Herd Improvement Strategy 2020

Herd Improvement Industry Strategic Steering Group

August 2014
# Contents

2 Executive Summary ........................................................................................................ 5  
3 Introduction .................................................................................................................. 9  
4 Context ......................................................................................................................... 9  
   4.1 What is Herd Improvement? ....................................................................................... 9  
   4.2 Why is Herd Improvement Important? .................................................................... 10  
   4.3 The Need for Change ............................................................................................. 10  
5 Herd Improvement Industry Vision .............................................................................. 12  
   5.1 Impacts - Farm Level ............................................................................................... 12  
   5.2 Impact - Service Provider ....................................................................................... 14  
   5.3 Impacts – Whole of Industry .................................................................................. 15  
   5.4 The Change Required to Achieve the Vision and Create the Impact ...................... 16  
6 Key Strategic Themes ................................................................................................. 18  
   6.1 Increase the Ability of Herd Improvement to Deliver Farm Profit ....................... 18  
      6.1.1 Engagement and Messages .............................................................................. 18  
      6.1.2 Development of Reports and Tools ................................................................. 19  
      6.1.3 Data ................................................................................................................. 19  
   6.2 Redesign Oversight of the Herd Improvement Sector ............................................ 19  
      6.2.1 Strategic Guidance ......................................................................................... 19  
      6.2.2 Genetic Improvement Oversight ..................................................................... 20  
   6.3 Demonstrate value from Herd Improvement ......................................................... 20  
   6.4 Improve Service Provision at Farm Level ............................................................... 20  
      6.4.1 Efficiency Gains in Herd Test Centres ............................................................ 20  
      6.4.2 Dairy House .................................................................................................... 21  
      6.4.3 Investment ....................................................................................................... 21  
   6.5 Reset Genetic Evaluation to Changed Conditions ................................................ 21  
      6.5.1 Market Aware Genetic Evaluation .................................................................. 21  
      6.5.2 Progeny Verification ....................................................................................... 22  
      6.5.3 Short-Term Genomic Pipeline Working Group .............................................. 22  
   6.6 Refocus Industry on the Importance of People in Herd Improvement .................... 22  
7 Appendix 1 – Industry Stakeholders ...................................................................... 24  
   7.1 Herd Test Centres ................................................................................................. 24
7.2 Herd Test Centre Software Providers .......................................................... 24
7.3 On Farm Software Providers ......................................................................... 24
7.4 Bull Companies ............................................................................................. 25
7.5 Resellers ........................................................................................................ 25
7.6 NHIA ............................................................................................................... 25
7.7 ADHIS ............................................................................................................ 26
7.8 Breed societies .............................................................................................. 26
7.9 Artificial Breeding Companies ....................................................................... 26
7.10 Breeding Advisors ....................................................................................... 26
7.11 Dairy Futures CRC ....................................................................................... 26
7.12 Dairy Australia ............................................................................................. 26
8 Appendix 2 - Process and Methodology .......................................................... 29
  8.1 Lacey and Coats 2013 .................................................................................. 29
  8.2 Watson and Watson 2013 ............................................................................ 30
  8.3 Wickham 2014 ............................................................................................ 31
  8.4 The Process ................................................................................................ 32
9 Appendix 3 – Genetic & Genomic Workshop Attendees .................................. 34
10 Appendix 4 – The Current Situation In Herd Improvement ............................ 35
  10.1 General Observations ................................................................................ 35
      10.1.1 Data .................................................................................................... 35
      10.1.2 Competition versus Collaboration .................................................... 36
      10.1.3 Isolation ............................................................................................. 36
  10.2 Genetic Evaluation and Research ............................................................... 36
      10.2.1 Development, Implementation & Maintenance ................................. 37
      10.2.2 Service Delivery .............................................................................. 37
  10.3 Genomic Pipeline and Technology ............................................................ 38
  10.4 Herd Test .................................................................................................. 39
  10.5 Marketing and Extension .......................................................................... 40
  10.6 Breed Society Task Force ......................................................................... 41
11 Appendix 5 - Key Strategic Goals ................................................................. 42
  11.1 Genetic Evaluation and Research ............................................................... 42
  11.2 Genomic Pipeline and Technology ............................................................ 43
  11.3 Herd Testing .............................................................................................. 44
  11.4 Marketing and Extension .......................................................................... 44
  11.5 Breed Societies ......................................................................................... 46
12 Appendix 6 - Tactics for Achieving Strategic Goals ...................................... 49
2 EXECUTIVE SUMMARY

A broad cross-section of the herd improvement industry gathered in June 2013 and recognised that a whole of industry strategy and a blueprint to drive significant change were critically needed. A whole of industry approach to herd improvement investment has been absent in the past decade. Twelve months of activities followed that reinforced the value of herd improvement to the dairy industry and identified a vision and strategic goals that are essential for the future of the Australian dairy industry.

The vision for 2020 developed through this process is a vibrant herd improvement industry maximising profitability for dairy farmers through:

- Using an Australian genetic evaluation system to rank domestic and foreign sires and females to support farmers in building their herd which are best suited to profitable Australian dairy farms.

- Farmers and service providers understanding the link between decisions on herd improvement and profit, and being able to make decisions through reliable, easily understood and accessible information about genetics, environment and herd management.

- A strong Australian herd improvement industry underpinning the industry strategy which has all links in the domestic supply chain functioning well (including bull and heifer breeding, performance testing regime, research, evaluation and data systems) alongside the evaluation of animals from overseas to provide for the needs of the Australian dairying environment.

- The herd improvement industry having a collaborative and constructive approach to adopting new technology and practical innovations.

Achievement of this vision will be challenging and will require significant changes on farm, with service providers and across the entire Australian dairy industry. These changes will be achieved by the herd improvement industry in a variety of ways. We require:

- An industry committed to making changes to close the gap between potential and actual genetic gain which is worth an additional $25 million extra profit per year compounding to dairy farmers.

- Farmer leadership driving changes in the quality of farmer’s herd management decision making through promoting the importance of herd improvement for profitability amongst the farming community and service providers. Cultural change across the herd improvement industry enabling a more collaborative and constructive approach for service providers to deliver better services to farmers.

- Effective extension, marketing, proof of concept and demonstration of the verified link between profit and herd improvement and a clear understanding of this for farmers and the wider industry. This will enable the industry to capture more of the potential genetic gain by demonstrating how to make better decisions for herd improvement. These changes will also improve the utilisation of performance recording reports and other on-farm data to drive profitable decisions.
• The widespread use of genomics and 95% of farmers using Australian profitability metrics to drive elite sire selection, enabling a much faster rate of genetic improvement. This requires the retention of research and evaluation capacity which is focused on farm level profit and measuring genetic merit attuned to the Australian environment for domestic as well as imported products. A clearer understanding of the role of the domestic supply chain, overseas breeding programs and the importance of performance recording, underpinned by risk analysis, cost/benefit analysis and long-term planning for the needs of the Australian dairy industry.

• The effective recording, use and exchange of data will enable key management decisions to be made easily and more quickly without costly manual intervention. Material for farmers will be re-packaged and/or developed so the information they need is presented where and when they need it to make better decisions at key points in their herds’ life. Farmers will contribute data and use this data and innovative decision-making tools.

This strategy contains recommendations designed to ensure the dairy industry can take advantage of the opportunities to improve farmer profits through herd improvement.

An implementation plan (in preparation) will include the following short term actions:

1) Increase the ability of herd improvement to deliver farm profit:

a. The industry must improve the effectiveness of herd improvement value messages and their delivery so that more dairy farmers and service providers recognise the direct link between herd improvement, profit and the capital value of their livestock. These messages need to engage a wider section of the dairy industry including finance, milk companies, veterinarians and on farm consultants. A Task Force should develop an engagement plan for the wider industry including key messages, marketing and extension, underpinned by proof of concept, and a campaign to engage farmers and the broader industry.

b. Practical presentation of disparate data sources through quality reports to turn herd improvement services into better tools for on farm decision making. An industry-wide approach is justified to revamp key reports (that include herd test, genetics and genomic results) and better use existing data and efficiently access new data (e.g. DNA-based analyses). A working group of industry and design experts and farmer representatives must design reports that are valuable, clear and useable and collaborate to develop tools that take advantage of genomic technologies, such as genomic mating programs, calf selection, etc. as well as better articulating the link between performance data and genetic merit.

c. Dairy Australia leads discussions on a step-wise move to a central data repository, where data can move easily across the industry and be used to deliver decision making tools to farmers. Data (collection, collation, interpretation) is a significant obstacle to improving farm profitability through herd improvement as farmers and their advisors do not currently have access to all available data to make the best herd improvement decisions.

2) Review, and potentially redesign, oversight of pre-competitive activities that support the herd improvement industry:
a. An industry group \(^1\) should continue under the Dairy Moving Forward framework to provide strategic guidance in the herd improvement industry and ensure that farmer representation and advocacy is embedded into driving improved outcomes.

b. Review the oversight needs of the genetic improvement sector to ensure that there is clear alignment and line of sight from research through to delivery on farm.

3) Establishment of an ongoing research program via collaboration between Dairy Australia, DEPI and ADHIS (and possible other research organisations) to clearly demonstrate herd improvement’s impact on farm profit and to monitor genetic and phenotypic trends. This program would support proof of concept research to demonstrate the value of high genetic merit animals on farm through a combination of on-farm demonstration and desktop analysis.

4) Improved Service Provision at Farm Level:
   a. NHIA, with industry support, holds discussions with herd test centres to explore further efficiency gains, such as labs, logistics, response to new equipment, etc. These discussions should cover technology involved in delivering herd testing with a view to developing more delivery flexibility and evaluating new technologies. Whilst significant rationalisation has occurred recently in herd test, there remains scope for further efforts to deliver more efficient services to farmers.
   b. The dairy industry supports discussions on improving the efficiency of service delivery for breed societies which is vital to their ability to improve services and maintain access to current technology.
   c. Under the Dairy Moving Forward framework, HIISSG works with organisations and agencies to build investment coalitions to address key issues within this strategy.

5) Reset Genetic Evaluation to Changed Conditions:
   a. ADHIS should communicate regularly and work with key stakeholders to establish market needs in the medium term and then establish clear priorities to ensure market connectivity between genetic evaluation and the broader dairy industry. Resource requirements will need to be established and filled to respond to market needs.
   b. An industry-led working group is established to develop an implementation plan for a post-progeny test world. Measurement of individual cow performance (phenotypes) is the foundation of genetic improvement. Historically, many phenotypes were collected through progeny test programs run by bull companies. The dramatic fall in progeny test has made it imperative that the industry ensure its ability to accurately evaluate genetic performance in Australia.
   c. The industry implements, as a matter of urgency, the key recommendations from the Genomic Pipeline Working Group to ensure improved delivery of genomic breeding values (‘unplug the genomic pipeline’).

6) Refocus Industry on the Importance of People in Herd Improvement:
   a. NHIA, in collaboration with other industry bodies, develops a program of industry-endorsed training for herd improvement personnel.

---

\(^1\) The recommendation is that HIISSG continues in this role.
b. The herd improvement industry embeds the development, training and support of scarce personnel into industry discussions around genetic improvement.

c. NCDEA and other training providers invest in long-term education programs with regards to herd improvement practices of farmers and others working on farm.

In the development of this strategy, the following principles underpinned all discussions throughout the process and were accepted by all participants:

1) Genetic improvement is vital to the profitability of the Australian dairy herd.

2) Australian evaluation and research capability is vital to genetic improvement in Australia.

3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.

4) Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/adoptions of Australian evaluations.

5) Acceptance/understanding of genetics times environment (GxE) is vital for industry wide extension and support.

6) Measurement of animal performance is vital to managing animal performance.
3 INTRODUCTION

A broad cross-section of the herd improvement industry gathered in June 2013 and recognised the absence of a whole of industry strategy and a blueprint to drive significant change were of critical concern. Twelve months of activities followed that reinforced the current and potential value of herd improvement to the dairy industry and identified a vision and strategic goals that are essential for the future of the Australian dairy industry.

This process of developing a strategy for the herd improvement industry was initiated by a meeting held on 20-21 June 2013. This Workshop brought together key individuals [see Appendix 3 for attendees] and organisations involved in the science and delivery of genetic evaluation for the dairy industry to identify:

- issues of strategic importance;
- the degree of agreement regarding their relative importance; and
- key responses to perceived deficiencies.

This initial workshop resulted in two further pieces of work, the Lacey and Coats 2013 report and the Watson and Watson 2013 survey, which informed the second meeting of the group on 17 October 2013. A third report, Wickham 2014, was completed to cover more detailed requirements of implementing genomic technology within Australia to improve farm profitability.

A second workshop meeting on 16 January 2014 established a Steering Group to oversee the process of compiling a strategy as suggested in Lacey and Coats (2013) and five task forces were established under this Steering Group. The Steering Group has been called the Herd Improvement Industry Strategic Steering Group (HIISSG) and was tasked with delivering a strategy paper to the industry, with specific delivery to the Board of Dairy Australia as the organising entity for the work. In addition to the five Task Forces set up under HIISSG, it was recognised that while the ongoing National Breeding Objective (NBO) Review reported directly to the Board of ADHIS, its outcome is vital to the entire herd improvement industry.

This paper describes the findings of the Task Forces and describes a vision of the future as put forward by HIISSG. It should be noted that the process helps achieve the DMF objective in animal performance of “Dairy farmers confidently managing animal performance to deliver farm profit, health and welfare outcomes.” Specifically, the vision speaks directly to priorities 1 and 2 (Breeding herds that perform in Australian Conditions and Improve capacity for genetic improvement through genomic and reproductive technologies), and less directly to priorities 3 and 4 (Overcome issues and practices which impact on cow productivity, health and welfare and Investigate novel approaches to improve farm productivity via animal performance).

4 CONTEXT

4.1 WHAT IS HERD IMPROVEMENT?

Herd Improvement covers a wide range of activities, commercial services, service providers and industry bodies but is defined in the context of this paper as:
The provision of information to enable dairy farmers to improve farm profitability by making data driven decisions to manage the production, health and breeding of their cows.

And for the simplicity and the purposes of this document, this definition explicitly excludes other farm management areas such as nutrition, feedbase, people, and animal health (although there is some overlap with herd testing).

Appendix 1 provides an overview of the main players in herd improvement in order to describe its breadth.

4.2 **Why is herd improvement important?**

This paper does not purport to fully explore the question of importance in great detail and more information can be found in the sources quoted. The economic importance of herd improvement can be most readily calculated by a focus on two aspects of herd improvement: genetic gain and individual cow cell counts.

There have been a number of papers written over the years exploring the importance and impact of genetic gain on the Australian industry. The most recent was Lacey and Coats 2013. This paper estimated that the potential benefits of addressing issues of market failure in herd improvement could be worth in the neighbourhood of $25 million in gross farm margin per annum due to genetic gain, a figure which may well rise with continuing innovation in genomic technology. This is a substantial sum which would justify continued industry investment in herd improvement to realise the value of genetic gain. Lacey and Coats 2013 did not focus on the management benefits of herd improvement services and there is a lack of hard figures on the value of data for making breeding, feeding, culling and other management decisions.

4.3 **The need for change**

Across each Task Force and HIISSG itself, there was unanimity that significant change was necessary for the herd improvement industry to adapt to changing conditions and to contribute to farm profit. However, not every Task Force verbalised the need for change in the same way but there are three key areas which were identified as foci for change:

1) The strategic oversight of the herd improvement industry can be strengthened and improved to give clear guidance across the sector and ensure the best use of industry resources;
2) Key functions of the herd improvement industry, such as genetic evaluations, herd testing, etc., can be improved to take advantage of changes in technology, changes in scale of operations and linkages that can be forged across the dairy industry; and
3) The culture of the herd improvement industry can transition to one of collaboration and cooperation to improve advice, data and services at the farm level.

