



**FREW  
GROUP**



# final report

Project code: P.PIP.0461  
Prepared by: Koorosh Khodabandehloo  
BMC  
Date published: October 2015

**PUBLISHED BY**  
Meat & Livestock Australia Limited  
Locked Bag 991  
NORTH SYDNEY NSW 2059

## **Lamb meat in cooked meals for direct sale**

This is an MLA Donor Company funded project. Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government and contributions from the Australian Meat Processor Corporation to support the research and development detailed in this publication.

This publication is published by Meat & Livestock Australia Limited ABN 39 081 678 364 (MLA). Care is taken to ensure the accuracy of the information contained in this publication. However MLA cannot accept responsibility for the accuracy or completeness of the information or opinions contained in the publication. You should make your own enquiries before making decisions concerning your interests. Reproduction in whole or in part of this publication is prohibited without prior written consent of MLA.

## Abstract

Meat companies in Australia may consider diversifying their current portfolio of products and business model to complement existing business. The key objective of this project has been to examine opportunities and methods related to ready meals, in particular, positioning of Australian red meat industry as a whole. Meals designs that contain a high content of meat have been achieved and the potential for direct sale of such meals as a hot product to consumers around the world has been assessed and presented, which concludes the first stage evaluation of the approach under a Frew Group PIP project with the Australian Meat Processors Corporation (AMPC) and the Meat Livestock Australia (MLA). It has been shown that the opportunity for producing meals with high meat content and direct vending as hot food to consumers represents a significant growth area. An important part of the project has been the assessment of distribution and direct sale with the use of automated vending merchandising and dispensing that handles a select number of sealed prepared meals packs from chilled state. The practical feasibility of producing meals to cost and dispensing using a trial vending machine with microwave technology has been achieved. An innovative business model to expand Australian Meat Export in the longer term has been identified, potentially overcoming the current tariff/quota status where certain restrictions for fresh meat compared to cooked or partially prepared meats represent incremental growth opportunities (e.g. European Union Countries). Operating models for establishing a supply process as a new business venture have revealed high profitability potential for processors in Australia. Further research and practical feasibility with a small cluster of vending machines is necessary to reach understanding of many factors including ergonomics of the process, supply chain management, consumer acceptance and behaviours. The establishment of a new business based on the concept of this project would potentially return a further \$5.00 per lamb as the value proposition to Australia through increased export. There is potential for exploring opportunities in a similar way using lower priced, but quality red meats, expanding Australian exports, beyond the products considered by this project.

## Executive summary

The feasibility to utilise recovered or low value but quality meat from lamb to produce meals that can be sold hot to end consumers using vending machines has been reached.

Two specific opportunities present priority options as the main routes to the market, selling hot ready meals through automated 24 hour operated vending machines:

- a) Process quality, but low cost raw meat, cook and export bulk to meal manufacturers overseas for inclusion in “processor own brand” meals. The meals to be sold in vending machine under a “processor controlled” business structure.
- b) Prepare banded meals in Australia, with appropriate shelf life for shipment and placement in “processor owned” hot food vending machines, selling directly to the end consumer.

In the feasibility five meals have been developed: These were:

- Lamb Tikka masala with rice
- Meat balls and pasta
- Shepherds or cottage pie (lamb mince topped with mashed potato)
- Lamb Navarin
- Lamb sausage and mash

The meals have been practically developed and cooked using a vending machine, with high power microwave and electronic payment processing, to prove the potential of the process.

In early calculations close to A\$ 5.00 per lamb was estimated to be the gain from the conversion of recovered or lower value lamb meat into high quality and reasonably priced meals. The calculations suggest that this estimation of return could be exceeded.

Selling direct to the consumers anywhere in the world provides an effective supply and business process, which could now be a real possibility.

The conversion of raw meat (recovered or de-boned low cost) quality meat at around 82% CL into meatballs, correctly designed, presents the best option for a meat processor. Meatballs can have consistency in quality, eating appeal and easy to produce with uniform and high standard for inclusion as the main protein ingredient or component of a ready meal.

Trials meals using meatballs have been developed and tested using vending equipment with success, establishing parameters relating to taste, cooking and vending time as well as payment system. The basis of supply as a new business opportunity has been examined, requiring further consideration and adoption.

The business models considered show significant returns with meals selling price at A\$ 9.00 per meal out of a vending machine. Selling 60 meals per day, 300 days per year on 10 vending machines is estimated to generate over A\$ 2 million in 5 years as gross profit. The investments and set up cost recovery in creating the business is included in the cooked meat sales which may be priced as high as A\$ 15.00/Kg.

A review by Greenleaf indicates that there is solid potential for this project concept. It is recommended that these risks be quantified, requiring a follow up “implementation or adoption project”.

**Contents**

	<b>Page</b>
Abstract	2
1. Executive summary	3
2. Background	5
3. Project objectives	5
4. Methodology	5
5. Results and discussions	6
5.1 Conversion of recovered meal	6
5.2 Market channel opportunities for retailing ready meals in vending machines	7
5.2.1 Market opportunities	7
5.2.2 Distribution	9
5.2.3 Overview of vending machines	9
5.3 Ready meal ideas and selection criteria	11
5.4 Raw meat availability and carcass utilisation	12
5.5 Supply process and potential hot food vending locations	13
5.6 Outline business model, preliminary cost benefits and revenue potential	13
5.7 Meals developed, appearance and pricing	13
5.8 Vending and supply process	15
5.9 Meals taste profile	15
5.10 Market options and review of vending systems in the field	16
5.11 Vending business model and profit potential	17
5.12 Technology and meatball production equipment	17
5.13 Future markets and research	18
6 Concluding remarks	20
7 Relevant appendices	21
APPENDIX A Greenleaf report summary	21
APPENDIX B: List of Meals	26
APPENDIX C – BOM for selected meals (Feb 2015)	28
APPENDIX D – Food Manufacture Article	33
APPENDIX E: Vending operations for hot food around the World	34
APPENDIX F: Locations for hot meal 24-hour automatic vending machines	45

## **2. Background**

The Australia meat industry features highly in world markets delivering the highest quality meats. Whilst Meat Standard Australia (MSA) branding and programmes domestically are well recognised, limited premiums have been delivered under MSA exports. Furthermore, tariff/quota status poses restrictions, especially for fresh meat exports to Europe. There is additional value that can be attained for yielding more saleable sheep-meat that performs with consistent eating experience in heat and eat products, extending beyond the current MSA cut/cook profile. The high density of population and demand for quality fast, prepared or convenience foods around the world outside Australia may present an incremental growth opportunity that brings benefits to Australian Red Meat industry, overcoming fresh meat export barriers, exporting the meat in cooked or prepared ready meat to be sold in meals.

