketing (formerly ICA) programs as appropriate

During the three-year capability building program, a range of strategy development and implementation activities were planned including (but not limited to):

- Documentation of key objectives and innovation initiatives in each of the above key business areas
- Quantifiable innovation performance targets in each of the key business areas, including the development of baselines and measurement systems to monitor progress
- Development of an innovation skills and resources plan to build JBS's capability to effectively implement the innovation strategies
- Initiatives to support the cultural change required across the business to deliver against innovation objectives

The purpose of this project was the development and implementation of a Stage 3 Collaborative Innovation Strategy between JBS Australia and Meat and Livestock Australia. To establish strategic direction for the program, a joint JBS-MLA Executive Steering Committee was formed to provide strategic direction to a more comprehensive approach to improvement across the business. The agreed JBS business improvement priorities including collaborative initiatives were managed by key working groups across the key focus areas.

Overall, JBS made significant progress in development of R&D processes and systems. A number of R&D opportunities were identified and implemented to enhance JBS's capability. Specifically, key focus areas were a more formal structure around managing current and new project concepts within JBS and with external providers.

8 Recommendations / Next steps

There is a proposition that is currently being evaluated by MLA & JBS to further extend the program for an additional stage (i.e. Stage 4). The purpose of the next phase is proposed to build on the innovation capabilities established in the first three stages. This project will focus on the development and implementation of a Stage 4 Collaborative Innovation Strategy between JBS Australia and Meat and Livestock Australia. The primary investment within the project budget is the MLA innovation services fee whereby JBS Australia pay an annual fee for program participation, which includes the services of a MLA Relationship Manager and associated support for capability building activities for the program duration.

The Stage 4 Co-Innovation Program will have a value chain focus through enhancing producer engagement and by increasing their consumer insighting and ability to convert these to innovations. At the producer end of the value chain the focus will be on the development of Objective Carcase Measures and associated Value Based Payments model, which will involve integrating objective measurements for assessing and providing feedback on carcasses, as per project schedules including P.PIP.0466 - JBS lamb DEXA grading and automated forequarter / short rib middle processing.

Throughout Stage 4 of this program, JBS will be partnering to undertake a suite of large transformational projects such as Objective Carcase Measurement and associated, Yield Based

Payments Model. Part of this portfolio is designed to extract additional value from carcasses and potentially deliver a better return to producers and grow red meat demand. Further, JBS wish to develop their producer engagement strategy (i.e. development of a differentiated offering both supply and demand side) following the implementation of Livestock Data Link (LDL) and other feedback systems in the previous Co-Innovation stage.

The timeframe for development and implementation of the Stage 4 Collaborative Innovation Strategy is three years, although agreed innovation and R&D projects may be implemented and supported to address short, medium and long-term time horizons outside of this three-year period. The outcomes of an independent review of the JBS CISP Stages 2 and 3 will be available in June 2016. Tentatively JBS has indicated key priorities and projects across their expanded whole of business focus areas. This stage will focus on extending work through the supply chain.

It is anticipated that in Stage 4, the scope of the innovation strategy will be significantly broader to include initiatives in the key business areas of:

- Processing efficiency / processing automation
- Environmental sustainability management
- People, culture & capability building
- Strategic marketing & product innovation
- Insight to innovation program with customised implementation plans being developed to reflect JBS market specific strategies
- Real-time business decisions from data

The JBS Co-Innovation Program will be overseen by a joint JBS / MLA Steering Group and implementation will be managed by a team comprised of JBS Northern and Southern Divisions, MLA and external resources as required. This project provides support for a full-time (i.e 1 FTE) JBS Co-Innovation Manager for a period of three years. As the program strategy evolves it is anticipated that specific R&D projects will be developed, and additional resources to support these projects will be considered as required. Each individual R&D project will be contracted via a separate schedule to be attached to the Collaborative Head Agreement.

It is noted that where external expertise is required to undertake any of the above activities, these will be treated as separate projects and will be contracted under individual schedules in the same way that other innovation/R&D projects are managed.