These changes in turn are being driven by four key trends:

1) The current pace of change in genetics.
   a. The rapid reduction in progeny test programs will effect a range of organisations:
      i. Farmers
         1. Farmers will likely purchase increasing numbers of genomically tested sires versus daughter proven sires. There will be a higher
turnover of sires and movement of bull ABVs from genomic tested to daughter proven may impact acceptability of new technology

ii. ADHIS
   1. reduced collection of progeny test data will require changes to ensure the ability to continue to provide accurate genetic evaluations.
   2. reduced income from services associated with progeny test, such as the collection of workability traits, daughter location reports and NASIS registration fees

iii. Herd Test Centres – reduced incentives for herd testing and collection of workability, calving ease and AI joining data

iv. Breed Societies – reduced demand for the collection of linear type data

v. Bull companies – adjustment of bull selection procedures from one focused on progeny testing a few bulls to the wide scale screening of many bulls and the subsequent marketing of a small number of higher genetic merit bulls

vi. Resellers – a change of marketing from progeny test bulls being used at least partially to reduce the average cost of semen to a still developing world of genomic bulls replacing progeny test bulls

b. The rise of genomics and the subsequent refocusing on cow breeding values, rather than just bulls, changes the nature of breeding value delivery.

c. Genomics has accelerated a trend towards a truly global genetics marketplace. This change has both advantages (increased pool of genetics to draw on) and negatives (increased complexity of messages being delivered to farmers).

d. Rapid change in genetic evaluation technology makes the need for strong linkages across the functions of research, development, implementation and maintenance even more important.

2) The reduction in herd test participation
   a. Herd Testing has historically provided the basis for phenotypic data collection and analysis. To ensure continued herd test participation, value must be shown and delivered to producers via reports and data analysis, which leads to profitable on-farm decision making.

   b. Reduced herd test participation has the flow on effect of reduced data for genetic evaluation and other industry R&D purposes (eg. Fertility Focus, Mastitis Focus etc).

3) The changing requirements of farmers for decision making tools on farm
   a. With more data being collected electronically on farm, farmers will require filters to sort and prioritise this data to help them make decisions. If data silos persist or additional ones created, these filters will be increasingly difficult to optimise. This is true from both a farm and an industry perspective.

   b. Genomic technology will require farmers to adapt their breeding strategies
      i. Increasingly rapid turnover of genomic bulls will require farmers to track pedigree more closely to avoid worsening pedigree inbreeding. This may mean an increased reliance on mating programs, particularly if genomic inbreeding can be incorporated into the program
      ii. The move to genomic bulls will require a change to the traditional approach to of a small team of bulls since the lower reliability of genomic bulls compared to daughter proven bulls means more bulls are needed to spread the associated risk

   c. Increasing uptake of inline milk measuring tools will impact several organisations.
i. It may reduce the demand for traditional herd test, although calibration will still be required.
ii. Unless the data collected from these meters is included in industry databases, the ability of the industry to produce breeding values, track on-farm events and measure production is threatened.

4) The need for greater efficiency and capacity to offer services on farm.
   a. Increasing farm size will force change on service providers as farmers become increasingly time-poor
      i. Provision of herd test services will have to adapt to larger herds and the associated challenges
      ii. Traditional individual cow knowledge will likely wane and farmers will demand new tools to help them manage their cows
   b. A reduced national herd size is shrinking the potential market for service providers, hindering their ability to innovate. By collaborating, they can achieve economies of scale that will enable them to meet farmer demands more quickly.

5  **Herd Improvement Industry Vision**

*Dairy farmers maximise their profit through a vibrant herd improvement industry offering effective and highly valued services.*

This vision for 2020 developed through the HIISSG process will be achieved through:

1) Farmers using the Australian genetic evaluation system to rank domestic and foreign sires and females to support farmers in building their herds which are best suited to profitable Australian dairy farms.

2) Farmers and service providers understanding the link between decisions on herd improvement and profit, and being able to make decisions through reliable and accessible information about genetics, environment and herd management.

3) A strong Australian herd improvement industry underpinning the industry strategy which has all links in the domestic genetics supply chain functioning well (including bull and heifer breeding, the performance testing regime, and the research, evaluation and data systems), alongside the evaluation of animals from overseas providing for the needs of the Australian dairying environment.

4) The herd improvement industry having a collaborative and constructive approach to adopting new technology and practical innovations.

Achievement of this vision will be challenging and will require significant change on farm, with service providers and across the entire industry. These changes will impact the industry in a variety of ways. The following section describes some of these possible changes and their indicators.

### 5.1 Impacts - Farm Level

<table>
<thead>
<tr>
<th>Current</th>
<th>2020</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little farmer leadership on the importance of herd</td>
<td>Strong, vocal and sustained farmer leadership on the importance of herd improvement for farm profitability</td>
<td>* Clear support by high profile farmers for herd improvement</td>
</tr>
<tr>
<td>Improvement to farm profitability</td>
<td>Data exists in silos and does not move easily between on farm packages, service providers and industry</td>
<td>Single entry/multi use data entry</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>The value proposition for data is not well understood at the farm level</td>
<td>There is a clear management value for farmers in data collection – they are collecting the right data for a purpose they understand and value</td>
<td>* More farmers recording and using data to make management decisions</td>
</tr>
<tr>
<td>The potential profit to be gained through herd improvement is significantly compromised through poor information and decision making support.</td>
<td>Herd improvement is a significant and growing contributor to improved profit on farm</td>
<td>50% of the estimated $25m additional gain (2013 base and dollar equivalent) is being achieved</td>
</tr>
</tbody>
</table>
| Genetics accepted as important but not linked clearly to profit | Genetics is accepted as a driver of profit on farm | *95% of farmers use an industry Australian profit metric for breeding decisions | *Percentage of farmers using of top 50 sires (90%)  
* Rate of AI-bred replacements at 85%  
* The gap between actual and theoretical genetic gain reduced by 50%  
* The genetic merit of elite animals is celebrated and recognised by industry  
*high impact marketing and engagement plan |
| Genomic testing has low penetration and is difficult to access | High penetration of genomic testing through a seamless and easy system by which farmers can nominate animals for genomic testing, both for breeding values and for parentage discovery, including a method of sample taking which does not add work to the farmer’s routine | * 20% of herds are genomically testing 50% of their replacements prior to mating  
* Multiple store fronts for farmer access to genomic breeding values  
* Genomic breeding values are priced so as not to hinder widespread uptake, (likely price point between $30 and $50)  
* Genomic mating programs are widely available and used |
| Roughly 50% of farmers view the NBO as relevant to their farm and are supportive | Strong support for the NBO and related tools | * 80% of farmers view the NBO and related tools as relevant to their farm |
| Farmers are suspicious of changes in genetic evaluation and view changes as fixes for | Farmers are supportive of continuous improvement in genetic evaluation and trust the | * 50% of farmers are very confident and 40% are confident in ABVs |
something that was previously wrong

<table>
<thead>
<tr>
<th>Australian genetic evaluation system</th>
</tr>
</thead>
</table>

Milk production recording is viewed as only as a management tool for cell count, painful for the farmer and technology limited

Milk production records are seen as a key management asset. They are linked to key decisions to keep, sell, breed and treat cows.

* Milk production and other herd analyses are considered essential management tools by at least 70% of farmers
* Herd test centres undertake on-farm sampling without the perception of imposition and have services and technology of value for farmers
* Herd Test centres rapidly introduce new technology that is of value for farmers (e.g. pregnancy testing, novel milk composition analysis)

### 5.2 IMPACT - SERVICE PROVIDER

<table>
<thead>
<tr>
<th>Current</th>
<th>2020</th>
<th>Indicator</th>
</tr>
</thead>
</table>
| Divisive culture which inhibits innovation and co-operation | Collaborative culture to drive pre-competitive innovation for service delivery and tools | * Staff training and development is valued by service providers
* Single repository for herd improvement data, accessible by all service providers, which seamlessly connects farm, service provider and industry software |
| Service providers are isolated from industry level organisations and their decisions | Service providers feel connected to industry-level organisations and participate in actions to achieve the industry vision | * Code of advertising conduct is adhered to by all participants in the herd improvement strategy
* Broad support for industry priorities
* Engagement of service providers in discussions around priorities and strategies |
| Service providers support Australian breeding values half-heartedly | Service providers support and promote the use of Australian breeding values | * Service providers are supportive of continuous improvement in genetic evaluation
* Code of advertising conduct is adhered to by all participants in the |
| Herd improvement strategy                                                                 | Innovative herd test reports and tools available for farmers | * Single herd test centre software platform which drives innovation in decision making tools and input mechanisms which is strongly aligned to industry good |
| Herd test staff have little opportunity to improve service provision through training | Farmers experience improved service delivery from herd test staff | * Herd test staff have increased training opportunities, including learning from international experience |
| Separate organisations and services utilise scarce resources and increase costs of services | Breed societies and other herd improvement stakeholders operate collaboratively to improve service delivery and provide more cost effective services | * Shared software platforms * Shared back office functions * Single conformation assessment |

### 5.3 IMPACTS – WHOLE OF INDUSTRY

<table>
<thead>
<tr>
<th>Current</th>
<th>2020</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Australia plays a limited role in the herd improvement industry</td>
<td>Dairy Australia plays a strong enabling role in herd improvement to improve service provision</td>
<td>* Dairy Australia actively involved in setting priorities, funding research and delivering effective engagement campaign in herd improvement</td>
</tr>
<tr>
<td>Divisive culture which inhibits innovation and co-operation</td>
<td>Collaborative culture across the herd improvement industry and common vision for future developments</td>
<td>* HIISSG-type group involved in setting and implementing herd improvement strategy * Industry supports and enables the development of people involved in herd improvement</td>
</tr>
<tr>
<td>Little engagement of milk companies and banks to help improve profit through herd improvement</td>
<td>Wider stakeholder engagement and understanding of the role of herd improvement as a driver of profit</td>
<td>* Milk companies and banks advocating for herd improvement in connection with profit</td>
</tr>
<tr>
<td>No herd improvement marketing or proof of concept and extension is limited to one organisation</td>
<td>Herd improvement extension, marketing messages and proof of concept evidence are integrated across all industry programs</td>
<td>* Concrete proof of concept mechanisms to reinforce the link between herd improvement and profitability</td>
</tr>
<tr>
<td>Not all bulls available in Australia have Australian breeding values and the number of bulls is limited</td>
<td>All bulls available in Australia have Australian breeding values and selection intensity is driven higher by a large number of tested bulls</td>
<td>* All bulls available in Australia have Australian breeding values and selection intensity is driven higher by a large number of tested bulls.</td>
</tr>
<tr>
<td>Silos exist between research, genetic evaluation, development, implementation and maintenance with little industry representation nor overarching guidance</td>
<td>Governance of research, genetic evaluation, development, implementation and maintenance is aligned and co-ordinated with broad stakeholder representation</td>
<td>* Governance of research, genetic evaluation, development, implementation and maintenance is aligned and co-ordinated with broad stakeholder representation.</td>
</tr>
</tbody>
</table>

### 5.4 The Change Required to Achieve the Vision and Create the Impact

What is the scale and shape of the change necessary to achieve the industry vision described above and to create the impacts outlined? The table below lays out the key changes identified across the industry and links them to key strategic themes described in Section 6 which will in turn drive the change.

<table>
<thead>
<tr>
<th>Change required to achieve vision</th>
<th>Key recommendations (strategic themes) to drive change²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer leadership will promote the importance of herd improvement for profitability amongst the farming community to drive change in farmer’s decision making on their herd.</td>
<td>6.1 Increase the Ability of Herd Improvement to Deliver Farm Profit, 6.2 Redesign Oversight of the Herd Improvement Sector, 6.3 Demonstrate Value from Herd Improvement and</td>
</tr>
<tr>
<td>Cultural change across the herd improvement industry will enable a more collaborative and constructive approach for service providers to deliver better services to farmers.</td>
<td>6.1 Increase the Ability of Herd Improvement to Deliver Farm Profit, 6.2 Redesign Oversight of the Herd Improvement Sector, 6.4 Improve Service Provision at Farm Level,</td>
</tr>
</tbody>
</table>

² Key Strategic Themes detailed further in Section 6
Through effective extension, marketing, proof of concept and demonstration, there will be a verified link between profit and herd improvement and a clear understanding of this for farmers and the wider industry. This will enable the industry to capture more of the potential genetic gain by demonstrating how to make better decisions for herd improvement. These changes will also improve the utilisation of performance recording reports and other on-farm data to drive profitable decisions.

The widespread use of genomics and 95% of farmers using Australian metrics to drive elite sire selection, as well as an industry focus on closing the gap between potential and realised genetic gain will enable a much faster rate of genetic improvement. This is worth a potential $25 million extra profit per year, compounding (Lacey and Coats 2013). Achieving this potential will require retaining research and evaluation capacity which is focused on farm level profit to measure genetic merit that is well suited to assessing imported as well as domestic products and is attuned to the operating environment in Australia.

Farmers and the wider industry will have a clearer understand of the role of the domestic genetics supply chain, overseas breeding programs and the importance of performance recording, underpinned by risk analysis, cost/benefit analysis and long-term planning of the needs of the Australian dairy industry.

The effective recording, use and exchange of data will enable key management decisions to be made easily and more quickly without costly manual intervention. Material for farmers will be re-packaged and/or developed so the information they need is presented where and when they need them to make better decisions at key points in their herds’ life. Farmers will contribute data and use this data and innovative decision-making tools.
6 Key Strategic Themes

There are six strategic themes that have been identified as key drivers to deliver the industry vision laid out in Section 4. Properly executed, the strategies proposed in this document will ensure that the strategic vision is reached in 2020 by effecting the necessary changes. However, it must be recognised that a full implementation plan is not possible given the timeframe covered and the unknown shape of some of the requirements. In this case, implementation is about ensuring that the key strategic themes are identified and resourced so that more detailed implementation plans can be created and followed.

For each strategic theme, there are a number of key recommendations and actions that will begin the journey towards the industry’s vision for herd improvement in 2020. These recommendations and actions do not purport to cover all the tactics and actions that will be necessary but they are the key priorities in the coming 12 months.

6.1 Increase the Ability of Herd Improvement to Deliver Farm Profit

The Australian dairy industry is forgoing some of the financial benefit to be achieved through herd improvement because the marketing and extension of its benefits has been inconsistent and unclear, while reports and tools have not been optimised for farmer use. With clearly demonstrated linkages between herd improvement and profit, the industry can clarify its marketing/extension messages and make more specific and useful the reports and tools necessary for decision making. In addition, well known issues around data collection, access and use reduce the ability to delivery farm profit through data driven decisions.

6.1.1 Engagement and Messages

The industry should improve the effectiveness of herd improvement value messages and their delivery so that more farmers and service providers recognise the direct link between high quality herd improvement, profit and the capital value of livestock. These messages also need to be used to engage a wider section of the dairy industry (e.g. finance, milk companies, veterinary, on farm consultants). A lack of wider engagement has historically hindered the uptake of herd improvement tools to drive profit.

Recommendation: A Task Force, modelled on the one set up by HIISSG, should be established with the following remit:

- Developing key industry messages around herd improvement, including clear value statements for genetic improvement (including genomic testing for herd bulls and cows), herd test, use and collection of data and AI usage.
- Developing an engagement plan to deliver the agreed messages to other industry service providers, such as vets, consultants, factory field reps, DEPI staff, extension staff, RDPs, etc.
- Developing a campaign aimed at farmers around the benefits of genetics, genomics, data, use of AI and herd test.

Action: By 30 September 2014, the Task Force develop a proposal to engage the necessary resources to complete its remit.

This project is aimed at meeting Strategic Goals at 11.1.1, 11.1.2, 11.1.3, 11.3.4, and 11.5.1.
6.1.2 Development of Reports and Tools

Turning herd improvement services into better decisions on farm requires the practical presentation of disparate data sources through quality reports. An industry-wide approach is justified to revamp key reports that better use existing data and efficiently access new data (e.g., DNA-based analyses).

**Recommendation:** A working group of industry and design experts and farmer representatives should design reports that are valuable, clear and user friendly. The reports revamped/created should include herd test, genetics and genomic results.

**Action:** HIISSG to establish the working group by 30 August 2014 and the working group to have a proposed work plan by 30 September 2014, including the details of any resources that will be needed.

**Recommendation:** A working group of industry experts and farmers should collaborate to develop and scope new tools that can take advantage of genomic technology, such as genomic mating programs, calf selection, etc. as well as articulating the link between performance data and genetic merit.

**Action:** HIISSG to establish the working group by 30 August 2014 and the working group to have a proposed work plan by 30 September 2014, including the details of any resources that will be needed.

This project is aimed at meeting Strategic Goals 11.1.2, 11.3.1, 11.3.4 and 11.5.2.

6.1.3 Data

The lack of a coherent data structure is a significant obstacle to improving farm profitability through herd improvement as farmers and their advisors do not currently have access to all available data to make herd decisions. When considering centralising data, the industry must consider how to encourage on-going data collection by farmers and companies and the need to focus on high value data.