## **3. Project objectives**

- Evaluated Business model / value proposition for expanding Frew group's portfolio of products/markets with exporting ready meals, direct to customers (Vending machine merchandising) and defining the target market
- Developed pipeline of ready meal ideas using Australian red meat and selection criteria / matrix for screening to create and capture value
- Developed proof of concept ready meals – bill of materials, specification and market feedback
- Defined commercial upscaling needs to execute – processing efficiency design, product builds/raw meat added value, logistics, marketing mix

## 4. Methodology

The project methodology has been to take a step by step approach to establish the basis of a new business for meat processor profiting from selling meals directly to end consumer using vending machines at a number of international locations. The feasibility has involved:

- a) Process of including recovered or low cost, but quality meat in to meals.
- b) Evaluation of meal concepts and estimating cost of supply
- c) Researching vending machine technology
- d) Trials with meals and vending machines
- e) Assessing the business possibilities
- f) Practical evaluation of the business model based on meals costing and vending trials

The approach to the project requires further validation based on installation and experimental, but actual operation of 5-10 vending units in different locations in at least two diverse and culturally different regions in the world.

## 5. Results and discussions

The project has evaluated the conversion process of meat into meals for a number of examples, before proceeding to assess the potential use of vending technology and the supply process as an international operation.

### 5.1 Conversion of recovered meal

Many processors in Australia find it uneconomical to invest in recovering low value meat from bone during processing as fresh meat such as mince. As an example, when producing lamb Leg Chump on primal cuts (ref Handbook of Australian Meat - H.A.M. code 4801) the aitch bone (“H-bone”) would be removed. The H-bone may trade at A\$ 0.40/Kg or scraped for rendering (also about A\$ 0.40/Kg as tallow, with significant weight losses in the rendering process). It is considered practical to recover the meat from H-bone (approximately 40 grams per H-bone) and continue to sell the remaining bone. The same would apply to other bone or carcass meat such as the deboned shoulder carcass (relevant HAM codes 5159 and 7499O shoulder rib/neck trimmings [http://www.ausmeat.com.au/media/48573/2013\\_-\\_rfp\\_ham\\_no\\_booklet.pdf](http://www.ausmeat.com.au/media/48573/2013_-_rfp_ham_no_booklet.pdf)), which has intercostal and surface meat on ribs and the neck for recovery.

Early evaluations show considerable support for a new business model and a significant value proposition from developing meals utilising low value recovered or de-boned meat. It is proposed that the lamb meals are to be exported for direct sale using automated vending machines as hot food for the end consumer. The vending is to be on a 24 hour, seven days per week basis. The feasibility shows strengths to focus on lamb, targeting the export market specifically Europe. A snap shot assessment (Table 1) of the value proposition is made using the example of samosa as a product that can be made with recovered and minced meat from H-bone. Table 1 presents the return to the lamb brand owner at A\$ 0.83/per lamb.

<b>PROJECT NO. P.PIP.0461 Confidential</b>			
<b>Snap shot business opportunity and value proposition</b>			
UP 1	0.085	Kg	H-bone meat recovered per lamb
UP 2	0.40	A\$/Kg	Current recovery value when sold as bone
UP 3	0.95	A\$	Price per lamb samosa as retailed chilled in Australia (web information)
UP 4	0.045	Kg	Weight of one samosa
UP 5	0.025	Kg	H-bone meat in each samosa
UP 6	0.010	Kg	Loss in conversion
UP 7	0.075	Kg	H-bone converted meat as samosa
UP 8	3	Samosa	Per H-bone
UP 9	2.00	A\$/Kg	Estimated cost per Kg of H-bone meat conversion to samosa
UP 10	0.17	A\$/Samosa	Estimated cost per Samosa of H-bone meat conversion to samosa
UP 11	0.01	A\$/H-bone	Loss to the processor when converting as the a reduced H-bone weight is sold as bone
UP 12	0.45	A\$/Samosa	Estimated value of H-bone meat in a samosa accounting for loss of sale of H-bone as bone
UP 13	<b>0.28</b>	<b>A\$/Samosa</b>	<b>Estimated net value of H-bone meat converted for sale in a samosa</b>
UP 14	0.50	A\$/Samosa	Remaining balance form sale price per samosa (non meat value, manufacturing, packaging, distribution, sale, vending , etc)
UP 15	400	Lambs	per hour
UP 16	640,000	Lambs	per year, also the number of H-bones per year
UP 17	1,920,000	Samosa	Number of samosas that may be produced per year with available meat
UP 18	<b>530,062</b>	<b>A\$</b>	<b>Return to the processor per year</b>
UP 19	<b>0.83</b>	<b>A\$</b>	<b>Per lamb potential return to the processor</b>

**Table 1 Value proposition (example of lamb samosa)**

Mincemeat recovered from H-bone at 85 grams per H-bone (UP 1, Table 1), priced at A\$ 0.40/Kg (UP 2, Table 1) can be retailed at A\$ 0.28 A\$ per samosa (UP 13, Table 1), containing 25 grams of raw equivalent lamb mince (UP 5, Table 1) in one samosa, which currently has a selling price of A\$ 0.95/samosa, Figure 5.1, (UP 3, Table 1) cold, from a major retailer in Australia. This equates to A\$ 0.83/ lamb (UP 19, Table 1).



**Figure 5.1 Samosa retailed at A\$ 0.95 each**

It may be relevant to mention that similar “samosa” style products also retail at around A\$ 1.50 each in the UK supermarkets,

Section 5.7 elaborates on the business opportunity value proposition, based on the available meat, classed as low value meat; at 400 carcasses per hour is estimation to be close to A\$ 5.00 / lamb.

**5.2 Market channel opportunities for retailing ready meals in vending machines**

The concept for the project has been to consider and develop meals that may be sold hot, using vending machines, direct to the consumer.

The other channels for selling meals, considered commentary (see Figure 5.2), have been considered including:

- established supermarkets (cold)
- mini-market retail (cold),
- road side service or petrol stations (with self-microwave facility for customers)
- Mobile catering
- Established hot food catering companies.