The overall objective is to develop and implement JBS's Co-Innovation strategy across the Northern and Southern operations to be achieved via a range of innovative projects, processes and value chain exercises.

Specifically, a range of current and new strategy development and implementation activities are planned including (but not limited to):

- Documentation of key objectives and innovation initiatives in each of the above key business areas.
- Participate in the development of a JBS Co-Innovation Strategy in both Northern and Southern operations.

- Quantifiable innovation performance targets in each of the key business areas, including the development of baselines and measurement systems to monitor progress against planned objectives.
- Development of an innovation skills and resources plan to build JBS' capability to effectively implement the innovation strategies.
- Initiatives to support the cultural change required across the business to deliver against corporate innovation objectives.
- Scanning exercises of new innovative product, packaging, technology and processes and business model designs.
- External relationship management with research partners, research providers, equipment suppliers, processing sector and value adding sector as appropriate.
- Trade shows and industry events to evaluate new innovative products.
- Capture, collate and analyse consumer and market trend data to provide insights to new products and packaging to meet customer demand.
- Insight and innovation capability and skill development.
- Product evaluations and testing.
- Study tours of key international and domestic retail and food service markets of innovative products, processes, technologies and packaging.
- Facilitated workshops on technologies, processes and packaging involving suppliers and technical experts.

A draft Strategy is under developed and will be further refined prior to the finalisation of the scope of Stage 4, resources required and the roles and responsibilities of assigned Innovation Manager(s). A Strategy on a Page including current & pipeline R&D priorities / projects has been drafted and will form the basis of the proposed next phase of the Co-Innovation program stage 4.

9 Appendix – Supporting Documents

9.1 Related publications



Bordertown robotics technology a window to processing's future + VIDEOS

by Jon Condon, 27 November 2014

There's something unsettling about seeing a series of shiny, articulated, stainless steel robotic devices going about the normally labour-intensive business of processing livestock carcasses, without human intervention.

But that's exactly what's happening at JBS Australia's 8000-a-day Bordertown lamb plant in South Australia, where a jointly funded R&D project is providing a window into the future of meat processing in Australia.

Robotics and automation are increasingly being seen as a means by which Australian processing can fight back in its lack of competitiveness in processing/labour costs, often quoted as being at least 50 percent higher than those in the US, and perhaps double those in Brazil.

A short video of the Bordertown plant installation has now been seen by producers attending the recent LambEx conference in Adelaide, MLA's annual general meeting in Sydney, and again in Tasmania last week where JBS held a supplier awards night for its Great Southern farm assurance programs. Click on the Youtube link below to view. A second video will be added shortly.

Bordertown Automated Lamb Processing

Hot Topics: China, Indonesia, live export, MLA, Senate

Weather: Brisbane 16°C 23°C

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Robots at cutting edge in JBS' Bordertown plant

by James Nason, 16 July 2014

Gleaming robotic arms with spinning steel saws slice a lamb carcass into high-value cuts with swift, clinical precision.

Scenes of high-tech, mechanical agility which would not be out of place in the latest Transformers movie featured in a video shown at Australia's major sheep industry conference LambEx last week.

JBS innovation manager Graham Treffone explained how the company has successfully introduced robotic cutting technology into its processing chain at Bordertown in South Australia.

The innovation has been adopted for a number of reasons, including to improve workplace safety for employees, to increase accuracy and consistency and to maximise the yield of high value cuts, to reduce handling, improve food safety and