**Recommendation:** DA to develop a step-wise move towards a central data repository, where data can move easily across the industry and be used to deliver decision making tools to farmers.

**Action:** By 18 December 2014, DA to outline to HIISSG a proposed road map for future data development.

This project aims to meet Strategic Goals 11.2.5, 11.3.2, 11.8.4 and 11.5.5.

6.2 Redesign Oversight of the Herd Improvement Sector

There was a clear recognition from each task force, as well as HIISSG itself, that a key driver to increasing farm profit through herd improvement would be the establishment of representative and inclusive oversight of the herd improvement industry. There has been no mechanism for industry participants, whether they are farmers, service providers or industry bodies to set collective goals and priorities, nor to act in a coordinated way.

6.2.1 Strategic Guidance

Through the development of this document, HIISSG has performed an important role in providing high level guidance and leadership across the herd improvement industry. Through the implementation of the results of this paper it should continue to establish strategic goals, set priorities and help guide the collective investment in herd improvement services. This process
would be supported by Dairy Australia and would be considered to be a strategy group within the Dairy Moving Forward (DMF) framework.

**Recommendation:** That HIISSG continue to function under the DMF framework by providing strategic guidance in the herd improvement industry and ensuring that farmer representation and advocacy is embedded into driving outcomes.

**Action:** That DA reworks the HIISSG Terms of Reference to reflect the ongoing requirement for strategic guidance and have them endorsed by the Board of Dairy Australia, HIISSG, DEPI and ADF.

6.2.2 Genetic Improvement Oversight
The first priority of the Genetic Evaluation and Research Task Force was to review the oversight needs of the genetic improvement sector. This will ensure that there is alignment and line of sight from research through development to delivery on farm.

**Recommendation:** That DA establish an industry-led working group with broad industry representation to develop a model of oversight that works across the entire operational space of genetic improvement, from research through to delivery.

**Action:** ADHIS, DFCRC/DEPI, ADF and DA to develop an options paper in consultation with wider industry to be ready for distribution to the working group by 30 October 2014.

This project aims to meet Strategic Goal 11.2.1

6.3 Demonstrate Value from Herd Improvement
There is a gap in farmer and wider industry understanding of why herd improvement matters and what impact herd improvement has on farm profit. This gap is a result of the failure to clearly establish the link between herd improvement and profit through demonstration and verification at the farm and cow levels. The lack of demonstrated value for herd improvement has hindered the ability of herd improvement to deliver farm profit.

**Recommendation:** An ongoing research program should be established via collaboration between DA/DEPI/ADHIS (and possible other research organisations – CSIRO, UNE etc.) to clearly demonstrate herd improvement’s impact on farm profit and monitor genetic and phenotypic trends. This program should support proof of concept research to demonstrate the value of high genetic merit animals on farm through a combination of on-farm demonstration and desktop analysis.

**Action:** That DA/DEPI/ADHIS/ADF propose a work program by 30 September 2014.

6.4 Improve Service Provision at Farm Level
In order to improve the provision of herd improvement services to farmers and drive innovation in delivery, a measure of duplicated effort should be reduced. This would allow a renewed focus on farmer needs rather than survival.

6.4.1 Efficiency Gains in Herd Test Centres
While significant rationalisation has occurred recently in herd test, there remains scope for further efforts to deliver efficient services to farmers. This should include a reinvigoration of herd testing in Australia and encourage investment in its future.
**Recommendation:** NHIA, with industry support, to hold discussions with herd test centres to explore further efficiency, such as labs, logistics, response to new equipment, etc.

**Action:** NHIA to host an open discussion with herd test centres and develop an implementation plan from those discussions by 30 June 2015.

**Recommendation:** NHIA, with industry support, to hold discussions on the technology involved in delivering herd testing with a view to developing more delivery flexibility and evaluating new technology.

**Action:** NHIA to host an open discussion with herd test centres and develop an implementation plan from those discussions by 30 June 2015.

This project is aimed at meeting Strategic Goals 11.1.4 and 11.1.5.

### 6.4.2 Dairy House

The Breed Society Task Force identified that discussions on improving the efficiency of service delivery for breed societies will be vital to their ability to improve services and maintain technology.

**Recommendation:** The industry support discussions among herd improvement stakeholders, predominately breed societies but also potentially ADHIS and NHIA, to improve efficiency in back office functions.

**Action:** Breed Societies develop a plan to improve efficiency by 18 December 2014.

This project aims to meet Strategic Goal 11.4.

### 6.4.3 Investment

A whole of industry approach to herd improvement investment has been absent in the past decade. Investment from industry sources such as the DHIF fund, the Gardiner Foundation and Dairy Australia have varied in an uncoordinated way. This has meant, for instance, that industry investment in herd test has been non-existent for some time.

**Recommendation:** That HISSSG approach organisations and agencies under the DMF framework to build investment coalitions to address key issues within this strategy.

**Action:** HISSSG to develop an industry proposal to industry funding bodies to address key issues within this strategy.

### 6.5 Reset Genetic Evaluation to Changed Conditions

A common theme through all the Task Forces was the need to reset genetic evaluation to the changed conditions within the industry and build a strong foundation to drive genetic gain for farmers.

#### 6.5.1 Market Aware Genetic Evaluation

Several Task Forces identified the need to ensure market connectivity between genetic evaluation and the broader industry.

**Recommendation:** ADHIS to work with key stakeholder clients to establish market needs in the medium term and then establish clear priorities. Resource needs will have to be established and filled and communication with stakeholders must be regular.
**Action:** ADHIS to outline market needs, priorities and resources needed to HIISSG by 18 December 2014.

This project aims to meet Strategic Goals 11.2.4, 11.2.7 and 11.5.3.

### 6.5.2 Progeny Verification

The measurement of individual cow performance (phenotypes) is the foundation of genetic improvement. Historically, many phenotypes were collected through progeny test programs operated by bull companies. This is expected to change over time and a proactive plan is needed to ensure the industry’s ability to continue to accurately evaluate genetic performance in Australia.

**Recommendation:** Establish an industry-led working group to develop an implementation plan for a continued phenotypic data collection.

**Action:** ADHIS, DA and DFCRC to convene a working group on this topic and report back to HIISSG by 18 December 2014.

This project aims to meet Strategic Goal 11.3.3.

### 6.5.3 Short-Term Genomic Pipeline Working Group

While not strictly strategic, the Genomic Pipeline and Technology Task Force and the Genetic Evaluation and Research Task Force noted the urgent need to unplug the genomic pipeline.

**Recommendation:** The Industry should implement as a matter of urgency the key recommendations from the Genomic Pipeline Working Group to ensure improved delivery of genomic breeding values.

**Action:** The Genomic Pipeline Working Group should identify priority projects and the resources necessary to complete these projects by 30 June 2014.

This project aims to meet Strategic Goals 11.2.6, 11.3.5 and 11.4.

### 6.6 Refocus Industry on the Importance of People in Herd Improvement

Another common theme across all Task Forces was a need to focus on people across the industry, from herd test to genetic evaluation through research, resellers and breed societies. The industry has not invested in developing its capacity to the extent necessary to achieve the potential gains from herd improvement. A focus on people will enable better service provision at farm level, driving better data driven decisions and so improve farm profitability.

**Recommendation:** Request NHIA, in collaboration with other industry bodies, to develop a program of industry training for herd improvement personnel.

**Action:** NHIA to host an open discussion with other industry bodies to develop a program of industry training by 30 June 2015.

**Recommendation:** Embed the development, training and support of scarce personnel into industry discussions around genetic improvement.

**Action:** The genetic improvement oversight body envisioned above to clearly link the development, training and support of personnel to the ability to deliver genetic gain.

**Recommendation:** That NCDEA, training providers and service providers invest in education and training programs with regards to herd improvement practices of farmers and their staff.
**Action:** HIISSG to spearhead discussion with NCDEA, training providers and service providers about herd improvement education and training.
7 Appendix 1 – Industry Stakeholders

7.1 Herd Test Centres
In the Australian context, Herd Test Centres refer to an organisation that tests milk for farmers for volume, fat, protein and somatic cell count on an individual cow basis. This is distinct from the bulk milk testing performed by the factories for the purposes of calculating milk payments. Farmers herd test for management reasons, mainly to control mastitis and to prioritise culling of poor production cows. There are additional reasons, such as maintenance of pedigree records and to support progeny test programs, but these rationale are less important than management tools.

Herd Test requires farmers to attach metres to their dairies and collect a milk sample for each animal. This sample is then submitted to a lab for analysis. Historically, most herd testing has been done once per month with a morning and night sample. However, many herd are now changing to once a day, or Tassie, sampling. This single sample is than run through a model to predict daily production. This reduces the cost, workload and the inconvenience of herd testing. There is also a group of farmers who only herd test when they have an issue with somatic cell count. They “spot test” when needed, rather than test on a regular basis.

7.2 Herd Test Centre Software Providers
There are two main providers of software to run herd test centres in Australia. The largest is MISTRO, which is owned by HICO, a herd test centre. MISTRO is based in Victoria and is used for around 70% of the cows under test. The second largest is DairyExpress, which is owned by ABRI and operates only in Queensland and New South Wales. There are several smaller software packages used, such as TASHerd (in Tasmania) and AHRS (in Queensland).

This group has been severely hampered in their ability to development new products or delivery options due to the fragmented nature of data and the resulting costs of developing and supporting software across multiple database. Ironically, Mistro has developed applications for New Zealand that are unable to be rolled out in Australia because of the fragmented nature of the available data.

There have been recent steps taken to begin to address this fragmentation through the combining of all the Mistro databases into a single location and gradual expansion of Mistro into the majority of herd test centres. This merging will help drive the delivery of new products and tools to farmers by reducing the development and maintenance costs for their providers.

7.3 On Farm Software Providers
On farm software is a management tool for farmers. It can help manage the actual milking and feeding of individual cows. It can also hold all data related to the management of the farm, including veterinary treatments, matings, production information, etc. From this information various reports are created which help farmers make decisions on action to take to manage their farms, such as treat this cow, cull this cow, breed this cow. The use of these systems has grown dramatically in the past decades.

The field of companies providing on farm software is very broad. There are two main types of on farm software: a dairy-based software program which is used to run equipment from that company
and private software that may or may not run equipment from multiple companies. In the first camp is software from Deleval, Lely, Jantec, etc. This is proprietary software developed by the parent companies for their systems. It may or may not communicate with the rest of industry. In the second camp are Mistro Farm, EasyDairy, DairyComp 305, etc. These are programs developed either in Australia or overseas to integrate with various dairy equipment brands. They may or may not communicate with other industry data services.

Generally speaking, much of the data collected on farm stays on farm. With the exception of Mistro and EasyDairy, most packages do not contribute data to industry good use but are contained on farm-based data islands. This has been recognised by various studies as an issue that should be addressed to ensure the industry collects enough data for its research, development and implementation needs and to help drive innovation on service provision to farmers.

### 7.4 Bull Companies

Bull companies are companies that produce semen for sale to farmers. These can be both domestic and foreign owned and have both domestic and foreign bulls. Some importing companies are marketing collaborations between multiple bull companies.

Traditionally, bull companies have purchased young bulls from bull breeders and put them through a progeny test scheme to prove their value as breeding stock through the production of breeding values. With the advent of genomics, this traditional path to market is breaking down. The companies get breeding values earlier in the bull’s life and are no longer compelled to put a bull in to formal progeny test. This is reducing the number of progeny test bulls.

### 7.5 Resellers

Resellers are a unique feature of the Australian genetic landscape. They sit between the farmers and the companies producing the semen. Most countries do not have this intermediary and bull companies sell directly to farmers. Resellers play a critical filtering role for Australia dairy farmers and exercise a significant amount of influence on bull buying decisions. Resellers are often also herd test centres and provide many other management services.

The business model for resellers is that they sell product from various companies on various margins. These margins may have nothing to do with genetic merit and can be driven by supply and demand. The reseller structure encourages severe price competition, which while good for the farmer, may devalue good genetics. Today their business structure/model is changing due to the increased demand for herd synchronisation and herd fertility.

Resellers view themselves as honest brokers between bull companies and as the gatekeepers to farmers. Many have long standing relationships with their clients, who in some cases are also their owners (such as Cobden AB). If the resellers did not provide a valuable service, their farmers would not entrust their breeding decisions to them. In fact, resellers are expanding their product offering into a more complete service including syncro programs, inseminations, pregnancy testing, data entry, etc.

### 7.6 NHIA

The National Herd Improvement Association is the peak body for the herd improvement industry. Its members include herd test centres, bull companies, resellers, breed societies, and artificial breeding companies. Its objectives are:
- Lead the continual development of the Australian Herd Improvement Industry;
- Represent the industry for the benefit of NHIA Members;
- Stimulate high quality exchange of ideas and technology within the HI industry;
- Stimulate higher levels of professionalism within the HI Industry
- Deliver cost effective products and services to the benefit of the members.

NHIA runs seminars for its members, courses for industry and also chairs the Ruminant Genetics Trade Advisory Group for DAFF.

7.7 ADHIS
The Australian Dairy Herd Improvement Scheme performs genetic evaluations for the Australian industry. It collects data from herd test centres and breed societies to create breeding values for farmers. It has a close interaction with the Dairy Futures CRC and DEPIV, which perform a great deal of the basic research to produce the breeding values and national index.

7.8 BREED SOCIETIES
Breed societies exist for all the major breeds of dairy cattle in Australia. The two largest are Holstein Australia and Jersey Australia, which together would cover 95% of registered cattle and members. The main areas of activity are pedigree recording and type classification. In recent years they have also moved into the provision of mating programs and genomic breeding values and the joint promotion of bulls together with AI companies.

7.9 ARTIFICIAL BREEDING COMPANIES
Artificial Breeding Companies are companies that perform inseminations for farmers. They may or may not be part of a bull company, a herd test centre or a reseller. There are very limited numbers of non-reseller affiliated providers.

7.10 BREEDING ADVISORS
Breeding Advisors are individuals or companies that provide advice to farmers on what bulls to use and over what cows. They can be independent, but this is reasonably rare as most advisors have connections with particular bull companies. Breeding advisors may or may not provide a type inspection service which they use to suggest corrective matings to improve certain traits.

7.11 DAIRY FUTURES CRC
The Dairy Futures CRC has as one of its main programs and goals the increase in the rate of genetic gain through the introduction of genomically-derived breeding values. The CRC scientists work closely with ADHIS to implement the science of the CRC.

7.12 DAIRY AUSTRALIA
Dairy Australia plays an integral role in the herd improvement industry through its investments in Extension, CountDown, InCalf, ADHIS and the CRC.
The table below represents an incomplete list of organisations involved in the herd improvement industry as of March 2014.