**Figure 5.2 Supply channel options for selling meals direct to end consumer**

**5.2.1 Market opportunities**

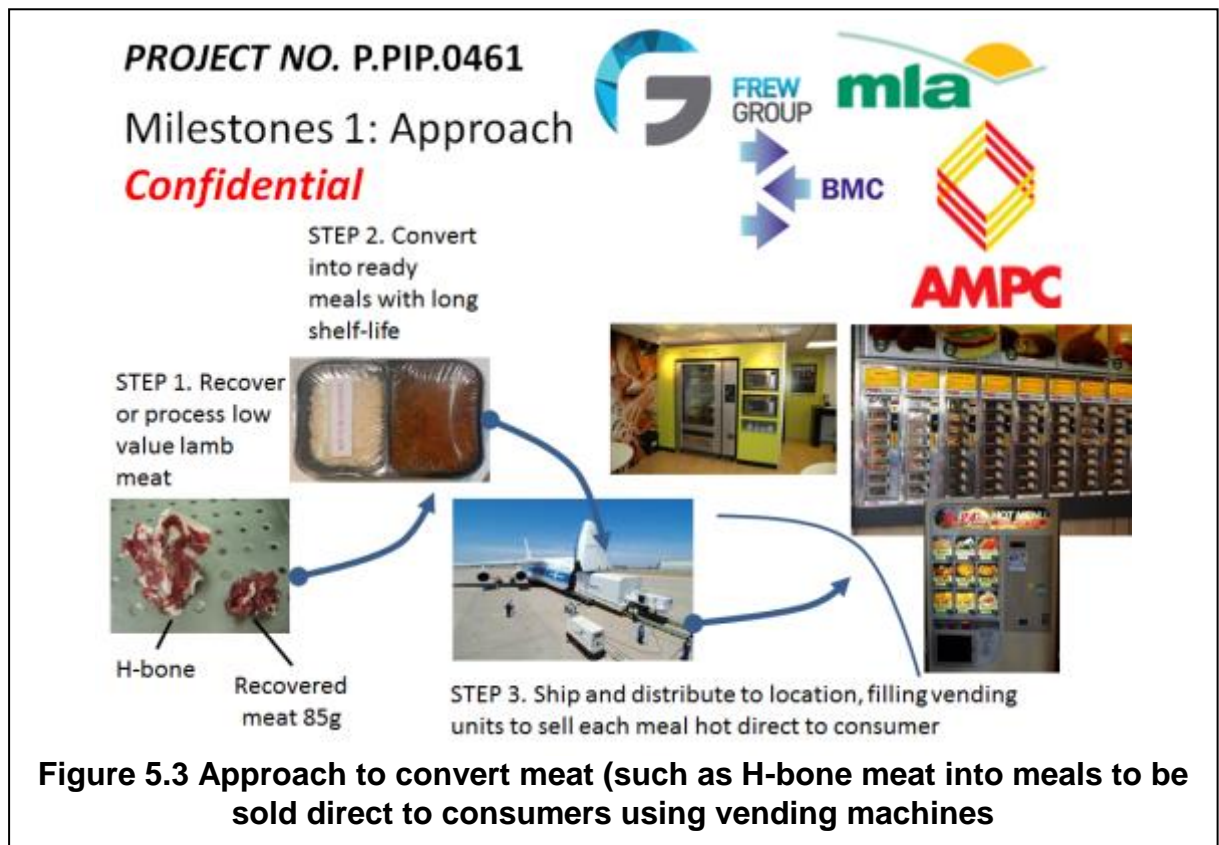
Among others, Australia currently supplies a number of overseas markets, with developed networks, possible for extension with ready meals and vending machines as a new route to the market. These markets could include:

<b>Europe</b>				
- UK	- Norway	- Others to follow		
<b>Middle East</b>				
- Dubai	- Jordan	- Kuwait	- Qatar	- UAE
<b>China</b>	<b>Japan</b>	<b>Africa</b>	<b>USA and Canada</b>	



It is identified that quota restriction would pose little issue, especially into Europe, given the fact that meals will be exported cooked and the quota status restricts the export of fresh meat (for further details see quota/tariffs from DAFF - <http://www.agriculture.gov.au/SiteCollectionDocuments/ag-food/quota/red-meat/entitle-perform/quota-position.pdf>).

Figure 5.3 illustrates the approach. Low priced lamb meat, such as the H-bone recovered meat, meat from the shoulder carcass after de-boning or other meat from the chump, intercostal meat from between French rack ribs, may be processed for meals (STEP 1). The task would be to convert the meat into ready to eat, quality and tasty meals (STEP 2). STEP 3 involves the transport, distribution and sale through hot food vending machines direct to the end consumer in a 24/7 operation.



The three step to market as presented have been a modelled for all meat types, where lower value quality meat may be converted into nutritious meals for export.

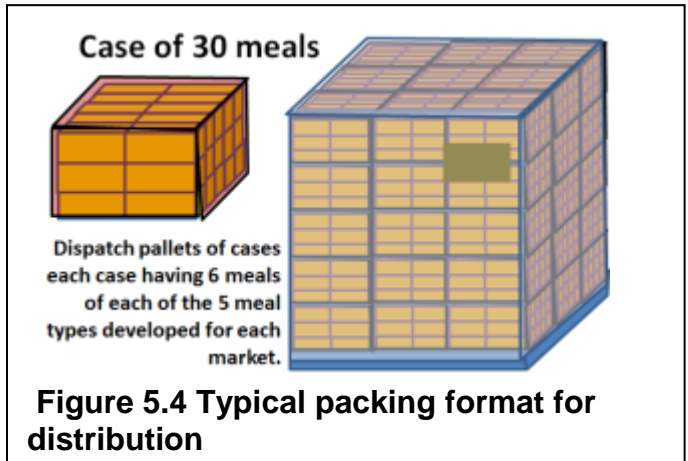
Meals may be branded and produced by third party contract manufacturers against protected own recipes developed to match specific tastes and market mixes.

Once markets are developed and growth justifies investment, new processing capability, from raw material to the finished long shelf-life meals, may be considered. This will be presented further in the next sections of this report.

In the first instance, focus will be on recovery or preparation of the meat for cooking, but contracting a meals manufacturer to produce the meals.

### 5.2.2 Distribution

Arrangements for meals distribution and delivery to the point of local distribution may also be contracted. Meals manufacturer may mix pack for each vending machine in such a manner that provides for effective and efficient local distribution. As an initial approach, the distribution could be based on, say, 5 different meals weighing maximum 400g (350 g nominal) per meal, case packed side by side, long edge touching, in 2 rows of 5 and 3 stacks, giving 30 meals. Case weight would not exceed 12 kg and each case would have 6 of each meal types. Figure 5.4 shows the case format (5x2x3) and typical pallet for shipment to local distribution depots. Local distribution process would deliver meals to the vending unit as needed in multiples of cases each carrying 30 meals, 5 of each type.



The distribution would use conventional channels and local contractors and/or vending machine operators, either franchised or contracted on a consignment by consignment basis. Note in the supply process traceability information with electronic monitoring would be important, giving information on the “health” of each pallet or case. Such “smart” technologies are now available at reasonable cost.

### 5.2.3 Overview of vending machines

Vending machines have been in use for several decades and have met with considerable success, especially in the chilled soft drinks market. Over the years, ice cream, sandwich and snacks such as potato chips and other food and drink items have come to be sold using such machines. In the past 2-3 years, hot food dispensing has become a possibility, for example, hamburger or French fries vending, which arrived on the market over a decade ago.

Combination set of vending units (Figure 5.5) is a typical arrangement and may be seen in many shopping malls across the world.

Vending machines have become a new channel for selling prepared meals and the latest reports predict higher quality new foods to be the focus for the industry (Rick Pendrous 5<sup>th</sup> December 2014 Food Manufacture:



**Figure 5.5 Combination vending at one location**

<http://www.foodmanufacture.co.uk/Business-News/Food-vending-set-to-take-off-in-the-UK>). It is anticipated that the next growth and new channel of opportunity will be the sale of quality foods through vending equipment.