more give, less take
UTE HAY FMD nab

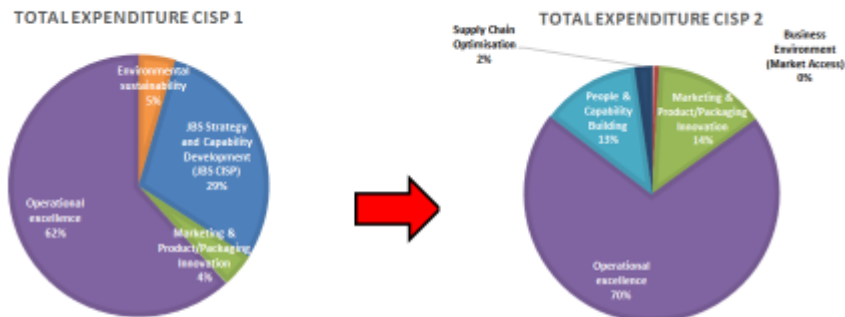
Weather: Brisbane 16°C 23°C

OPTIMISE EWE HEALTH AND LAMBING PERCENTAGES

9.2 Snapshot of outcomes of independent review of JBS Co-Innovation program (Stages 2&3)



JBS CISP 2 – People focused

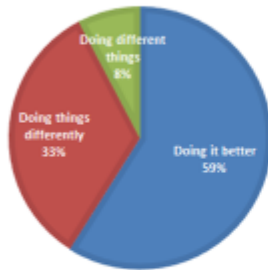


- CISP 2
 - Focused on the key low hanging fruit area of operation excellence
 - Expanded on market innovation and begun people and capability building
 - Supply chain optimisation and market access – now growing foci in JBS

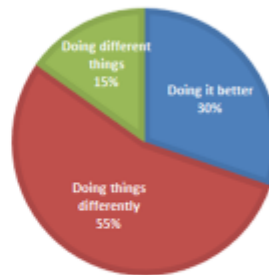


JBS CISP 2 – Doing things differently

TOTAL PROJECTS - CISP 1



TOTAL PROJECTS - CISP 2



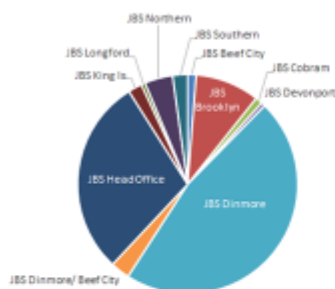
• CISP 2

- There has been a shift from "safe projects" which just improve to "radically" changing the process.
- Examples include the installation and commercialisation of the LEAP III & IV.

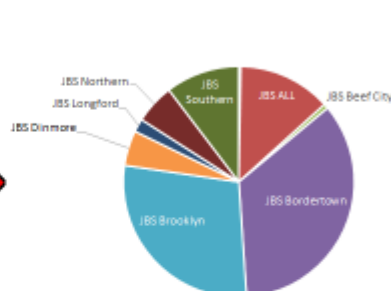


JBS CISP 2 – Broadening focus

TOTAL EXPENDITURE - CISP 1



TOTAL EXPENDITURE - CISP 2



• CISP 2

- Projects have been spread more broadly across plants imbuing a broader awareness and greater sense of connectedness across the organisation



Legacy ➡ CISP 3 – Cross cultural collaboration

- Senior management plant walkthroughs between plants
 - Information transfer within plants
 - Information transfer between plants
- Toowoomba – conducting staff rotation, collaboration of ideas
 - Making connections across the plant and setting a platform for innovation.
 - Currently only one plant but under review to see adopted more broadly
- Opportunity for CISP 3 - Building on the IDP success of the individual managers – extending to engage senior management



Legacy ➡ CISP 3 – Integrated supply chains

- Producer collaboration
 - LDL will provide feedback to 2300 suppliers under its Farm Assured producer group
 - Conducted a 2000 supplier field day in Melbourne earlier this year to develop better relationships with producers
- Cross processor collaboration
 - Teys & JBS teaming up on VBM
- Opportunity for CISP 3 - focus on developing systems and people to see major innovation occurring along the supply chain.



Pre-Innovation ➡ Sustainable Innovation

- JBS has been investing in “Pre-Innovation” or setting up for future innovation
 - Building capability and importing new skills
 - Examples - acquiring Primo Small goods, IDP
- JBS is now poised to capitalise on this foundation to begin building sustainable innovation across the company