<table>
<thead>
<tr>
<th>Name</th>
<th>Service type</th>
<th>Region</th>
<th>Ownership</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Express</td>
<td>Herd Test Centre</td>
<td>NSW &amp; QLD</td>
<td>ABRI (owned by UNE)</td>
<td>Co-operating with MISTRO and moving platforms</td>
</tr>
<tr>
<td>ABS Australia</td>
<td>Bull Company</td>
<td>National</td>
<td>Multinational, Listed</td>
<td>Also owns PIC. Recently sold herd test division to NHD.</td>
</tr>
<tr>
<td>Australian Herd Recording Services</td>
<td>Herd Test Centre, Herd Test Software Provider</td>
<td>Victoria</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Bovine Inseminations</td>
<td>Herd Test Centre, Reseller, AB company</td>
<td>Victoria</td>
<td>Private</td>
<td>Recently sold to NHD and moving to MISTRO</td>
</tr>
<tr>
<td>Brown Swiss Australia</td>
<td>Breed society</td>
<td>National</td>
<td>Association</td>
<td>Administrative work handled by Holstein</td>
</tr>
<tr>
<td>Cobden AB</td>
<td>AB company, Reseller</td>
<td>Victoria</td>
<td>Co-op</td>
<td></td>
</tr>
<tr>
<td>DairyData</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Private</td>
<td>Also provide software to most major vet clinics</td>
</tr>
<tr>
<td>Dairy Livestock Services</td>
<td>Livestock sales</td>
<td>National</td>
<td>Owned by Ruralco</td>
<td></td>
</tr>
<tr>
<td>De Laval</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Multinational</td>
<td></td>
</tr>
<tr>
<td>Easy Dairy</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>FarmWest</td>
<td>Herd Test Centre, Reseller, AB company</td>
<td>WA</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Genetics Australia</td>
<td>Bull Company, Reseller</td>
<td>National</td>
<td>Co-op</td>
<td>Recently sold herd testing operations to HICO and NHD</td>
</tr>
<tr>
<td>Hico</td>
<td>Herd Test Centre, AB Company, Reseller</td>
<td>VIC</td>
<td>Co-op</td>
<td>Recently bought Gippsland herd test from GA</td>
</tr>
<tr>
<td></td>
<td>Herd Test Software Provider, On Farm Software Provider</td>
<td>National</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holstein Australia</td>
<td>Breed society, Breeding Advisor</td>
<td>National</td>
<td>Association</td>
<td></td>
</tr>
<tr>
<td>Jersey Australia</td>
<td>Breed society, Reseller</td>
<td>National</td>
<td>Association</td>
<td></td>
</tr>
<tr>
<td>Leading Edge Genetics</td>
<td>Reseller</td>
<td>Gippsland</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Lely</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Multinational</td>
<td></td>
</tr>
<tr>
<td>National Herd Development</td>
<td>Herd Test Centre, AB Company, Reseller, Breeding Advisor</td>
<td>VIC and SA</td>
<td>Co-op</td>
<td>Recently bought the herd test business of ABS, GA and Bovine</td>
</tr>
<tr>
<td>Numurkah Nu'Genes</td>
<td>Herd Test Centre, AB Company, Reseller, Breeding Advisor</td>
<td>VIC and SA</td>
<td>Private</td>
<td>Contracts testing through NHD</td>
</tr>
<tr>
<td>Orchard Superior Herds</td>
<td>Reseller and provider of cattle assessment</td>
<td>Victoria</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>TasHerd</td>
<td>Herd Test Centre, Herd Test Software Provider</td>
<td>Tasmania</td>
<td>Works with MISTRO to sell MISTRO Farm</td>
<td></td>
</tr>
<tr>
<td>Yarram Herd Services</td>
<td>Herd Test Centre, AB Company, Reseller, Breeding Advisor</td>
<td>VIC</td>
<td>Co-op</td>
<td>Yarram AB and Yarram Herd Testing recently merged.</td>
</tr>
<tr>
<td>Name</td>
<td>Service type</td>
<td>Region</td>
<td>Ownership</td>
<td>Additional Notes</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------</td>
<td>----------------</td>
<td>-------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Afimilk</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Multinational, Co-op</td>
<td></td>
</tr>
<tr>
<td>AgriGene</td>
<td>Bull Company, AB Company, Breeding Advisor</td>
<td>National</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Alta Genetics</td>
<td>Bull Company, AB Company, Breeding Advisor</td>
<td>National</td>
<td>Multinational Private</td>
<td></td>
</tr>
<tr>
<td>Auzred Xb</td>
<td>Reseller, Breeding Advisor</td>
<td>National</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>CRV Australia</td>
<td>Bull Company, Breeding Advisor</td>
<td>National</td>
<td>Multinational Co-op</td>
<td></td>
</tr>
<tr>
<td>Daviesway (DairyKing / Boumatic )</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>GEA Farm Technologies</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Multinational, listed</td>
<td>Westfalia</td>
</tr>
<tr>
<td>Generations</td>
<td>Bull Company</td>
<td>National</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Illawarra, Ayrshire, Guernsey</td>
<td>Breed society</td>
<td>National</td>
<td>Association</td>
<td></td>
</tr>
<tr>
<td>Jantec Systems</td>
<td>On Farm Software Provider</td>
<td>National</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Livestock Improvement Australia</td>
<td>Bull Company, Breeding Advisor, AB Company</td>
<td>National</td>
<td>Multinational, Co-op</td>
<td></td>
</tr>
<tr>
<td>Semex</td>
<td>Bull Company, Breeding Advisor</td>
<td>National</td>
<td>Multinational, Co-op</td>
<td></td>
</tr>
<tr>
<td>Viking Genetics</td>
<td>Bull Company</td>
<td>National</td>
<td>Multinational, Co-op</td>
<td></td>
</tr>
<tr>
<td>World Wide Sires Australia</td>
<td>Bull Company, Breeding Advisor</td>
<td>National</td>
<td>Multinational, Co-op</td>
<td>Also distributes through Genetics Australia</td>
</tr>
</tbody>
</table>
8 Appendix 2 - Process and Methodology

The process of developing a strategy for the herd improvement industry was initiated by a meeting held on 20-21 June 2013. This Workshop brought together key individuals [see Appendix 3 for attendees] and organisations involved in the science and delivery of genetic evaluation for the dairy industry to identify:

- issues of strategic importance;
- the degree of agreement regarding their relative importance; and
- key responses to perceived deficiencies.

This initial workshop resulted in two further pieces of work, the Lacey and Coats 2013 report and the Watson and Watson 2013 survey, which informed the second meeting of the group on 17 October 2013. A third report, Wickham 2014, was completed to cover more detailed requirements of implementing genomic technology within Australia to improve farm profitability.

8.1 Lacey and Coats 2013

The Lacey and Coats report dealt with the rationale for industry investment in herd improvement, specifically around genetic evaluation. The main conclusions of this report were:

1. Past investment has resulted in the development of valuable intellectual property (IP), both in terms of the genetic evaluation systems embodied in ADHIS and in terms of the developed capability in evaluation and research of genetic improvement. It is difficult to value this capability but it has been and will remain important to the Australian dairy industry.

2. Investment in the maintenance of ADHIS evaluation software is justified.

3. The Dairy Futures CRC has projects underway aimed at substantially improving the reliability of genomic estimates of ABVs, particularly for animals with little or no familial linkage to the Australian dairy herd. This is potentially very valuable IP, as it would allow all of the world’s genomics to be translated to ABVs. It would increase the size of the pool from which superior bulls could be identified and would negate any valid reason for not supplying ABVs for all bulls marketed in Australia. This work has the potential to enable a renaissance in the understanding and use of ABVs and APR by Australian dairy farmers.

4. The rationale for collective investment in genetic evaluation in Australia is sound, past investment has generated valuable IP and future investment has good prospects to maintain and enhance this IP. The rate of adoption of this IP is the factor upon which returns to collective and public investment will turn.

5. It is concluded that the ‘adoption rate’ has been relatively poor. This is exemplified by the gap between the rate of genetic gain achieved to date ($9.30 per cow per annum) and the estimated maximum rate of gain of $23. It is also evident from various survey research commissioned by Dairy Australia.

6. Without broad industry backing and support, the ‘traditional model’ of marketing and extension of ABVs and APR has been unable to effectively marshal other industry stakeholders to help promote and deliver genetic evaluation IP. This has meant that the model has been constrained by the changing market over the last decade (notably with the decline in market share of Australian companies). Company self-interest has dominated
with no overarching industry vision to temper competition. In fact, the genetic evaluation system itself has become a competitive tool in the marketplace. [emphasis added]

7. To help overcome this, an industry wide extension and marketing program is required to effectively market current and future genetic evaluation IP. This program should encompass all stakeholders who play a role in influencing the decisions of dairy farmers in this field. It should also seek to remove the evaluation system as a competitive tool.
   a. A scoping study is required to identify the magnitude and timing of such a program, but it is noted that this program might involve significant investments for a number of years.
   b. It is recommended that should Dairy Australia accept that such a program be implemented, it should take direct responsibility for its carriage.

8. It is important that all key players in the herd improvement sector be committed to the program and that all parties agree on terminology, the body of knowledge and ‘genomic dynamics’ (anticipated timing of genomic developments). Dairy Australia must help develop and lead a process to engage the sector, develop a herd improvement strategy and implement that strategy. This should be a very collaborative process so that all key players are engaged and invested in the resulting strategy [emphasis added].
   a. It is imperative that Dairy Australia and key players also agree the metrics by which the effectiveness of R&D and extension and marketing will be judged. These should include qualitative measures and also quantitative measures (such as the market share of the top 50 APR bulls and increasing the rate of genetic gain).

8.2 Watson and Watson 2013

The Watson and Watson report was the result of a survey and interviews with farmers and service providers about attitudes to genetics and herd improvement. The key conclusions of this report were:

1. “…it is clear that improving herd genetics is an important focus for the industry.

2. While HI and semen companies provide most dairy farmers with information to assist making purchase decisions, there is much evidence to suggest that ADHIS tools play an important role in validating recommended bulls and providing data for comparing bulls being offered by one company with those offered by others.

3. There is evidence in survey results to suggest that greater understanding of breeding values and the APR (among both dairy farmers and representatives of organisations selling semen) results in higher levels of confidence in these measures and increased reliance on them when decisions are being made...

4. Survey results reveal that it is critical for ADHIS to continue developing their relationship with HI and semen companies. There is a need to increase consultation with relevant organisations to ensure they have confidence in the tools and products ADHIS provides the industry and that they do not merely see ADHIS as encroaching on their ‘space’. Independent and retail advisers are often seen as an important conduit for information between RDCs and farmers and companies selling semen are similar. If HI reps, semen sellers and resellers have confidence in ADHIS tools, then it is likely they will speak positively about them to dairy farmers and this should assist in dispelling concerns over how they are calculated.
5. Less than half of all dairy farms are currently herd testing and the decrease since 2006 is significant. This trend is likely to continue with a greater uptake of in-line meters over the coming years unless dairy farmers are encouraged to keep testing. Simplified collection procedures, providing labour support on herd test days and/or offering rebates or incentives may need to be considered.”

8.3 Wickham 2014

The Wickham report explored the necessary steps to ensure that Australian dairy farmers can realise the potential profit gains arising from genomic technology. The key conclusions of this report were:

1. A national structure to set policy and provide core cattle breeding and information services be established with sufficient resources to ensure cattle breeding contributes, to the greatest extent possible, to increasing the profitability of Australian dairy farms.

2. An annual continuous improvement process be established to ensure the major stakeholders, including the cattle breeding and information service providers, in the Australian dairy industry are fully involved in, and supportive of, the major breeding and information infrastructure initiatives undertaken on behalf of Australian dairy farmers for the foreseeable future.

3. An Australian dairy industry farm production sector data repository be established in a series of achievable steps over the next three years.

4. A group of Genetics Data Herds be established to ensure the high quality data needed to maintain and build the accuracy of genomic selection in the future.

5. To facilitate the envisaged widespread adoption of genomics technologies by virtually all Australian dairy farmers in the next five to ten years, an official system of lifetime identification for all dairy cattle recording and reporting be established and implemented at an appropriate future date – 3 to 4 years’ time.

6. Agreements with Service Providers be established in order to ensure the dairy industry can deliver in a smooth fashion the information tools dairy farmers need to increase farm profitability as rapidly as possible, and in particular to ensure the successful establishment and realisation of the full potential of the Central Data Repository.

7. Establish the optimal design, using current and anticipated future genomic and other technologies (eg sexed semen), for the Australian dairy cattle breeding scheme. Also to ensure that appropriate steps are taken to ensure the actual design moves to the optimal.

8. Steps are taken to use genomics, cattle breeding, and the facility provided by the Central Data Repository to reduce the costs associated with diseases on Australian dairy farms.

9. Australia maintains and enhances the research infrastructure required to enable future developments in genomic technologies to be evaluated and effectively exploited in a timely fashion. Also, that the research infrastructure has the capacity to identify any undesirable genetic trends in a timely manner.

10. Steps be taken to improve the quality of data available for the full range of information purposes in the Australian dairy industry.
8.4 The Process

A second workshop meeting on 16 January 2014 established a Steering Group to oversee the process of compiling a strategy as suggested in Lacey and Coats (2013) and five task forces were established under this Steering Group. The Steering Group has been called the Herd Improvement Industry Strategic Steering Group (HIISSG) and was tasked with delivering a strategy paper to the industry, with specific delivery to the Board of Dairy Australia as the organising entity for the work. In addition to the five Task Forces set up under HIISSG, it was recognised that while the ongoing National Breeding Objective (NBO) Review reported directly to the Board of ADHIS, its outcome is vital to the entire herd improvement industry.

Figure 1 is a diagram of the groups involved in this work.

**Figure 1 Herd Improvement Industry Strategic Review Structure**

The HIISSG Terms of Reference and membership of HIISSG and the Task Forces are listed at Appendices 7-12.

HIISSG was set up with clear values around engagement and collaboration, two values that have not traditionally been a focus of the industry. The values under which HIISSG operated, and which have been adopted by the Task Forces, are:

1. To operate in a transparent manner
2. To consult with stakeholders as widely as possible
3. To represent all sectors of the industry and ensure effective communication
4. To work towards outcomes that are in the common interest and promote win-win solutions

These values meant that HIISSG was very conscious of its need to be inclusive in order to achieve agreement on improved outcomes. The methodology therefore focused on canvassing as wide a
range of opinions as possible. Over 30 organisations were involved in the preparation of this report, either through the original workshops, HIISSG or the Task Forces. This is in addition to farmers who have had direct input throughout the process as well.

The Task Forces functioned autonomously and were responsible for their outputs. They were provided with a guideline to help structure their discussion and output, but were not asked to slavishly follow this. Below is the template provided to each Task Force:

1) Introduction
2) Current situation
   a. Is change necessary and why?
   b. What are the pre-competitive needs?
3) 3-5 key strategic goals for the group
   a. What does 2020 look like?
   b. What are the industry benefits of this vision for 2020?
   c. How do the goals affect the situation at farm level?
4) 3-5 key tactics to achieve each of these goals
   a. What are the major actions that need to be taken to make the 2020 vision a reality?
5) Implementation
   a. Details of any implementation impediments or preconditions
   b. The organisations involved
   c. Quantum of costs expected
6) Further commentary if necessary

The Terms of Reference and the full reports of the task forces are attached as Appendices 5-9.

The reports of the individual Task Forces were combined into the current document to describe a coherent vision for the entire herd improvement industry. HIISSG provided the oversight for this process and approved the final version.
## Appendix 3 – Genetic & Genomic Workshop Attendees

<table>
<thead>
<tr>
<th>Attendee</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Nation</td>
<td>Dairy Futures CRC</td>
</tr>
<tr>
<td>Chris Murphy</td>
<td>Dairy Australia</td>
</tr>
<tr>
<td>Jennie Pryce</td>
<td>DEPI</td>
</tr>
<tr>
<td>Ben Hayes</td>
<td>DEPI</td>
</tr>
<tr>
<td>Matt Shaffer</td>
<td>Holstein Australia</td>
</tr>
<tr>
<td>Mike Ginnivan</td>
<td>Dairy Futures CRC</td>
</tr>
<tr>
<td>Rick Lacey</td>
<td>Lacey Consulting Group</td>
</tr>
<tr>
<td>Peter Thurn</td>
<td>Genetics Australia</td>
</tr>
<tr>
<td>Mike Huth</td>
<td>CRV Australia</td>
</tr>
<tr>
<td>Daniel Abernethy</td>
<td>ADHIS</td>
</tr>
<tr>
<td>Michelle Axford</td>
<td>ADHIS</td>
</tr>
<tr>
<td>Steve Coats</td>
<td>Curlew Connections</td>
</tr>
<tr>
<td>John Morton</td>
<td>Jemora Pty Ltd</td>
</tr>
<tr>
<td>Geoff Akers</td>
<td>Dairy Australia</td>
</tr>
<tr>
<td>Max Roberts</td>
<td>Dairy Australia</td>
</tr>
<tr>
<td>Adrian Drury</td>
<td>ADHIS</td>
</tr>
<tr>
<td>Daryl Hoey</td>
<td>ADF</td>
</tr>
</tbody>
</table>
10 Appendix 4 – The Current Situation in Herd Improvement

The process of developing a strategy for the herd improvement industry was initiated by a meeting held on 20-21 June 2013. This Workshop brought together key individuals [see Appendix 3 for attendees] and organisations involved in the science and delivery of genetic evaluation for the dairy industry to identify:

- issues of strategic importance;
- the degree of agreement regarding their relative importance; and
- key responses to perceived deficiencies.

This initial workshop resulted in two further pieces of work, the Lacey and Coats 2013 report and the Watson and Watson 2013 survey, which informed the second meeting of the group on 17 October 2013. These works are discussed more fully in Appendix 2.