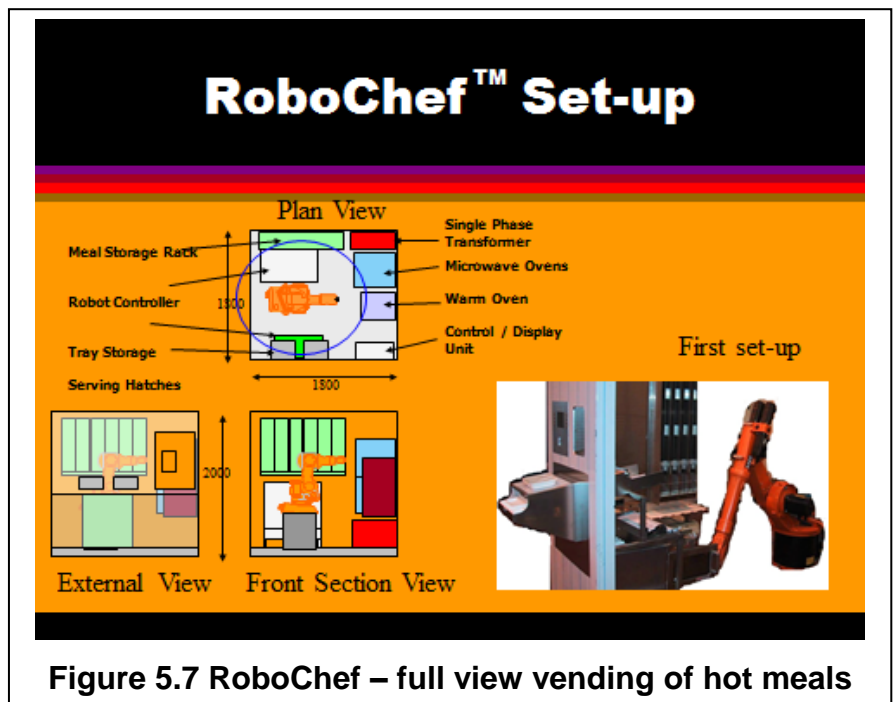
Vending ready meals present specific challenges and these relate to wastage, which has a direct link to shelf life and vending schemes.

The types of vending machines on the market are general locked to brands and are enclosed, where the customer cannot see the product until it is dispensed. Options (see Figure 5.6) where the meal is dispensed cold and the customer is required to heat the meal using microwave ovens located adjacent to the machine exist in many locations, especially petrol or road service stations.



**Figure 5.6 Vending ready meals**

RoboChef (Figure 5.7) is a new option and has an open arrangement with a robotic loading and unloading microwave ovens and dispensing the food to the customer, all in full view. RoboChef provides the opportunity for an IT based vending, with possibilities of spot promotions, also disposing of meals close to their end time for consumption. Although RoboChef opened significant long term advantages, much of the R&D in this project may be tested using a conventional vending machine for hot food. Assessments of the vending machine suppliers has identified several vending machine manufacturers, which have developed an automatic refrigerated vending machine that incorporates a heating module, allowing the machine to dispense hot ready meals. It is claimed that the heating time is programmable on a product by product basis, guaranteeing the meal to be served in the optimum condition for immediate consumption.



**Figure 5.7 RoboChef – full view vending of hot meals**



### 5.3 Ready meal ideas and selection criteria

The Meal options can be rather broad ranging from liquid meals (such as soups), snack meals, such as sausages in a pot and higher value meals including a meat based sauce, stew or curry with rice, pasta, bread, vegetables, etc. The latter, meat options with one or two complements is the direction being set as these have the possibility for a higher return for the meat content. This may be seen by examining retail pricing of chilled meals in supermarkets, compared with other food types containing meat. The packaging needs to be user friendly. It is also important that the cooking of a variety of foods can take place the same heating cycle using a microwave. Innovations in channelling heat within a packing tray have become available (see Figure 5.8 Sealed Air's Simple Steps™) making the potential for mix of products to be packed, without restricting innovation in meal design.

Over 500 potential lamb meals have been reviewed on the web and in discussions with MLA (Chef Sam Burke) as well as retailers in UK (Marks and Spencer, Tesco and Sainsbury).

A selection of meal ideas is listed in Appendix B, extracted from the website of a major Australian retailer. This clearly demonstrates the huge range of recipes that have been developed, but only a few are potentially needed as the top selection.

In specific regions potential markets for vending "Australian Lamb Meals" requires targeted developments. Such considerations are beyond the current scope of the project. The main priority is to reach the feasibility of the full chain of supply with a select number of meals that support the business model.



The meals list, as a short list, that may be produced from the meat types described in the next section of this report is presented below:

- |  |  |                   |
|--|--|-------------------|
| Lamb Tikka Masala and Rice                                     | Lamb Raganiosh and Rice                              | Lamb lasagne      |
| Lamb Spaghetti Bolognese                                       | Lamb mince kebab and rice                            | Lamb tagine       |
| Lamb sausage and mash  | Lamb meat balls and pasta                            | Lamb Navarin      |
| Lamb curry and rice  | Lamb burgers with cheese                             | Meat ball product |
| Rogan Josh   | Jal Frezi  | Lamb Biryani      |
| Souvlaki kebabs  | Lamb Moussaka  | Lancashire Hotpot |
| Casserole with Dumplings                                       | Shepherds pie (lamb mince topped with mashed potato) | Sheek kebab       |
| Lamb Morsels with pea pure and beetroot                        | Misoyaki Lamb  | Kung pao lamb     |
| Greek Lamb casserole   | Irish lamb stew                                      | Lamb koftas       |
| Lamb meat ball korma curry                                     | Spicy lamb mince with rice                           | Lamb casserole    |
| Lamb Greek Pastitsio   | Lamb rissoles with mint pea mash                     | Lamb Bredie       |
| Pappardelle with lamb, Pancetta, rosemary and napoletaba sauce | Lamb and date tagine                                 | Balti lamb curry  |
| Coriander and cashew lamb curry                                |  |                   |

Lamb and pumpkin curry	Greek lamb meatballs	Lamb rogan josh
Tagliatelle pasta with lamb ragout	Indonesian lamb curry	Lamb pilaf
Saffron and lamb pilaff	Lamb and apricot cous cous	Lamb flatbreads
Goan lamb vindaloo	Lamb and honey meatballs	Lamb paprikash
Lamb and herb patties	Lamb and potato curry	Lamb cannelloni
Lamb bredie	Lamb stroganoff	Mongolian lamb
Balinease lamb	Curried meat balls pot	Curried meat balls

In reducing the list to 5 the following considerations have been made.

- Compatibility of the meal with available meat
- International popularity and appeal to consumers wide specific tastes
- Easy and economic production with established processing equipment
- Ease of packaging and proven shelf life
- Established history in cooking speed and compatibility with microwave or combination oven cooking and holding capabilities
- Easy to source round the year complements (rice, pasta, potatoes, etc.) at competitive pricing avoiding cost variation over seasons.
- Easy processing capability with low cost equipment for processing or preparing the meat content (mincing or dicing, etc.)
- Low complications of cooking with microwave technology, avoiding sophisticated packaging.

The above criteria and discussions with meals producers as well as retailers have resulted in a list of 5 meals. These are:

- Lamb Tikka masala with rice
- Lamb Navarin
- Meat balls and pasta
- Lamb sausage and mash
- Shepherds pie (lamb mince topped with mashed potato)

This list constitutes the basis for the first development assessments to validate the process of supply and the business model.



**Figure 5.9 Example of long shelf life ambient meal.**

Of particular interest will be development of these meals to highest quality and longest shelf life for automatic vending, initially in chilled form. Innovations in the development of ambient meals will also be explored as this presents lower cost of transportation and storage options. Such meals are already available with shelf life of greater than 12 months See Figure 5.9.

#### **5.4 Raw meat availability and carcass utilisation**

The following includes potential sources of meat from lamb carcasses for meals:

- MT 1: Recovered meat from H-bone (HAH code 4801)
- MT 2: Recovered meat from deboned Shoulder rib carcass (HAM codes 5159 and 7499O)
- MT 3: Neck meat (HAM code 5020)
- MT 4: Deboned meat from the lamb Shoulder primal (HAM code 4983)
- MT 5: Chump or Rump meat (HAM code 4790)

MT 6: Flap meat (HAM code 5011)  
MT 7: General trim as sausage meat

(HAM code source - [http://www.ausmeat.com.au/media/48573/2013 - \\_rfp\\_ham\\_no\\_booklet.pdf](http://www.ausmeat.com.au/media/48573/2013_-_rfp_ham_no_booklet.pdf))

Section 8 will present the details in respect of the business model and the benefits converting and selling these meats into ready meals. The main benefits would be from conversion of low value meat into meals with the meat weight constituting one half or one third of the meal weight in the range 300 to 350 grams of meal total weight. On average it is estimated that the target meals will use 167 grams of meat in each meal.

### **5.5 Supply process and potential hot food vending locations**

The focus of the project has been established as follows:

- **Meat type: Lamb meat only**
- **Vending: Fully automated hot food only**
- **Meals for export (and potentially home markets)**

In the UK hot food vending machines have started to be used ([http://www.graddonvending.co.uk/hot\\_food\\_vending.html](http://www.graddonvending.co.uk/hot_food_vending.html)). Potential locations for vending have been considered and listed in Appendix F:

The locations need to provide suitable area for eating and disposing of packaging or unconsumed food.

Having a drink dispensing unit in the same area would be an advantage. Combination of vending machines as presented earlier may include ice cream vending machine, deserts and other complementary foods.

### **5.6 Outline business model, preliminary cost benefits and revenue potential**

Figure 5.10 presents the first assessment of the benefits to the processor in a more detailed manner. The main return is from conversion of low value meat into meals, with the meat weight constituting one half or one third of the meal weight, in the range 300g to 350g. For the calculations 167 grams (row C) of each meat type (MT) has been assumed.

The up pricing of the meals give a potential return close to A\$ 5.00 per lamb based on the calculations presented in Figure 5.10. To achieve this gain approximately 5.35 Kgs of low value lamb meat per lamb needs to be allocated to meals, which includes recovered meats and trim. Given 167grams of meat in each meal, the expectation is that the conversion will be at 30 meals or one case of finishes meals per lamb if all the meat types as in Figure 5.10 is allocated to meals production.

### **5.7 Meals developed, appearance and pricing**

In total, 5 product concepts have been fully developed and tested as presented in Figure 5.11a.

Although the packs look similar from the outside, after cooking in microwave and removing the top skin film, the presentation in the tray is appealing and product concepts can be easily differentiated (see Figure 5.11b).

<b>PROJECT NO. P.PIP.0461</b>		BMC-FREWS <b>Confidential</b>		All currency in AU\$				
Up pricing low value lamb meat as finished meals:		Potential return from meals/Lamb A\$						4.98
Ref	Meat type	MT 1	MT 2	MT 3	MT 4	MT 5	MT 6	MT 7
		Recovered H-bone meat	Recovered deboned Shoulder carcass meat	Neck meat	Deboned shoulder meat	Chump or Rump meat	Flap meat	General trim as sausage meat
A	Raw meat Price A\$/ Kg	0.40	0.40	2.50	4.50	6.00	3.50	2.00
B	Meat recovery and preparation cost/ Kg	3.60	3.00	2.00	3.00	2.00	3.00	2.50
C	Kg Meal quantity/meal (est.)	0.167	0.167	0.167	0.167	0.167	0.167	0.167
D	No of meals / Kg	6	6	6	6	6	6	6
E	Target meal selling price	10.00	10.00	12.00	15.00	15.00	12.00	10.00
	Expected percentage return for meat content	25%	25%	25%	34%	43%	34%	25%
F	Estimated return per meal for meat content at 25% A\$	2.50	2.50	3.00	5.10	6.45	4.08	2.50
G	Non meat cost and profit/meal A\$	7.50	7.50	9.00	9.90	8.55	7.92	7.50
H	Estimated return for meat content in meals (F*D) A\$/Kg	15.00	15.00	18.00	30.60	38.70	24.48	15.00
I	Increased revenue per Kg (G-B)	11.40	12.00	16.00	27.60	36.70	21.48	12.50
J	Kg meat available per lamb	0.085	0.150	0.300	2.200	1.100	0.800	0.800
K	No. of lambs processed per hour	400	400	400	400	400	400	400
L	Number of Lambs per year	640,000	640,000	640,000	640,000	640,000	640,000	640,000
M	Meat available of each type Kg	54,400	96,000	192,000	1,408,000	704,000	512,000	512,000
N	No of meals per year (M/C)	326,400	576,000	1,152,000	8,448,000	4,224,000	3,072,000	3,072,000
O	Revenue per year from Raw meat (M*A) A\$	130,560	230,400	2,880,000	38,015,999	25,343,999	10,752,000	6,144,000
P	Revenue per year from Ready Meals sold cooked (M*I) A\$	620,160	1,152,000	3,072,000	38,860,799	25,836,799	10,997,760	6,400,000
Q	Gain in Revenue from meals (P-O)	489,600	921,600	192,000	844,800	492,800	245,760	256,000
R	Increase revenue per Lamb (Q/L) A\$	0.76	1.44	0.30	1.32	0.77	0.38	0.40

Figure 5.10 Up Pricing and benefits evaluation

The appearance of the meals inside the vending machine is considered to be of a lower importance compared with the same after the meal has been cooked, retrieved and the top film removed. The use of Sealed Air's Simple Steps™ packaging, established and well accepted by the market, gives the high profile to the meals as developed and tested.

Appendix C presents the following against each meal:

- a) Composition,
- b) Bill of Material,
- c) Cost of each meal and breakdown.