A second workshop meeting on 16 January 2014 established a Steering Group to oversee the process of compiling a strategy as suggested in Lacey and Coats (2013) and five task forces were established under this Steering Group. The Steering Group has been called the Herd Improvement Industry Strategic Steering Group (HIISSG) and was tasked with delivering a strategy paper to the industry, with specific delivery to the Board of Dairy Australia as the organising entity for the work. In addition to the five Task Forces set up under HIISSG, it was recognised that while the ongoing National Breeding Objective (NBO) Review reported directly to the Board of ADHIS, its outcome is vital to the entire herd improvement industry.

Each Task force was asked to provide an overview of the current situation in their particular area. While their work covered significant sectors of the industry, it also covers several other observations that cross task forces. Perspectives on the current situation in the herd improvement area were also raised during Steering Group meetings and discussions.

10.1 General Observations

10.1.1 Data

The current situation of data in the herd improvement industry has been well documented, e.g. van Moort 2010, Harris Park Group 2012 and others. Van Moort 2010 presented a reasonable summary of the situation which is still valid four years later:

“There is overwhelming consensus between stakeholders that they [sic] way dairy data is currently exchanged limits potential productivity gains from herd improvement for the Australian dairy industry. Re-positioning dairy data exchange into a pre-competitive setting is essential to support research, improve genetic evaluation and underpin information product innovation across the industry to realise productivity gains through better on-farm decision making.”

In each of the Task Forces, access to, use and quality of data were identified as key challenges of the current situation. These challenges covered the gambit from blockages in the genomic breeding value pipeline to obstacles in the development of mobile services for herd test. The Task Forces were united in their contention that the current data environment is not fit for purpose if Australia is to maintain a competitive herd improvement industry.
10.1.2 Competition versus Collaboration
Another theme that ran through the Task Forces was the impact that a decade of low profit margins for service providers has had on the ability of the herd improvement industry to have clear strategic goals. Keeping in mind that low and variable profitability at the farm level has forced service providers to focus solely on keeping the wheels on their business. There has been effectively no ability for industry to steer developments in any particular way. It has been entirely reactive, rather than proactive.

In addition, competitive pressures have meant that there has been an unwillingness to discuss areas of mutual interest or industry good. Service providers have been in their bunkers and opportunities that require competitors to collaborate on a pre-competitive basis have been untouched. A culture has arisen of distrust, not only between competitors but also between industry bodies and stakeholders. This lack of trust has hampered what would normally be mutual support between organisations and scuppered any chances at cooperating to grow the pie instead of fighting over ever smaller pieces.

10.1.3 Isolation
Given the previous two observations, it is perhaps no surprise that another common theme is that the herd improvement industry does not often have an opportunity to discuss matters of strategy or common interest. Industry meetings are few and far between, generally arranged around NHIA events or the biannual Herd conferences. Many participants at both the HIISSG and Task Force level noted that an important side benefit of the process has been the conversation amongst their peers about larger issues. Industry participants were appreciative of the opportunity to come together under this process and of the leadership shown by Dairy Australia in convening and driving the dialogue.

10.2 Genetic Evaluation and Research
The current situation in genetic evaluation and research is a split role, where the Australian Dairy Herd Improvement Scheme (ADHIS) undertakes genetic evaluation and Dairy Futures Cooperative Research Centre (CRC) has the primary role for bioscience research. Dairy Australia has an indirect role by being a substantial financial contributor to both organisations and being represented in the management structure of the CRC. The Department of Environment and Primary Industries Victoria (DEPI) also has a major role in both ADHIS and Dairy Futures CRC as the employer of many of the key staff in both organisations and provider of key infrastructure.

ADHIS has had a consistent mandate and operating style since its inception in 1983. It seeks to preserve the integrity of genetic evaluation and has a mandate to make decisions in the best interests of dairy farmers. Given the complexity of the decision making, these decisions are not always clearly understood by farmers, but independence is preserved by having a farmer ownership structure and a Board consisting largely of dairy farmers.

Dairy Futures CRC is a limited-life organisation, concluding in June 2016. Its role and function is driven by Dairy Australia and DEPI, and the CRC achieved significant leverage of these activities through Commonwealth Government grants, farmer participation and breed society support.

Genetic evaluation is undergoing rapid change. Technology is driving change in all countries, but Australia also has to contend with a rapidly changing marketplace. The taskforce believes that we have not set ourselves up adequately for this scale of change and provided a whole-of-industry framework from which to provide leadership in such an environment.
An assessment of critical activities identified two areas that require considerable re-thinking in this new environment. These are development, implementation & maintenance (DIM) and service delivery.

10.2.1 Development, Implementation & Maintenance
There has always been a requirement for D/I/M functions but in this changed environment there are major deficiencies. This has traditionally been done with long lead times, opportune sharing of specialised staff (where the function has been done by either research or operational staff) and with low levels of time and market pressure. D/I/M functions require effective resources and this area needs to be clearly recognised and planned to deliver the required outcomes. The D/I/M functions have not been adequately resourced and have not adjusted to the rapidly changing environment.

To be clear, the D/I/M functions are broader than technology implementation, they include:

- Frequent adjustments to the evaluation system
- Demonstration of benefits from utilisation of technology
- A feedback loop to refine further research and developments to meet market needs.
- Articulation of the need and impact from updates and system improvements
- Evaluation of new technology (e.g. genomics, on-farm milk meters)
- Review new research (both domestically and internationally) and to make recommendations on improvements and issues of strategic importance (e.g. health traits)
- Oversee data quality and standards

This deficiency is even greater when it is considered that there is limited capacity for D/I/M activities in the commercial sector. Over the last 10 years there has been a reduction in staff levels for these functions (often driven by a lack of profitability of the sector) and the absence of appropriate funding grants (such as the defunct Dairy Herd Improvement Fund).

10.2.2 Service Delivery
Service delivery needs to be considered as an expanded activity that is much broader than publishing breeding values. It needs to be re-thought so as to meet the needs of commercial partners (primarily breeding companies, but also resellers, breed societies and farmers). This is a fast-moving space and the services are critical in moving to the 2020 vision of routine genomic assessment of 50% of heifers receiving genomic breeding values before mating and in providing near real-time advice on mating.

NB: The genomic pipeline taskforce will also deliver recommendations relating to service delivery.

Many of the services are likely to be pre-competitive and will need to be tailored to the needs of the commercial sector. The changed business model to allow for generation of revenue and commercial management is undeveloped at this point.

Examples of services to be delivered include:

- Verificiation of pedigree, or the capacity for a third party to verify pedigree using their own software
- Inbreeding management in an on-demand manner, either live or via third parties that use their own software.
- Mate allocation (on-demand or third party)
- Export heifer analysis (pedigree, merit, breed confirmation, suitability for export market)
- Analysis of non-additive genetic traits (recessive diseases, haplotype analysis, niche traits such as A2 or immunity)
- Services to add value to the herd book
• Response to selection prediction and benchmarking of performance
• Lifetime prediction of the value of individual animals

As stated in the opening paragraphs, the rapid advancement of science is providing a myriad of opportunities to increase genetic gain. Many of these opportunities are evident by looking at global trends, particularly in much larger scale breeding industries in North America and Europe. It needs to be assumed that the Australian breeding industry (its evaluation services and the broader breeding activities such as studs and domestic proving schemes) is in a competitive environment with imported technology (evaluation systems) and products. This will drive the need to continue to adopt new technology as it becomes available as well as striving for unique propositions that are attuned to the needs of the Australian breeding industry.

Additional factors that are likely to be significant drivers of change by 2020:

• Reduction of the cost of genotyping (current CRC project)
• Genomic information routinely used in mating programs (inbreeding checks, improved mating choices) – priority role for D/I/M and commercial services functions
• Improved sexed semen product (higher conception rates, greater efficiency that drives price down) – recent reports suggest substantial recent improvements and pending increase in usage in foreign markets (e.g. NZ, Ireland).
• Commercial take up of genome editing technology (pilot project underway in CRC). This approach seems inevitable, particularly for overcoming genetic diseases and improving welfare outcomes. It also provides risk mitigation opportunities (e.g. restrict infection from foot and mouth disease).
• Lifetime prediction of value of individual cattle based on a) their breeding merit, b) an assessment of non-additive gene effects (e.g. recessive disease or recessive productivity traits), c) observations of cow’s performance and d) novel characteristics (e.g. profile of rumen microflora and cow’s individual response to feed and health challenges).

10.3 Genomic Pipeline and Technology

The current usage rate of genomic technology is widely held to be insufficient to realise the potential profit improvement for farmers. The process of nominating an animal for testing is not straightforward. Currently the movement of data between the organisations involved is not automated nor easy. The relatively basic reports being delivered to farmers do not meet their needs and the value from genomic testing of livestock is not clearly articulated or marketed. In short, the pipeline is blocked.

This recognition has resulted in a separate Task Force being set up to suggest mechanisms to unblock the pipeline in the short term. The remit was focused on issues that will deliver value in the short term and result in improved uptake over the coming 12 months. In other words, a short term focus on the ensuring the basic infrastructure to deliver a service exists for genomic technology and the value proposition in testing of animals and the marketing of the service drives uptake and benefit from the technology.

At the same time, there are longer term issues which will impact the usage of genomic technology over the coming few years which are more challenging to address but equally important. Some of these questions include: What should the genomic pipeline look like in 2020 and what infrastructure is needed? What can industry support do to ensure smooth implementation and what impact does genomics have on farm management decisions?
Because many organisations play important roles in the pipeline and the technology, a whole of industry approach is needed to realise the substantial profit gains offered by genomics. The pipeline must work seamlessly and demonstrate real tangible benefits to deliver a valuable outcome for farmers. If it is not seamless, and therefore not easy, farmers will fail to adopt this technology and the significant industry investment will not achieve its goals.

As acknowledged in the Genetics and Research Taskforce “the Australian breeding industry (its evaluation services and the broader breeding activities such as studs and domestic proving schemes) is in a competitive environment with imported technology (evaluation systems) and products. This will drive the need to continue to adopt new technology as it becomes available as well as striving for unique propositions that are attuned to the needs of the Australian breeding industry”. (Genetics and Research Taskforce Report, 2014)

10.4 Herd Test
Herd test information is used by farmers to manage their cows and make treatment, feeding, breeding and culling decisions. Herd test information has also formed the basis for bull proofs by supplying the phenotypic information. However, since deregulation, it has been lacking the investment and innovation necessary to maximize the benefits to the dairy industry.

An historical note is important. Australia has traditionally had many service providers to the herd test sector. It is true to say that, in almost every state, farmers have generally had a choice in the provision of their herd testing service. Whilst this choice may have been limited in some geographical regions, there was genuine competition within the sector for farmers’ herd test business.

For many years, this competition has generally resulted in service providers competing with each other primarily on the basis of price, rather than any substantial differentiation of service offering. This developed a mindset over time, both within the service provider sector and the farmers, of value being equated with cost. As a result, competition reduced margins which in turn reduced the resources available for re-investment in the development of new equipment, systems, processes and staff development for the sector.

Ultimately this has led to a herd test sector which is a low cost to farmers but paradoxically offered limited value since there were virtually no internal resources for ongoing research, innovation and development.

Prior to de-regulation in 2000, a significant portion of dairy farm licence fees in Victoria were paid into the Dairy Herd Improvement Fund (DHIF) which was administered through NHIA with substantial input from UDV. The DHIF fund was used to fund a variety of research projects in the herd improvement space, both large and small, to the tune of approximately $200,000 to $300,000 per annum. Further details of some of these projects can be found on the NHIA website. Whilst DHIF was a Victorian fund, there is no doubt that the results of this research was of benefit to the rest of Australia.

With the advent of de-regulation in 2000, the DHIF ceased to be funded and instead all dairy farm licence fees have been paid to Dairy Food Safety Victoria (DFSV). As a statutory body, the financial reports of DFSV are freely available on-line and total assets in 2013 exceed $5.8 million. DFSV makes no direct contribution to herd improvement currently.

It is, perhaps, not insignificant that the last project funded by the DHIF fund involved the introduction of new technology in the form of Electronic Milk Meters (EMM) in Maffra and Timboon.
This was one of the very few technological innovations introduced in Australian herd testing in the past decade.

Whilst other project funding sources do exist, such as the Gardiner Foundation, herd test service providers have been largely unsuccessful in accessing these for two reasons. Herd improvement has not been a priority for these funding sources and secondly, the application processes are complicated and require a high level of project management expertise (and most herd test service providers have not had the human resources to address this).

10.5 Marketing and Extension
Belief in the importance of genetic improvement is strong amongst Australia’s dairy farmers, with two-thirds of farmers reporting that genetic improvement is very important (and a further 30% perceiving genetic improvement as fairly important). However, there is some regional variation, with a lower proportion of dairy farmers in Gippsland (58%) and Tasmania (55%) believing it is very important to continually improve the genetics of their herds.

Whilst the importance of genetic improvement is largely unquestioned, there is enormous variation in the relative importance of breeding decision-making and the use of animal data by individual dairy farmers. One segment of dairy farmers is highly passionate about their cows and breeding an improved next generation – and spend considerable time and effort seeking information to inform what they see as a critical decision on their farm. However, another segment put much less emphasis on information and decisions in relation to herd improvement – with farmers in this group seeing bull selection as a low priority activity and one of the many decisions that they must make throughout the year. It should be understood and acknowledged that belief in the concept of ‘genetic improvement’ does not necessarily result in actions that support this belief.

In general, the majority of dairy farmers get most of their bull information from semen sellers or those marketing bulls – 25% get information from resellers as the main source of information, 19% from bull companies and 14% from catalogues. Any changes to improve the herd improvement industry will require working closely with this group.

Farmers generally consult ABVs in their decision-making process and ABVs influence about 75% of semen purchases, with 33% of farmers reporting ABVs have a lot of influence on this decision. The influence of ABVs diminishes in northern Australia, with only 22% of farmers in Queensland and 23% in NSW reporting that ABVs strongly influence their breeding decisions. Overall, confidence in ABVs and APR is relatively low – nationally less than one in five farmers is very confident in ABVs and less than one in ten is very confident in the APR. This is partly linked to lower levels of understanding of these indices – only 6% of farmers say they have a very good understanding of ABVs and 12% report good understanding of the APR. Overall, 47% of farmers that use AI report that the APR is relevant to their farming system (Watson and Watson 2013).

Historically Genetics Australia did much of the extension and marketing in regards to genetics and the value of breeding cows for Australian conditions. This included a magazine that went to all dairy farmers several times a year and regularly focused on the technical ABV issues in language that farmers could relate to and also explained ABV traits, particularly new traits that were to be implemented. The last magazine went out in around 2005. In early 2008, the ADHIS extension area was known as the Genetic Learning Package (GLP) and during 2008 and 2009 put considerable energy and resources into developing resources for farmers and advisers around the understanding and use of ABVs. In more recent times, and as the market has changed, ADHIS has been responsible
for extension and marketing in this area – and has largely been the lone voice extolling the benefits of domestic evaluation and indices.

84% of dairy farms use AI, either solely (15%) or in conjunction with some herd bulls (69%). This proportion is comparable to data from 2006, when 86% of farmers used AI. However, analysis by ADHIS indicates that the number of doses of semen sold relative to the number of cows is sub-optimal. Based on 84% of national herd joined to AI, a national herd size of 1,600,000, and an assumption of 1.5 straws per cow, the total number of doses could be expected to be 2,016,000 – however 2013 data from NHIA indicates sales of 1,841,000 semen doses (or about 90% of ideal, or 175,000 doses short) (NHIA 2014).

Of concern also is the proportion of replacements being bred from AI – only 17% of herds source all of their replacements from AI, whilst another 30% of herds have no replacements bred by AI. This represents a missed opportunity to ensure that the next generation of cows are bred using the best available genetics. As an industry we need to broadly acknowledge the difference in production terms and profitability from AI bred to naturally bred stock. The cumulative impact of this missed opportunity could be hundreds of dollars per cow per year.

Herd testing is something that farmers think should be done but is easily left in the too hard basket, and there has been a large reduction in herd testing over the past eight years. 45% of farmers currently herd test – a significant 21 points lower than the proportion recorded in the 2006 National Dairy Farmer Survey (66%). An increasing number of farmers are using inline meters to measure and monitor cow performance – with 11% of farmers currently with inline meters in place and a further 26% very likely or fairly likely to install meters when they upgrade their dairy. This level of uptake of inline meters represents an opportunity for access to the data they generate, but also represents a risk if this data is not captured centrally.

10.6 BREED SOCIETY TASK FORCE
The registered sector in the Australian dairy industry consists of 7 major breed societies (Holstein, Jersey, Brown Swiss, Ayrshire, Illawarra, Guernsey and Australian Dairy Red Breed). Traditionally breed societies have provided four main functions:

1. Pedigree recording and reporting services; the custodians of breed purity
2. Evaluation of dairy animal conformation according to breed standards
3. Coordination of farmer social interactions such as community, show and sale activity
4. Representation of farmer member interests to the wider herd improvement industry.

Dairy breed societies have developed a reputation for providing these services in an accurate and unbiased manner. Now these traditional roles are challenged by rapid changes in technology and the ever present need to deliver information and analysis as economically and efficiently as possible while maintaining their integrity.

The rapid rise of genomic information is a case in point. Genomics provides pedigree information that is potentially more accurate than data collected by traditional methods. Genomics also offers improved breeding value accuracy. The need to keep pace with technological change is a constant and is expected from those who use breed society services; albeit faster, better and more efficient services delivering profitable outcomes to their farm business.
By embracing technology and developing systems to deliver new and improved services, breed societies will provide benefit not only to their members but importantly to dairy industry stakeholders at large.

11 APPENDIX 5 - KEY STRATEGIC GOALS

Underlying the vision described above are key strategic goals that have been developed by the Task Forces.

11.1 GENETIC EVALUATION AND RESEARCH

1) Change the governance structure so as to empower the oversight and simplify the accountability for genetic improvement in Australia.
   a. Lift the point of oversight so as to span across the full range of genetic improvement functions (i.e. not just evaluation).
   b. Broaden stakeholder representation in the governance structure to increase the buy in from all parties that use and influence the use of genetic improvement in Australia (i.e. commercial stakeholders as well as farmer representatives).

2) Commence a “business turn-around” approach to re-set the function and structure of all aspects of genetic improvement. Examples include:
   a. Upgrade of market-focussed evaluation services. This includes:
      i. A transparent process for demonstrating quality (TQM),
      ii. Establishing and then meeting market expectations such as frequency of service, and
      iii. Regular benchmarking of services offered against both local needs and global trends.
   b. Maintain a balanced portfolio of research.
      i. Reinforce the current situation where the quality and capacity of research in Australia is world-class, is highly rated by global peers, and regularly initiates global trends.
      ii. Maintain an early and thorough connection with industry
      iii. Maintain an ability to be well informed of global research trends and be open to global collaboration.
      iv. Support blue sky/exploratory projects and tap into larger programs (such as the tie up between forages and animals in the CRC and in DEPI’s Bioscience Research Division).
   c. Build world-leading capability in development/implementation/maintenance (D/I/M).
      i. Periodic review to assess performance and positioning of D/I/M functions.
   d. Capture, sharing and use of data.
      i. A dedicated effort to expand the utility of data collected so that it provides value to farm businesses as well as for genetic evaluation and research.
      ii. Improvements include streamlining of data flows and demonstration of the value of information.

3) Deliver services into a competitive environment.
   a. The market will compare all evaluation services with foreign/alternate evaluation systems.
4) Maintain and develop people
   a. Recognise the scarcity of capable people with experience in genetic improvement services
   b. Consider the retention of key staff and development and training of future staff in all tactical decisions.

11.2 GENOMIC PIPELINE AND TECHNOLOGY
1) Genomic technology should become imbedded into herd improvement practices.

Goals for 2020:
   a. 20% of herds are genomically testing 50% of their heifer calves before mating
   b. 4000 bulls tested in Australia
   c. All bulls screened by international companies active in Australia are also screened on the Australian genomic system

This goal recognises that to realise the potential for profit improvement at farm level, genomics will need to become routine and widespread. By reaching these goals, Australian dairy farmers will improve their profit by increasing their genetic gain for important traits. This goal seeks to create a virtuous cycle for gains in profitability due to genetics.

2) Data should move through the genomic pipeline unhindered and without intervention.

Goals for 2020:
   a. The ordering of genomic tests is simple for farmers and service providers to undertake
      i. Electronic nomination process
      ii. Minimal requirements to enable testing
      iii. Fostering a level of accountability at farmer level on accuracy of data as it is viewed as fundamentally important
   b. Close data linkages between the ADHIS, Herd Test and Breed Society databases and international datasets held by breed societies, evaluations centres and Interbull
   c. Reporting and follow through of genomic test results needs to be well supported by commercial service providers

This data-related goal is driven by the realisation that data should not hinder the provision of genomic information to the industry. By making the requesting of genomic breeding values simple, farmers can to do so as a matter of course. Genomic testing should add the minimum amount of work possible to farmers’, and AI companies’, workload. To be clear, all reporting of both results and errors will need to be reviewed and optimised to ensure that data moves freely into both directions and that any error correcting is done quickly and as simply as possible.

3) Technological and methodological innovation maintains world best practice genomic evaluations
Goals for 2020:

a. Analysis of the performance of genomic evaluation in predicting genetic merit are undertaken annually and recommendations on developments/updates implemented.
b. Genomic reliability is at globally comparable rates for major traits and indexes.
c. Establishment of a culture amongst farmers and industry of continuous quality improvement
   i. The continuous improvement process provides a very useful tool for bringing all elements of the industry together and for ensuring steady and long-term progress.

4) Support the industry-stated goal of doubling of the rate of genetic gain in cows for the national breeding objective.

Goals for 2020:

a. Increase the profile of elite genetics to encourage friendly competition.
b. Increase the acceptance of genetics as a driver of profitability.
c. Develop new reports and tools which increase the value of genomic breeding values and genetic improvement.

5) Farmers and service providers have access to an efficient commercial delivery service.

Goals for 2020:

a. Genomic breeding values are available to farmers for under $30.
b. An easy mechanism for sample taking is developed and implemented which is part of management practice on farm rather than another job to do, such as collecting a sample at tagging.
c. The creation of multiple shopfronts to initiate genomic breeding values.
d. The maintenance of a single responsible data aggregator to ensure integrity in the system.

11.3 HERD TESTING

1. Increase the participation of farms/cows on herd test to 55% of the national herd by 2020. Currently this participation level sits at approximately 43%.
2. Communicate in a more effective way, the value proposition for herd test to farmers as well as other industry participants such as veterinarians, consultants, milk buyers and other industry bodies.
3. Develop staff training opportunities for service providers within the herd test sector.
4. Develop more flexibility around service delivery of herd test to farmers.
5. Investigate further opportunities within the herd test sector for co-operation and rationalisation particularly with regards to marketing, laboratories, transport and logistics.
6. Promote a herd test sector which is more connected with other parts of the Australian dairy industry and more ‘plugged in’ to international trends and developments.

11.4 MARKETING AND EXTENSION

1) Increased recognition of value of genetic improvement
GOAL: All dairy farmers link genetic improvement to increased profitability

This goal seeks to not only emphasise the importance of genetic improvement, but more importantly seeks to ensure that dairy farmers and those who service them clearly understand the linkage between genetic improvement and improved farm profitability. For example, the Irish dairy industry clearly and confidently links higher genetic potential (EBI) animals with increased overall farm profitability. Interestingly, the work by Penry & Nettle (2010) found that a modest 64% of farmers agreed that the current ABV system was a good indicator of the profitability of semen for their farms.

2) Use of tools to make the best breeding decisions

GOAL: An increasing proportion of dairy farmers make informed decisions to drive genetic improvement in their herd.

This goal is focused on the increasing use of existing tools and resources (such as the Good Bulls Guide, Selectabull, Genetic Progress Report, etc.) and for newly developed tools to drive more informed breeding decisions on farms. Ultimately these tools must be easy to use, relevant to the decisions farmers are making (and the way that they are making these decisions) and drive confidence in the outcomes. The Penry and Nettle report (2010) recommended that simple tools be developed to check genetic advice provided by advisers and organisations, and for an “on track” check service for farm businesses and advisers to check their progress toward a breeding objective. This concept has now become the Genetic Progress Report. Additional tools must be developed in collaboration with industry to ensure sufficient support to drive uptake.

3) Knowledge of and confidence in APR

GOAL: An increasing proportion of dairy farmers have confidence in the APR and think it is relevant to breeding decisions of their farm

Currently 47% of farmers that use AI report that the APR is relevant to their farming system, so the goal is to substantially increase market acceptance of the Australian breeding objective. A target has not been defined but could be set at 75% confidence by 2020. Addressing this goal will require a combination of addressing existing issues with the APR (through the National Breeding Objective review) and improved marketing and extension to lift understanding of the NBO. The outcome of the NBO Review should provide the catalyst for a well thought out and ongoing national media campaign promoting the value of a breeding goal for Australia. Additional measures or metrics around NBO use may also need to be developed, e.g. semen sales, calves born by bull or NBO of replacements, etc.

4) Increased use of AI

GOAL: An increased number of doses of semen per cow across national herd and more heifers joined to AI

Approximately 1,841,000 semen doses were sold in 2013, or about 90% of optimal levels based on 1.5 doses per cow across national herd that uses AI. This represents a significant missed opportunity to ensure that cows and heifers are bred using the best available genetics. Increasing AI use will lift the rate of genetic improvement across the national herd.
Cows that are sired by AI bulls produce 10% more fat (kg/cow/lactation) and 12% more protein kilograms compared to cows sired by herd bulls.

5) Improve access to and use of on-farm data

GOAL: Maintain herd recording participation and increase use of on-farm data to inform herd decisions

The taskforce identified that improving use of data to inform on-farm decisions was an important goal, as well as ensuring that data generated on farm was available to industry to generate breeding values, etc. The focus of extension and marketing in this area is to reinforce the value of data and the impact it can have on improving profitable decisions. The goal should also aim to lift the amount of data collected from existing herd recording participants and on-farm data gatherers.

11.5 BREED SOCIETIES

1) Single data repository

For many years the Australian dairy industry, from farmers to service providers, has been talking about and calling for a single data base/repository. Overwhelming consensus is that changes are required to improve the collection, analysis, use and transfer of data. Generally speaking, the industry has not articulated a clear value proposition around data. This has limited the ability for farmers to make data driven decisions on farm.

The immediate development and implementation of a single data repository for the herd improvement industry is necessary because currently the fragmented system does not have the capability to provide what farmers want: single entry, multiuse data that allows them to make decisions. In other words, a data system that is:

- **Accurate**: multiple points of entry lead to incorrect data such as multiple unlinked ID’s, different calving and birth dates, dams, sires etc.
- **Centrally located**: data is found in islands as on-farm software packages do not have a common pipeline to other industry databases. This strands data that could be used to provide genetic improvement, benchmarking or industry statistics, among other services.
- **Complete**: incomplete data is a consequence of data being entered on different system for different reasons.
- **Accessible**: data must be accessible so farmers and organisations have access to their own data as well as access to shared data. For example, access to milk production data and LTE results would help formulate breeding strategies based on results analysis.
- **Live**: users must be able to add and correct data on a web based system in real time

2) Dairy House

By 2020 it is envisaged there will be an alliance of breed societies under the governance of an ‘All Dairy Breeds Board’ domiciled in a ‘Dairy House’ that caters for the needs of both the registered and unregistered dairy breed sectors and includes services such as:

a. A central resource sharing for the collating of milk production, linear type evaluation, animal identification, pedigree and fertility data. This could also include
herd and flock improvement data for other domestic milking animals including milking buffalo, goats and sheep.

b. Contribution and access to a single herd improvement data repository that includes genomic breeding values, pedigree, linear type and herd health data
c. The potential for other herd improvement stakeholders to become part of the “Dairy House”
d. Responsibility for the dissemination to industry for all dairy breed pedigree and breed development data via print, web and digital services
e. Responsibility for dairy breeds database integrity and management
f. Centralises the administrative requirements of all breed societies including the recording and processing of memberships, registrations, classification, transfers and exports.
g. A coordinated voice and expert opinion on specific dairy animal welfare issues
h. providing advocacy for:
   i. collaboration with all stakeholders in the dairy herd improvement industry to share a vision
   ii. supporting a well aligned robust data collection and delivery pipeline
   iii. facilitating the sourcing and testing of registered Australian sires
   iv. access to pedigree and herd improvement data from the non-registered sector
i. Other services
   i. membership education
   ii. supporting dairy youth
   iii. fostering communication with like-minded herd improvement organisations globally

3) Genomics

a. Breed societies are well placed to deliver genomic services to farmers because of their existing systems in place to deliver similar services and the commitment to data accuracy. Genomic services include

   I. **Genomic breeding values**

      Breed societies are currently involved in the delivery of genomic breeding values for females and males to individual breeders. With the transfer of genotypes from foreign countries becoming more common it would make sense for breed societies to play a role in transferring data between foreign herd books and the Australian genetic evaluation system.

   II. **Parentage Discovery**

      Historically breed societies have provided parentage verification services to members that needed confirmation of their animal’s parentage. This was done by the breeder nominating the most likely set of parents and the laboratory validating the results. With genomics there is no longer a need for the breeder to nominate the most likely parent. The farmer can submit a sample and then receives the parents. This has several applications:

      - Useful in large herds with large numbers of cows calving at one time, increasing the risk of cross mothering, etc.
      - Useful in the situation where multiple bulls are run with cows after AI as it can verify which bull served the cow.
• Less paperwork for farmers if the turnaround can be optimized as the birth can be recorded electronically and the results fed back electronically to on farm packages and herd test centres.

III. Genomic Mating programs
There is a portion of the market that uses mating programs for advice on how to best breed individual cows. This is generally done using pedigree and conformation information. DEPI have developed calculations to generate mating advice for cows using their genotype and the genotype of potential sires. This product needs further development to integrate it with data systems of potential service providers.

IV. Breed Composition Analysis
There are many animals that are sired by herd or occasionally AI sires that are not genotyped. In the case of both local and export markets there is often demand for animals being of specific breed composition. Genomics will identify the % of a particular breed in an animal’s pedigree that could determine the eligibility for herd book entry or suitability for particular export markets.

4) National Genetic Merit Indexes
The National Breeding Objective (NBO) review is comprehensive and employs a consultative approach to discover what preferences dairy farmers have when making breeding decisions. This initiative will in turn help formulate future breeding indexes in Australia and should be undertaken regularly. The industry could consider multiple indexes reflecting: different management systems; individual breeding objectives; and breed specific goals.

5) Retain Identity of Each Breed
Farmers should be free to choose whatever breed fits their breeding program. As such, industry should encourage the maintenance of the smaller breeds in order to maintain diversity of choice. Each breed society should retain responsibility for the direction of its breed development and evaluation. For smaller breeds, international collaboration may be the only way to deliver breeding values.

6) Herd Improvement Data Reporting Standard
Any increase in the uptake of herd improvement data by Australian dairy farmers in their breeding decisions will depend on timely, accurate and complete whole herd information being consistently delivered through a well-supported, commercially focused, robust data collection, recording and reporting pipeline.

The industry should encourage this service by collaboration between breed societies, on-farm dairy farm software and herd recording service providers for the collection and delivery of pedigree and herd recording data in one centre, using an animal identification system with “single entry/multiple use” capability.

This “one stop shop” for individual animal and whole herd data reporting service can include but is not limited to the following:

1. parentage discovery
II. parentage verification  
III. lactation and milk production reports  
IV. mating reports  
V. herd health status reports in collaboration with vets and milk processors  
VI. genomic testing and evaluation reports including ABV(g)

**12 APPENDIX 6 - TACTICS FOR ACHIEVING STRATEGIC GOALS**

### 12.1 GENETIC EVALUATION AND RESEARCH

#### 12.1.1 Overall
- Consider future needs for oversight of genetic improvement that includes broader stakeholder representation and a broader mandate to improve all functions and span across operational activities, research and D/I/M (see figure below for a potential model).

- Seek allocation of resources from key stakeholders (DA, DEPI, herd improvement businesses) that are based on the overall value proposition of genetic improvement and recommend the allocation of resources across operational, research, D/I/M, and service delivery functions.
- Reserve the ability to co-fund research that is outside of the current herd improvement work program. This allows for scientists to attract funds and collaborate globally, as is evident from current practices.
- Revise all structural elements relating to the genetic improvement governance structure. This includes a review of organisational structures, including the potential for a Canadian (CDN) or Irish (ICBF) model.
- Recognise that the strategic goals require investment to complete structural changes as well as investment to improve the competitive position.
- Acknowledge that the desired process is a “turn-around” process that will take until 2020 to achieve the desired vision.
  - Manage expectations through frequent communication and industry engagement  
  - Create stakeholder buy in from early successes  
  - Provide suitable stakeholder engagement with changes that will impact on commercial practices (eg. mandatory genotyping of all males).  
  - Maintain trust by being clear about the limitations of existing policies and capability as well as in describing changes that did not meet expectations (eg. technical changes).
- Consider policy issues that set criteria for investment in pre-competitive and competitive activities that take into account market failure, market opportunities, and also unique aspects of the Australian commercial environment.
  - Benefit from licensing in technology from outside the local industry for validation and implementation.