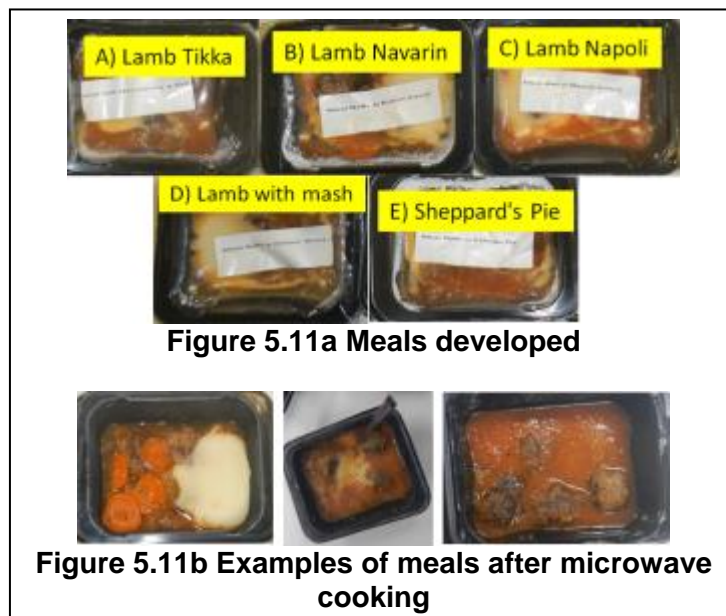


Figure 5.11a Meals developed

Figure 5.11b Examples of meals after microwave cooking

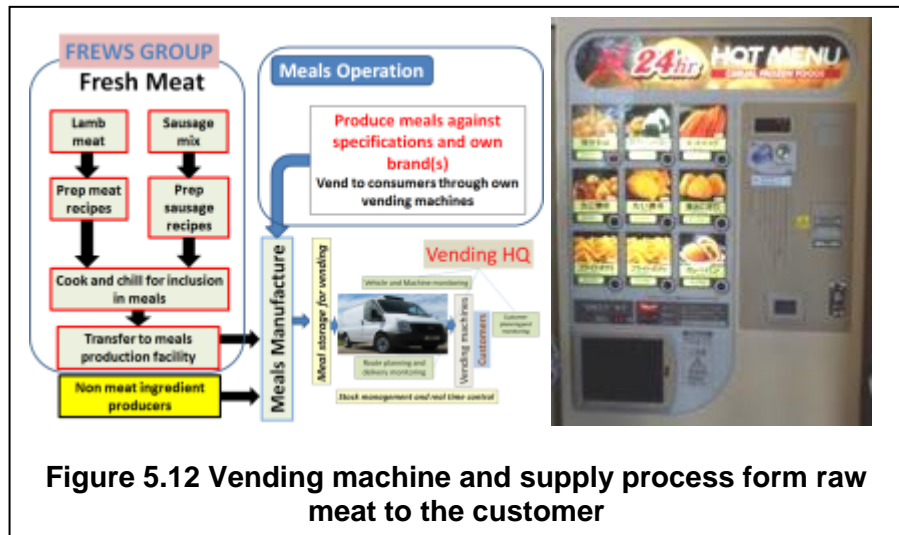
Figure 5.13 gives the prices (delivered to Vending machine) for the branded meals under consideration with target transaction sell price of \$8 per unit. The approach in the development of the meals has been to maintain a constant weight of 180g in all meal types.



The branded meals may be sold as hot food from a vending machine, with meal price not less than A\$ 8.00 per meal. The table in Figure 5 gives the estimated cost of each meal and an average cost of A\$4.77 at the point of sale in a vending machine, with the raw lamb price content at A\$ 2.50/Kg. The total gross profit by adding value: preparing cooked meat, converting into ready meals, and selling under own brand directly to consumers is estimated A\$ 16.91 per Kg of Raw Meat; a value proposition of 676% over the price of raw meat.

**5.8 Vending and supply process**

Figure 5.12 presents a 3000 Watt microwave oven vending unit, currently in use in



**Figure 5.12 Vending machine and supply process form raw meat to the customer**

Europe and is being marketed in Australia as a demonstration unit, awaiting first introduction for selling meals to end consumers. The inclusion of this machine in this project is likely to be the first to reach customer trails in Australia, to be followed by field trials outside Australia, subject to continuation of the work to demonstrate scale up operation capacity and capability.

**5.9 Meals taste profile**

The meals selected have been prepared, cooked and tasted. The results have been based on the opinion of 4 parties: a chef, person managing the meals preparation, Robert Frew and Koorosh Khodabandehloo.

The results, Figure 5.13, provide a ranking for the meals, with 5 being the most preferred ranking with respect to taste and 1 the least preferred, as follows:

P.PIP.0461 FREWS MEALS (confidential)	Ranking
Lamb Tikka Masala with Veg	4
Lamb Navarin	2
Meatballs (Napoli Sauce)	3
Lamb and Mash with Onion Gravy	5
Shepherds Pie	1
<b>Best taste=</b>	<b>5</b>

**Figure 5.13 Meals’ ranking against tastes.**

Rank 5 is considered high and the others follow in with lower score in eating quality. Note that these meals have been verified for shelf life of 30 days plus at the time of testing. Nutrition value will be a consideration in a future milestone, however, the meals selected have already be classed as “healthy eating” based on information available at the time of first tasting.



The main opportunity is the potential for added value and the greatest strength is the brand owner delivering direct to the end consumer in the proposed business model.

**5.10 Market options and review of vending systems in the field**

Based on considerations and information to date, the business option that will provide the most potential is one that provides for vending sales to be under the direct control of the processor as the management of generated revenue will be fully transparent in different markets.

Evaluation of the vending systems for sale of meals reveals that selling cooked ready meals in a hot vending operation is still a new business around the world. Appendix E gives an overview of the vending systems claimed to be in operation.

The evaluation of the vending market points to the following:

- Vending machines are well established for selling food (cold sandwiches) and there is future growth speculated also for the fully automatic 24-hour hot food vending.
- The option of a fully automatic vending machine for selling hot meals is fully developed with a few examples (see Appendix E) already in operation.
- The price of the equipment for vending is in the range of 22,000 to 30,000 A\$ depending on the options. A rental option is also available.
- There are many possibilities for location, which have yet to be exploited. See Appendix F for locations list identified to date.
- The most important driving influence in reaching a successful result will be the acceptance of the consumer of the quality, safety and favourable taste of the meals to be purchased from an automated vending machine.

Simple revenue and profit calculation						
Note that ongoing running costs are included in the calculations						
	A	B	C	D	E	
	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	\$ initial set up cost
	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	annual set up cost per vending machine per unit
	8.00	8.00	8.00	8.00	8.00	\$/meal selling price
	10	1	1	5	10	vending machines
	60	60	44	40	60	meals per day
	300	300	300	300	300	days per year
	1.66	1.66	1.66	1.66	1.66	\$ profit from each meal excluding meat
	0.82	0.82	0.82	0.82	0.82	\$ profit from cooked meat
	2.48	2.48	2.48	2.48	1.66	\$ total gross profit per meal
	44,671.86	44,671.86	32,759.37	29,781.24	29,871.86	\$ Total profit from one vending machine at year 1 end
Cumulative	8.9	8.9	12.1	13.3	13.3	Months ROI against initial set up cost
Year 1 \$	413,718.61	11,671.86	240.63	115,906.20	265,718.61	\$ Cumulative cash (gross profit) at year 1 end
Year 2 \$	830,437.23	53,343.72	29,518.73	249,812.41	534,437.23	\$ Cumulative cash (gross profit) at year 2 end
Year 3 \$	1,247,155.84	95,015.58	59,278.10	383,718.61	803,155.84	\$ Cumulative cash (gross profit) at year 3 end
Year 4 \$	1,663,874.46	136,687.45	89,037.46	517,624.82	1,071,874.46	\$ Cumulative cash (gross profit) at year 4 end
Year 5 \$	2,080,593.07	178,359.31	118,796.83	651,531.02	1,340,593.07	\$ Cumulative cash (gross profit) at year 5 end