#### Diagram

![Genetic Improvement Oversight Structure](image)

- Research  
- D/I/M  
- Evaluation Operations  
- Service Delivery
12.1.2 Evaluation
- Move to monthly runs of evaluation (or alternatives based on further market feedback)
- Fast turnaround of commercial cow and herd bull tests to allow for timely culling decisions.
- Revise approach for prioritisation of work (determine a new and open/consultative method that addresses needs of each market sector)
- Continue the review of the national breeding objective; include a consideration of multiple indexes, sub-indexes and the inclusion of traits that are sought by key market sectors.
- Increase the user friendliness of the delivery of results from evaluation. This includes outputs for use in mating programs and in commercial systems.
- Preserve the key role of DEPI in terms of employment, use of facilities and efficient connections with research activities.

12.1.3 Research
- Continue to lead and participate in global initiatives (conferences, formal collaboration) that mean that scientists have a well-formed view of future needs and opportunities. Create a forum where these views can be shared with and understood by the oversight committee and the industry.
- Prioritise efforts in the near term to support the turn-around activities for industry. Phase current research and manage the workload of new research so as to meet this priority.
- Continue with the current student load at postgraduate level in order to maintain a range of exploratory studies.
- Expand the involvement of undergraduate and masters students to address development tasks and to measure the impact of improvements to the genetic evaluation system.
- Manage the handover of the research initiatives (e.g. Ginfo) to the D/I/M team so that it has enduring industry value.
- New trait development work (outside of exploratory studies) will be prioritised by the new governance structure.

12.1.4 Development, Implementation and Maintenance
- Deliberately over-resource this function to a) overcome current deficiencies and work through a backlog of activities sought by both ADHIS and the broader industry and b) demonstrate a change in attitude to stakeholders.
- Build capacity in the short term through secondment and from significant provision of resources from the commercial sector and broader research sector. This includes availability of sites to demonstrate the inherent value of genetic improvement and the essentiality of using Australian evaluations.
- Scope the outstanding tasks already known to ADHIS and engage with stakeholders to identify and prioritise their task requirements.
- Assess the maintenance requirements of the current evaluation system, including demonstration of its worth and the need to source accurate data that is representative of at least 95% of Australian dairy farms.
- Identify technical limitations of current evaluation methods (outlier farm systems, bloodlines not represented by current genomic reference set) and support appropriate policy/messaging while identifying methods of overcoming these limitations for development.
- Identify comparative weaknesses of current (and likely future) evaluation services in Australia and peer/competitive countries and suggest solutions to the oversight committee.
- Expand function (as described earlier) to include demonstration of benefits and other “custodian” roles in data and evaluation.
12.1.5 Data

- Invest in activities to better relate how current data is used to make on-farm decisions and how this data and future sources of data could be better used for decision making.
- Use Ginfo (sentinel herds) as a media to test improvements to on-farm use of data in decision making.
- Solve on-farm issues related to quality of data (eg correct a mistake once and it is “fixed everywhere”) and overcome access issues for data sourced from multiple platforms.

12.1.6 Service delivery

- Map out timeframes for new services to deliver. This includes current services covered by the genomics pipeline taskforce.
- Resource this function as a dedicated business unit and set service targets.

12.1.7 Competitive environment

- Contrast the expression of ABVs with evaluation systems from major import sources (eg US, NZ, Canada, Netherlands, France) and identify aspects where different methods of expression provide may disadvantage genetics from Australia or provide information not available in Australia.
- Determine five unique properties of the Australian evaluation system that demonstrate the superiority of using the system over all other competitive evaluation systems (ie local factors that are more powerful factors than access to larger breeding programs overseas). Where possible, demonstrate in commercial environments the impact of these unique properties and prepare material for marketing purposes.
- Recognise that the majority of product used in Australia is imported and work with importers to provide affordable access to Australian evaluation tools for all relevant sires in their country-of-origin.

12.1.8 Personnel

- Provide significant lead time in planning for employee succession, particularly in specialised roles where talent search is global.
- Attract talented people from overseas genetic improvement industries that have a desired organisation culture to assist in business turnaround activities.

The tactics above should start a virtuous cycle to create more value for genetic improvement:

- Farmers demand to have a national infrastructure for genetic improvement. A highly functional infrastructure that is competitive, meets current and future needs and allows for inventive behaviour.
- Genetic improvement that is responsive to farmers’ needs with a strong outcome-focus. This includes an expectation that outcomes sought in the NBO review can be met.
- Farmers respond by increasing their use of genetic improvement tools and measure their increase in asset value (ie. the herd is valued for its qualities by the market and by banks).
- The broader genetic improvement sector responds by expanding their use of Australian genetic improvement tools and advocating their use.
- Marketing and extension efforts can become more business-focussed
- The collective value from all the strategic goals is to close the gap between current rates of genetic gain and the potential gains that are observed in the best herds. Closing the gap by
50% is realistic and would be of the order of $9/cow/year ($14M pa). This benefit is scalable; ie if research delivers improvements, there will be a greater payoff as a consequence of a superior genetic improvement system.

12.2 Genomic Pipeline and Technology

12.2.1 Genomic Technology Use

Genomic technology should become imbedded into herd improvement practices.

i. Clearly articulate and demonstrate the proof of concept and value from cattle management via genomic testing services

ii. Clearly demonstrate the ability to predict lifetime profitability to each animal tested and have this recognised and accepted via research and analysis.

iii. Develop a range of services to support testing (including but not limited to):
   - Parentage discovery – use genomic testing to determine the pedigree of stock on-farm (current service)
   - Data for export heifers – to contribute data both pedigree and ABV. This data can be used to provide greater value to stock put up for sale.
   - Calf selection – used to assess the calves you want to keep and those you seek to sell
   - Heifer/cow mating – ability to select and mate cows to bulls according to their genetic merit.
   - Genomic inbreeding analysis – to assess the level of inbreeding of cows to assist in joining decisions.
   - Improved performance – more profitable, more fertile, improved productive efficiency and longer lasting cows. (Genetic merit is linked directly to performance and on farm profit)

iv. Support for commercial innovation built of genomic evaluation results

v. Review the processes used by the cattle breeding industry to identify, evaluate and incorporate genomic technology in the breeding programs and selection decisions made by both bull breeding organisations and Australian dairy farmers.

12.2.2 Data movement

Data should move through the genomic pipeline unhindered and without intervention.

i. Clearly articulate the blockages in dataflow, animal & sample identification and support initiatives to address these blockages

ii. Provide support R&D, proof of concept research and additional analysis on the benefits of testing at a farm level to service providers to demonstrate the benefit of genomic testing at a farm level

iii. Support for a whole of industry communications/marketing strategy on the benefits of genomic testing at a farm level

12.2.3 World’s Best Practice Evaluation

Technological and methodological innovation maintains world best practise genomic evaluations

i. Need access to large Australian data sets to determine relevance and accuracy of technology to Australian dairy cattle breeding.

ii. Maintain an industry level understanding of technology being considered both domestically and internationally to form a judgement of its potential to improve dairy farm profitability.
iii. Implement an annual process in which researchers and the wider Australian dairy cattle breeding industry come together to share plans, agree priorities, share results, share implementation decisions and share their assessment of current services.

iv. Implement a DNA warehouse where tissue samples are collected on all calves (male and female) at birth from Ginfo herds. Sufficient tissue is collected and stored to enable several genotype tests to be conducted over a period of time to support R&D and maximise benefits from future technological improvements.

Supporting innovation and the uptake of genomics will require the development of a culture of continuous quality improvement where changes to breeding values are seen not as corrections, but improvements. Currently, changes are seen as negative corrections while in most cases, they are improvements to technology or methodology. In those cases were changes are corrections, they should be publically acknowledged as such. Confidence in the genetic evaluation system will encourage this culture.

12.2.4 Rate of Genetic Gain
Support the industry-stated goal of doubling of the rate of genetic gain in cows for the national breeding objective.

To achieve these goals the industry requires:

i. Top cow and heifers lists to be actively promoted
ii. Recognition and reaffirmation of the value of high genetic merit animals through proof of concept RD&E
iii. Recognition and reaffirmation of the value of high genetic merit animals by industry organisations including milk companies and the financial sector
iv. Develop new reports and tools which increase the value of genomic breeding values and genetic improvement.

While lists are currently available, the ranking of the few cows genomically tested in Australia has not attracted significant interest to date. This should change and raising the profile of top genomically tested females will encourage further testing. More testing will increase the probability of finding exceptional bulls, thereby accelerating genetic gain.

The industry should collectively support the message that genetics is important to the profitability of Australian farms. By doing so, a consistent message that making good breeding decisions improves your bottom line will be delivered to farmers through a variety of channels.

The industry should help develop and implement new reports to improve the usability of genetic and genomic information. One possible example is a genomic mating program which takes into account the genetic merit of the animals and manages inbreeding at the genomic level. The Task Force discussed this at some length but did not reach unanimity on whether this should be an industry or commercial role. However, the group acknowledged that the provision of genomic mating programs should be encouraged.

12.2.5 Service Delivery
Farmers and service providers have access to an efficient commercial delivery service.
i. Investment and partnerships with organisations on research into new and novel approaches to genomic testing
ii. Industry support and innovation from service providers in their ability to provide genomic testing and support services including new entrants
iii. Ensure data accuracy
iv. Recognition and reaffirmation of the value of high genetic merit animals through proof of concept RD&E

This goal supports Goal 1 by attuning the technology to market needs. To gain the widest possible uptake, a price low enough to make the test a routine part of farmers’ day will be necessary. Otherwise, only the elite animals will be tested. It will also be necessary to make sure that any perceived or real deficiencies between local and overseas genomics are acknowledged and addressed.

The Task Force felt strongly that although there should be multiple ways for farmers to access genomic breeding values through various channels (such as herd test centres, etc.). However, there should only be one data manager to ensure accuracy and consistency within the system. Currently this is the breed societies.

12.3 HERD TEST

12.3.1 Herd Test Uptake
Increase the participation of farms/cows on traditional herd test to 55% of the national herd by 2020.

- Formulate a national policy framework to assist service providers with access to resources for research, development and innovation.
- Educate and inform existing extension personnel (vets, consultants, factory field officers, DEPI staff, DA extension staff, RDP staff etc.) on the value of herd test information for both individual farmers as well as wider industry genetic gain/productivity. Actively seek industry advocates. Existing industry investments in tools such as Fertility Focus Reports, Mastitis Focus Reports and Genetic Progress Reports need to be better integrated into herd test reports along with the extension effort to explain these to farmers. Ensure consistency of themes and messages throughout the industry.
- Integrate herd test with factory QA systems. Add value for both farmer and factory.

12.3.2 Herd Test Value Proposition
Communicate in a more effective way, the value proposition for herd test to farmers as well as other industry participants such as veterinarians, consultants, milk buyers and other industry bodies.

- After a clear value proposition has been articulated, instigate a campaign to explain the herd test value proposition clearly and simply. Herd test should more properly be seen as an investment rather than an expense (the ‘hassle factor’ or effort vs. value). For example herd tested cows outperform non-herd tested cows by 30% according to the Australian Dairy Herd Improvement Report 2013.
- Re-design herd test reports to improve visual appearance, make information more accessible and relevant. Make stronger links between cow performance and profit. Create
new reports around genomics, fertility, transition management and disease incidence/prevention.

- Utilize skills of professional communicators to achieve these goals.
- Targeted communications with various industry groups (vets, consultants, milk buyers, extension staff etc.) about value of herd test, what information is available, how this is of potential benefit to their clients.
- Communicate more effectively within the herd improvement industry itself. Elevate the herd test sector from its ‘poor cousin’ status.
- Assist service providers to develop communication capabilities within their own staff so that extension from within the herd test sector is improved.

### 12.3.3 Training

Develop staff training and development opportunities for service providers within the herd test sector.

- Staff training, recruitment and retention are a challenge for all service providers.
- Develop industry training programs relevant to the herd test sector. For example in New Zealand they have a Certificate III in Herd Improvement but there are no equivalent qualifications in Australia. Current dairy training is almost entirely focussed at farm level only but there is scope for a wider type of industry training.
- Enlist wider industry sponsorship to send one delegate from the herd test sector to attend the ICAR conference every year. Sponsorship would be dependent on sharing information with all service providers on return. This will help embed a culture of international awareness.

### 12.3.4 Service Delivery

Develop more flexibility around service delivery of herd test to farmers.

- In Victoria there is a need to research ways to reduce dependence on a sub-sampling system which is outdated and inefficient. Solutions include working with equipment providers (Delaval etc.) on measuring devices and methods of extracting milk samples as well as single sample collection.
- Australian Herd Test guidelines are outdated and urgently require updating. This will provide a transparent, common set of rules for the adoption of best practice throughout the industry, for example, in the calculation of Production Index (PI), the calibration of measuring devices or the formula for single sample testing.
- Examine how new shed equipment such as robotic milkers and auto mastitis detection systems/in-line meters can be integrated into the herd test system. Make recommendations on how service providers can play a role in getting data from new technology on-farm into the genetic evaluation system.
- Whilst RFID has improved problems relating to individual cow ID, there are still issues in certain areas/states. A campaign to encourage early insertion of NLIS tags would assist.
- Explore what other tests can be performed on the milk sample that will add value and profit to the farmer.

### 12.3.5 Structural Change

Investigate further opportunities within the herd test sector for co-operation and rationalization.
• A project to explore national laboratory requirements for milk sample testing and make recommendations on future investment. For example, at the moment the number of individual milk analyser machines in Australia far exceeds current demand and is not optimal use of limited investment resources.

• Pre-competitive advice concerning transport and logistics within the sector.

• Case studies of herd test success stories in other countries such as LIC in New Zealand and the change in their business model from ‘not for profit’ or Agsource in the USA would possibly be beneficial to service providers in Australia.

12.3.6 Industry Connections
Promote a herd test sector which is more connected with other parts of the Australian dairy industry and more ‘plugged in’ to international trends and developments.

• Develop enhanced linkages between the service providers and milk processors.

• Create a pathway between the herd test sector and DIAL (the processor research organisation) to enable the development of joint research initiatives.

• Develop the necessary project management expertise within the sector to become more successful in identifying potential research funding sources such as State and Federal Governments, Dairy Australia and the Gardiner Foundation.

• Foster a closer relationship between the service providers and Dairy Australia to enable a greater understanding of herd test and its place in the dairy industry.

12.4 Marketing and Extension Task Force

12.4.1 Value Recognition
Increased recognition of the value of genetic improvement

• Engage broader audience – service providers, milk companies, vets, nutritionists, etc. in the area of genetics that best fits their area of work.

• DA must play a significant role in getting policy makers at banks to put a real financial value of the ABV level in herds.

• Ensure research farms, Focus Farms and other demonstration and extension sites have clear focus on genetic improvement

• Utilise conferences and other forums to present genetic improvement topics

12.4.2 Tools
Use of tools and information to make the best breeding decisions

• Develop tools to enable farmers to predict genetic improvement (e.g. Genetic Progress Report for heifers) and/or assess performance at key dates, e.g. calving and demonstrate past links between performance and genetics. This helps build confidence in future predictions.

• Increase training and education offering in relation to genetic improvement – for farmers and service providers

• Independent, industry standard adviser training (as previously signalled in 2008 adviser focus groups)

• Pilot program for resellers to lift their capability

• Increase accessibility and focus on cow ABVs at herd level
12.4.3 NBO
Knowledge of and confidence in National Breeding Objective

- Modify NHIA survey to categorise sales by APR
- Ensure research farms, Focus Farms and other demonstration and extension sites utilise APR in their breeding decisions
- Profile top APR herds
- Advertising Code of Conduct
- Rebrand and relaunch ‘APR’ following National Breeding Objective review

12.4.4 AI
Increased use of AI

- Engage service providers to develop commercial services for an easy insemination program for heifers, and link to existing heifer campaigns (e.g. Heifers On Target)
- Capture permission to access herd test data, AI use and other genetic improvement activities as key farm data (e.g. through Farm Monitor Project) – to enable evaluation of link to profitability
- Promote improved profitability of AI
- Capture herd improvement data and metrics in industry surveys and other programs, e.g. Dairy Farm Monitor

12.4.5 Herd Test and Data
Maintain herd test and improve access to and use of on-farm data

- Centralised data system
- Pre-competitive analysis tools that interpret existing data in more useful ways (EBI reports, Profit Profiler, Genescreen)

12.5 Breed Societies
Breed societies believe they can make the vision a reality provided:

- there exists a seamless transition of data between on-farm herd management software systems, DPC’s, breed societies and ADHIS
- genomic evaluations and pedigree verification is available for all breeds
- online access to genetic evaluations (similar to the Canadian Dairy Network)
- online registrations in real time capability across all breeds and linked to all on-farm herd management software systems
- there is a “single entry/multiple use” animal identification system in place to allow pedigree, herd health and production records to be added to the national data reference set.
- Genomic reports are standardised and released monthly
Herd Improvement Industry Strategic Review
Membership and Terms of Reference

1) Herd Improvement Industry Strategic Steering Group:
Chair: Chris Murphy

Farmers
Trevor Saunders, Gippsland, VIC
James Mann, Mount Gambier, SA

Department of Environment and Primary Industries Victoria
Ben Hayes

Dairy Australia
Chris Murphy, Group Manager Farm Productivity and Delivery
Matt Shaffer, Program Manager – Genetic Improvement and Data

Australian Dairy Farmers
Daryl Hoey, Northern VIC
Irene Clarke, Senior Policy Analyst

ADHIS
Daniel Abernethy, General Manager

Dairy Futures CRC
David Nation, CEO

NHIA
Carol Millar, General Manager

Bull Companies
Graeme Gillian, Chairman NHIA and General Manager, Alta Genetics
Rob Derksen, Genetics Australia

Breed Societies
Patrick Glass, Gundowring, VIC, Holstein Australia

Herd Test Centres
Tony Francis, HICO

2) Herd Test Task Force
Chair: Carol Millar

Geoff Potts (Dairy Express)
Neil Odgers (Hico)
Frank Treasure (Farmwest)
Peter Nish (Tasherd)
Lisa Reynolds (Farmer)
Paul Douglas (Ginfo)
Tony Francis (MISTRO)

3) Genetic Evaluation and Research Task Force
Chair: David Nation

Daniel Abernethy (ADHIS)
Ben Hayes (DEPI)
Carol Millar (NHIA)
Scott Joynson (Jersey Australia)
James Smallgood (ABS)
4) Marketing and Extension Task Force:
Chair: Chris Murphy

Michelle Axford (ADHIS)
Jeff Coutts (Consultant)
Neil Webster (DA)
Brad Granzin (DEPI)
Jim Lindsay (Consultant)
Brad Aitken (Leading Edge Genetics)
Christian Hickey (NHD)
Rob Derksen (GA)

5) Genomic Technology and Pipeline Task Force:
Chair: Daniel Abernethy

Rohan Butler (Holstein Australia)
Peter Williams (ADHIS)
Steve Mills (Farmer)
Bruce Ronalds (ABS)
Jennie Pryce (DEPI)
Greg Tiller (GA)
Craig Lister (Farmer)

6) Breed Society Task Force:
Chair: Patrick Glass

Scott Braendler (Ayrshire)
Mike Hentschke (Ayrshire)
Graeme Hamilton (Aussie Reds)
Tim Humphris (Aussie Reds)
David Shibble (Brown Swiss)
Ben Govett (Brown Swiss)
Alan Clark (Guernsey)
David Jupp (Holstein)
Geoff Cochrane (Illawarra)
Michael Tuhan (Illawarra)
Scott Joynson (Jersey)
14 Appendix 9 – Herd Improvement Industry Strategic Steering Group

Terms of Reference

Herd Improvement Industry Strategic Steering Group

Objective: To create a vision, strategy and the tactics to implement this strategy for the herd improvement industry which will improve farm profitability and industry sustainability.

Participants: Farmers (2 farmer members), Dairy Australia (Group Manager, Farm Productivity and Delivery, and Program Manager – Genetic Improvement and Data), Australian Dairy Farmers (2 members by appointment), DEPI (1 Representative by DEPI appointment) ADHIS (General Manager), Dairy Futures CRC (CEO), NHIA (General Manager), Bull Companies (2 representatives by NHIA appointment), Holstein Australia (by appointment), Herd Test Centres Representative (1 representative by NHIA appointment)

Chair: Chris Murphy, Group Manager, Farm Productivity and Delivery, Dairy Australia

Term of Operation: The SG will complete its main deliverables by 30 June 2014

Reporting: The SG has a responsibility to report to the entire Herd Improvement Industry throughout the process. In addition, the SG will report to the Board of Dairy Australia, as the organising entity.

Values:
1) To operate in a transparent manner
2) To consult with stakeholders as widely as possible
3) To represent all sectors of the industry and ensure effective communication
4) To work towards outcomes that are in the common interest and promote win-win solutions

Principles:
1) Genetic improvement is vital to the profitability of the Australian dairy herd.
2) Australian evaluation and research capability is vital to genetic improvement in Australia.
3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.
4) Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/adoptions of Australian evaluations.
5) Acceptance/understanding of GxE is vital for industry wide extension and support.
6) Measurement of animal performance is vital to managing animal performance.

Member Responsibilities: Each member will be expected to communicate with other stakeholders in their sector. This is a key commitment of this steering group. In addition, each member should operate in an independent manner with a view towards industry good.

Deliverables:
1) A draft strategic plan for the herd improvement industry will be developed by 31 March 2014.
2) A finalised strategic plan for the herd improvement industry will be developed by 30 June 2014.
3) A culture of open communication/collaboration around herd improvement issues should be developed and maintained.
4) A recommendation with supporting information on whether the SG should continue to operate but under new terms, be replaced by another body, or be disbanded.

Steering Group Responsibilities: The SG will be responsible for strategic guidance in the herd improvement area. The SG can set up and manage task forces to enable it to complete its work. It must ensure that the work of any task forces or working groups fit within the agreed overarching industry strategy and will deliver on the agreed strategic priorities.
15 APPENDIX 10 - GENETIC EVALUATION AND RESEARCH TASK FORCE

Terms of Reference

Genetic Evaluation and Research Task Force

Objective: To suggest and refine a vision, strategy and the tactics to implement this strategy in relation to genetic evaluation and research in Australia to the Herd Improvement Industry Strategic Steering Group.

Participants: Daniel Abernethy, Ben Hayes, Scott Joynson, Carol Millar and others to be appointed at the discretion of the Task Force as required.

Chair: David Nation, CEO, Dairy Futures CRC

Term of Operation: The Task Force will complete its main deliverables by 15 March 2014

Reporting: The TF will report to the HIISSG.

Values:
1) To operate in a transparent manner
2) To consult with stakeholders as widely as possible
3) To represent all sectors of the industry and ensure effective communication
4) To work towards outcomes that are in the common interest and promote win-win solutions

Principles:
1) Genetic improvement is vital to the profitability of the Australian dairy herd.
2) Australian evaluation and research capability is vital to genetic improvement in Australia.
3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.
4) Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/adoption of Australian evaluations.
5) Acceptance/understanding of GxE is vital for industry wide extension and support.
6) Measurement of animal performance is vital to managing animal performance.

Member Responsibilities: Each member will be expected to communicate with other stakeholders in their sector who are not represented. This is a key commitment of this Task Force. In addition, each member should operate in an independent manner with a view towards industry good.

Outcomes: Draft vision, strategic priorities and implementation tactics for genetic evaluation and research will be delivered to the Herd Improvement Industry Strategic Steering Group by 15 March 2014.

Potential Questions to Consider:
1) What research/evaluation capacity do we want within the Australian industry?
2) What structure would suit the future needs of the industry best?
3) What is the feedback mechanism between industry, farmers, evaluation and research?
4) What types of traits might become more important by 2020?
5) How might evaluation and research be funded?
6) What is the best option to maintain the industry’s ability to collect data for industry good purposes?

Task Force Responsibilities: The Task Force is responsible for delivering a draft vision, strategy and implementation tactics to the Herd Improvement Industry Strategic Steering Group. The Task Force may also be asked to provide other suggestions and advice as requested by the Herd Improvement Industry Strategic Steering Group.
16 APPENDIX 11 – GENOMIC TECHNOLOGY AND PIPELINE TASK FORCE

Terms of Reference

Genomic Technology and Pipeline Task Force

Objective: To suggest and refine a vision, strategy and tactics to increase the profitability of farms through the uptake of genomic technology in Australia to the Herd Improvement Industry Strategic Steering Group.

Participants: Rohan Butler, Steve Mills, Jennie Pryce, Bruce Ronalds, Peter Williams and others to be appointed at the discretion of the Task Force as required.

Chair: Daniel Abernethy, CEO, ADHIS

Term of Operation: The Task Force will complete its main deliverables by 15 March 2014

Reporting: The TF will report to the HIISSG.

Values:
1) To operate in a transparent manner
2) To consult with stakeholders as widely as possible
3) To represent all sectors of the industry and ensure effective communication
4) To work towards outcomes that are in the common interest and promote win-win solutions

Principles:
1) Genetic improvement is vital to the profitability of the Australian dairy herd.
2) Australian evaluation and research capability is vital to genetic improvement in Australia.
3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.
4) Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/ adoption of Australian evaluations.
5) Acceptance/understanding of GxE is vital for industry wide extension and support.
6) Measurement of animal performance is vital to managing animal performance.

Member Responsibilities: Each member will be expected to communicate with other stakeholders in their sector who are not represented. This is a key commitment of this Task Force. In addition, each member should operate in an independent manner with a view towards industry good.

Outcomes: Draft vision and implementation tactics for ensuring the increase in the uptake of genomic technology will be delivered to the Herd Improvement Industry Strategic Steering Group by 15 March 2014.

Potential Questions to Consider:
1) What should the genomic pipeline look like in 2020?
2) How can industry make it easier to use genomic technology?
3) What infrastructure is necessary to ensure smooth implementation?
4) What impact does genomic technology have on management decisions on farm?
5) What impact can genomic technology have on the environment?

Task Force Responsibilities: The Task Force is responsible for delivering a draft vision, strategy and implementation tactics to the Herd Improvement Industry Strategic Steering Group. The Task Force may also be asked to provide other suggestions and advice as requested by the Herd Improvement Industry Strategic Steering Group.
17 APPENDIX 12 – HERD TEST TASK FORCE

Terms of Reference

Herd Test Task Force

Objective: To suggest and refine a vision, strategy and the tactics to implement this strategy in relation to the provision of herd testing services to the Herd Improvement Industry Strategic Steering Group.

Participants: To be appointed by NHIA.

Chair: To be appointed by NHIA.

Term of Operation: The Task Force will complete its main deliverables by 15 March 2014

Reporting: The TF will report to the HIISSG.

Values:
1) To operate in a transparent manner
2) To consult with stakeholders as widely as possible
3) To represent all sectors of the industry and ensure effective communication
4) To work towards outcomes that are in the common interest and promote win-win solutions

Principles:
1) Genetic improvement is vital to the profitability of the Australian dairy herd.
2) Australian evaluation and research capability is vital to genetic improvement in Australia.
3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.
4) Industry wide extension/marketing and advocacy/leadership is vital to the broad based farmer support/adoption of Australian evaluations.
5) Acceptance/understanding of GxE is vital for industry wide extension and support.
6) Measurement of animal performance is vital to managing animal performance.

Member Responsibilities: Each member will be expected to communicate with other stakeholders in their sector who are not represented. This is a key commitment of this Task Force. In addition, each member should operate in an independent manner with a view towards industry good.

Outcomes: Draft vision, strategic priorities and implementation tactics for the herd test industry will be delivered to the Herd Improvement Industry Strategic Steering Group by 15 March 2014.

Potential Questions to Consider:
1) What is a target herd test participation rate for the herd test sector for 2020?
2) What sort of new services/reports should the industry consider for the herd test?
3) What collaborative partnerships can/should the herd test industry forge to help meet their vision?
4) How will the herd test industry interact with on farm meters?
5) How can the industry make herd test participation less onerous?
6) What does the herd test software space look like in 2020?
7) How does the flow of data change by 2020?
8) What is the best option to maintain the industry’s ability to collect data for industry good purposes?

Task Force Responsibilities: The Task Force is responsible for delivering a draft vision, strategy and implementation tactics to the Herd Improvement Industry Strategic Steering Group. The Task Force may also be asked to provide other suggestions and advice as requested by the Herd Improvement Industry Strategic Steering Group.
Appendix 13 – Marketing and Extension Task Force

Terms of Reference

Marketing and Extension Task Force

Objective: To suggest and refine a vision, strategy and the tactics to implement this strategy in relation to the marketing and extension of genetic messages to the Herd Improvement Industry Strategic Steering Group.

Participants: Michelle Axford, Neil Webster, Jeff Coutts, and others to be appointed at the discretion of the Task Force as required.

Chair: Chris Murphy, Group Manager, Farm Productivity and Delivery, Dairy Australia

Term of Operation: The Task Force will complete its main deliverables by 15 March 2014

Reporting: The TF will report to the HIISSG

Values:
1) To operate in a transparent manner
2) To consult with stakeholders as widely as possible
3) To represent all sectors of the industry and ensure effective communication
4) To work towards outcomes that are in the common interest and promote win-win solutions

Principles:
1) Genetic improvement is vital to the profitability of the Australian dairy herd.
2) Australian evaluation and research capability is vital to genetic improvement in Australia.
3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.
4) Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/adoption of Australian evaluations.
5) Acceptance/understanding of GxE is vital for industry wide extension and support.
6) Measurement of animal performance is vital to managing animal performance.

Member Responsibilities: Each member will be expected to communicate with other stakeholders in their sector who are not represented. This is a key commitment of this Task Force. In addition, each member should operate in an independent manner with a view towards industry good.

Outcomes: Draft vision, strategic priorities and implementation tactics for genetic marketing and extension will be delivered to the Herd Improvement Industry Strategic Steering Group by 15 March 2014.

Potential Questions to Consider:
1) What should genetic marketing and extension look like in 2020?
2) What methods do we need to use to reach farmers?
3) What are the key messages to get across?
4) How can we work with service providers in marketing/extension?

Task Force Responsibilities: The Task Force is responsible for delivering a draft vision, strategy and implementation tactics to the Herd Improvement Industry Strategic Steering Group. The Task Force may also be asked to provide other suggestions and advice as requested by the Herd Improvement Industry Strategic Steering Group.
Objective: To suggest and refine a vision, strategy and the tactics to implement this strategy in relation to the breed society roles to the Herd Improvement Industry Strategic Steering Group.

Participants: To be appointed by the breed societies.

Chair: To be appointed by the breed societies.

Term of Operation: The Task Force will complete its main deliverables by 15 March 2014

Values:
1) To operate in a transparent manner
2) To consult with stakeholders as widely as possible
3) To represent all sectors of the industry and ensure effective communication
4) To work towards outcomes that are in the common interest and promote win-win solutions

Principles:
1) Genetic improvement is vital to the profitability of the Australian dairy herd.
2) Australian evaluation and research capability is vital to genetic improvement in Australia.
3) Broad based farmer support/understanding of Australian evaluations is vital to the Australian evaluation and research capability.
4) Industry wide extension/marketing and advocacy/leadership is vital for broad based farmer support/adoptions of Australian evaluations.
5) Acceptance/understanding of GxE is vital for industry wide extension and support.
6) Measurement of animal performance is vital to managing animal performance.

Member Responsibilities: Each member will be expected to communicate with other stakeholders in their sector who are not represented. This is a key commitment of this Task Force. In addition, each member should operate in an independent manner with a view towards industry good.

Outcomes: Draft vision, strategic priorities and implementation tactics for the herd test industry will be delivered to the Herd Improvement Industry Strategic Steering Group by 15 March 2014.

Potential Questions to Consider:
1) What will breed societies look like in 2020?
2) What sort of new services/reports should/could they consider?
3) What collaborative partnerships should/could breed societies forge to help meet their vision?

Task Force Responsibilities: The Task Force is responsible for delivering a draft vision, strategy and implementation tactics to the Herd Improvement Industry Strategic Steering Group. The Task Force may also be asked to provide other suggestions and advice as requested by the Herd Improvement Industry Strategic Steering Group.


The CIE. (2011). *The impact of innovation on the dairy industry over the last 30 years.* Melbourne: Dairy Australia and the Victorian Department of Primary Industries.