Case 1						
Simple revenue and profit calculation						
Note that ongoing running costs are included in the calculations						
	A	B	C	D	E	
	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	\$ initial set up cost
	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	annual set up cost per vending machine per unit
	9.00	9.00	9.00	9.00	9.00	\$/meal selling price
	10	1	1	5	10	vending machines
	60	60	32	40	60	meals per day
	300	300	300	300	300	days per year
	2.64	2.64	2.64	2.64	2.64	\$ profit from each meal excluding meat
	0.82	0.82	0.82	0.82	0.82	\$ profit from cooked meat
	3.46	3.46	3.46	3.46	2.64	\$ total gross profit per meal
	62,311.86	62,311.86	33,232.99	41,541.24	47,511.86	\$ Total profit from one vending machine at year 1 end
Cumulative	6.4	6.4	11.9	8.5	8.5	Months ROI against initial set up cost
Year 1 \$	590,118.61	29,311.86	232.99	174,706.20	442,118.61	\$ Cumulative cash (gross profit) at year 1 end
Year 2 \$	1,183,237.23	88,623.72	30,465.99	367,412.41	887,237.23	\$ Cumulative cash (gross profit) at year 2 end
Year 3 \$	1,776,355.84	147,935.58	60,698.98	560,118.61	1,332,355.84	\$ Cumulative cash (gross profit) at year 3 end
Year 4 \$	2,369,474.46	207,247.45	90,931.97	752,824.82	1,777,474.46	\$ Cumulative cash (gross profit) at year 4 end
Year 5 \$	2,962,593.07	266,559.31	121,164.96	945,531.02	2,222,593.07	\$ Cumulative cash (gross profit) at year 5 end

Case 2						
Simple revenue and profit calculation						
Note that ongoing running costs are included in the calculations						
	A	B	C	D	E	
	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	\$ initial set up cost
	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	annual set up cost per vending machine per unit
	9.00	9.00	9.00	9.00	9.00	\$/meal selling price
	10	1	1	5	10	vending machines
	60	60	32	40	60	meals per day
	300	300	300	300	300	days per year
	2.64	2.64	2.64	2.64	2.64	\$ profit from each meal excluding meat
	0.82	0.82	0.82	0.82	0.82	\$ profit from cooked meat
	3.46	3.46	3.46	3.46	2.64	\$ total gross profit per meal
	62,311.86	62,311.86	33,232.99	41,541.24	47,511.86	\$ Total profit from one vending machine at year 1 end
Cumulative	6.4	6.4	11.9	8.5	8.5	Months ROI against initial set up cost
Year 1 \$	590,118.61	29,311.86	232.99	174,706.20	442,118.61	\$ Cumulative cash (gross profit) at year 1 end
Year 2 \$	1,183,237.23	88,623.72	30,465.99	367,412.41	887,237.23	\$ Cumulative cash (gross profit) at year 2 end
Year 3 \$	1,776,355.84	147,935.58	60,698.98	560,118.61	1,332,355.84	\$ Cumulative cash (gross profit) at year 3 end
Year 4 \$	2,369,474.46	207,247.45	90,931.97	752,824.82	1,777,474.46	\$ Cumulative cash (gross profit) at year 4 end
Year 5 \$	2,962,593.07	266,559.31	121,164.96	945,531.02	2,222,593.07	\$ Cumulative cash (gross profit) at year 5 end

**Figure 5.15 TOP: Cumulative gross profit (Column A – 10 vending machines selling 50 meals per day each, Column B – 1 vending machine selling 60 meals/day each, Column C – 1 vending machine selling the number of meals/day for break even on initial set up cost of just over 12 months, Column D – 5 vending machines selling 40 meals/day each, and Column E, which shows the revenue as in Column A, but only with respect to profits from the vending part of the business. Case 2 at A\$8.00 per meal.**

**BOTTOM: as TOP but with the meals sold at A\$ 9.00 per meal Case 2.**

**5.11 Vending business model and profit potential**

An excel spreadsheet is formulated for assessment of the business opportunity. A key factor is the calculation of ROI based on all the known investments and costs when operating a single vending machine and multiples thereof.

ROI is considered against initial and per vending machine set up costs, estimated to be A\$ 30k and A\$ 3k respectively.

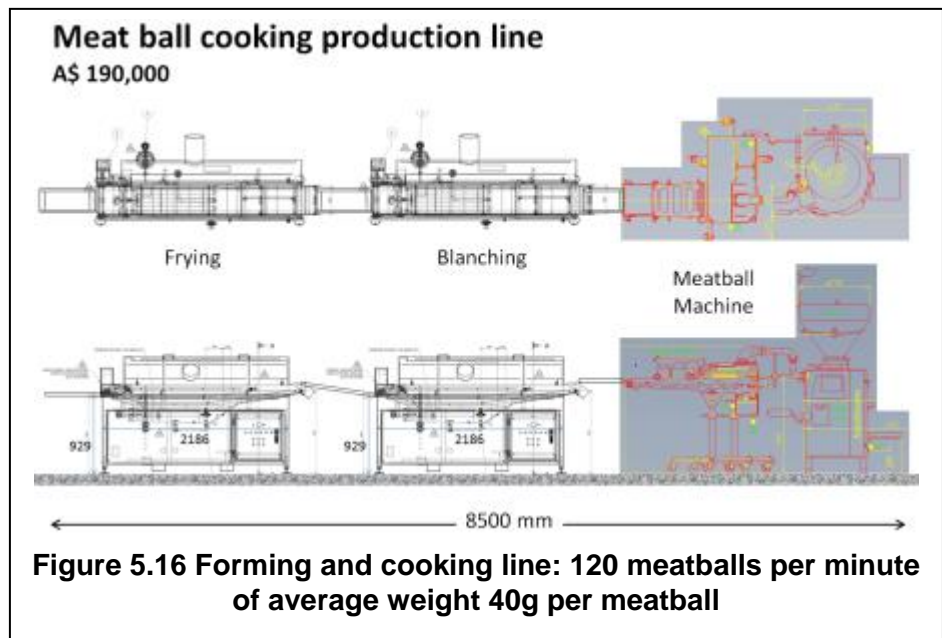
Different meals sales scenarios, meal prices and numbers of vending units in the field may be evaluated using the spreadsheet. Figure 5.15 presents example of a selection of business scenarios showing the magnitude of the business opportunity.

The columns in Figure 5.15 show the different scenarios and the cumulative gross profit from year 1 to 5. Calculations shown for Case 1: A\$8.00 (TOP) and Case 2: A\$9.00 (BOTTOM) as the price per meal. The number of meals to achieve breakeven in 12 months ROI can be seen to be 44 and 33 meals per day respectively for the cases 1 and 2 with one vending machine selling over 300 days in the year.

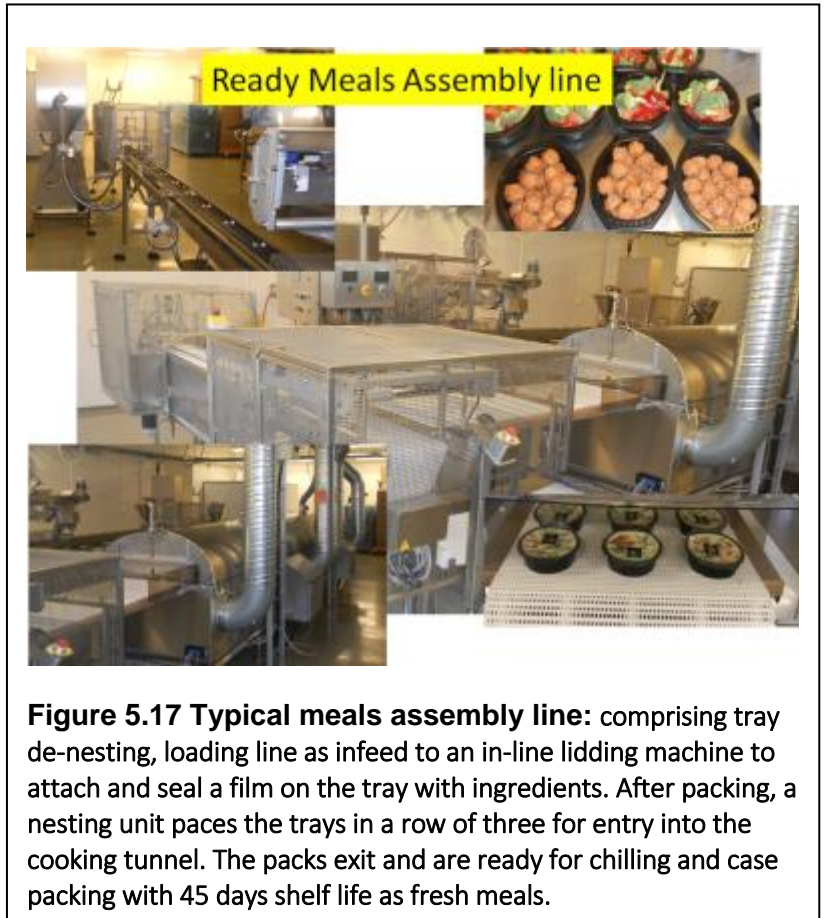
It is calculated that a typical meatball forming machine can produce 150 meatballs per minute. The processing line cooking and producing meals based on a 180g meat content per meal selling at 60 meals per day requires 160 vending machines, which in the steady state is likely to generate close to A\$ 10 million per year from combined profit of cooked meat and sale of meals in vending machines, over A\$ 7 million per year being attributed to the vending business, but requiring 1,778 Kg of fresh meat per day.

**5.12 Technology and meatball production equipment**

Technology and equipment has been identified (see Figure 5.16) for a low cost facility with optimum batch production arrangement to achieve a minimum size business scenario optimised for both effective supply and future option for expansion.



The overall process to produce meatballs from fresh lamb meat has been considered. Recovered meat from leg and shoulder provides for a stable source at quantities capable of providing quality cooked meatballs for a steady volume of meals. It is estimated that the line in Figure 5.16, can produce cooked 32g meatballs at a rate of 120 meatballs per hour and with 8 meatballs per meal, one hour of production can supply 15 vending machines for one day; each vending machine selling 60 meals per day. This is the smallest continuous line of industrial type equipment that can be specified in respect of the selected meals. It is important to note that the volume of raw meat that would be processed per hour is approximately 250 Kg per hour, allowing also for losses, whilst including for other ingredients such as meatball mix and water.



**Figure 5.17 Typical meals assembly line:** comprising tray de-nesting, loading line as infeed to an in-line lidding machine to attach and seal a film on the tray with ingredients. After packing, a nesting unit paces the trays in a row of three for entry into the cooking tunnel. The packs exit and are ready for chilling and case packing with 45 days shelf life as fresh meals.

The evaluation of cooking and packing options has been made in consultation with existing meals producers. The cost of introducing a new meals assembly line is estimated at A\$ 650,000 to A\$ 750,000 in addition to the cost of the meatball production line.

A typical line for producing meatball meals is shown in Figure 5.17. The overall space required for this line excluding end of line case packing is 12 by 10 square meters.

It is possible to consider a lower throughput line using commercial catering equipment; however, this requires a number of handling operations between forming and cooking equipment. This option has been discarded because of the labour costs involved.

### 5.13 Future markets and research

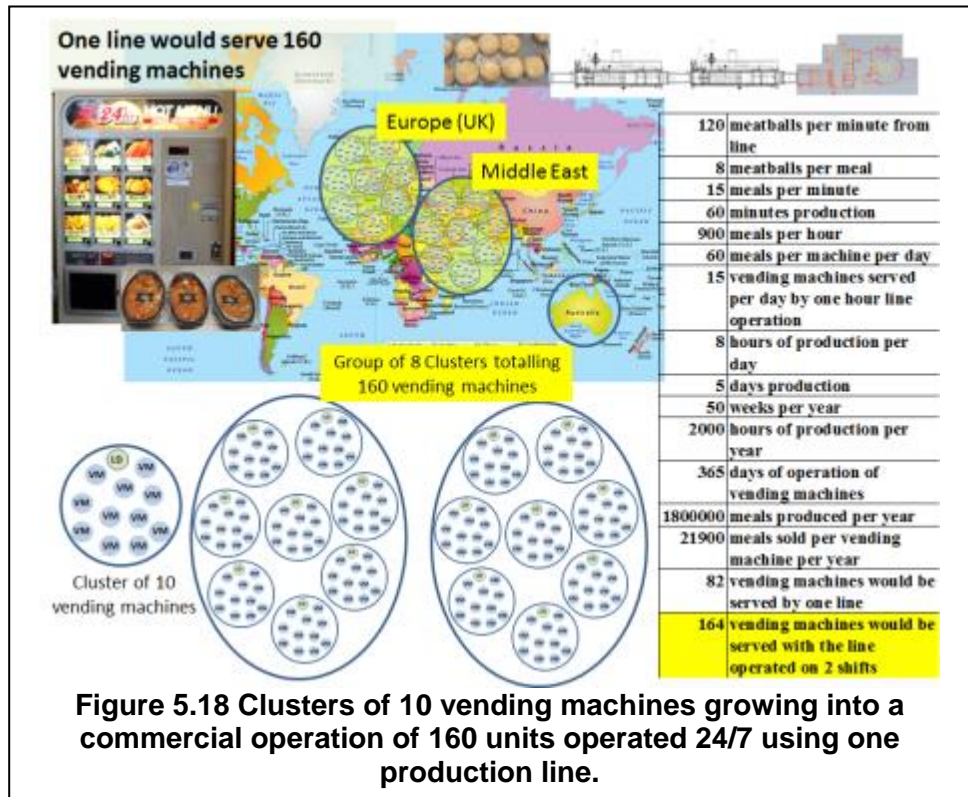
It is envisaged that under a new programme of work, marketing mix elements in respect of future market research needs include;

- buyer/shipper range networks covering:
  - o Shipment of frozen meals direct to meals processors
  - o Shipment of meals as fresh to depots located in specific regions of the world where clusters of vending machines may be installed.
- Operating constraints to ship to location and support a flow of volume and vending of fresh meals at a rate that keeps the supply network occupied at high service levels without waste.
- Franchising or networking structures that can assist with business

- Branding and labelling that creates a niche market presence and high market share.

It is proposed that a follow up PIP project considers the above and expand the feasibility to a scale-up demonstration where Experimental Clusters of 5 or 10 vending units are set up for trial in two specific regions, such as the Middle East and Europe (UK).

Figure 5.18 gives an overview of the approach to the scale-up feasibility. Note also in Figure 5.19, the magnitude of the revenue to be validated by a scale-up trial.



The potential margin from operating 160 vending machines is estimated at over \$36m over 5 years.

Simple revenue and profit calculation						
<i>Note that ongoing running costs are included in the calculations</i>						
	A	B	C	D	E	
	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00	\$ initial set up cost
	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	annual set up cost per vending machine per unit
	9.00	9.00	9.00	9.00	9.00	\$/meal selling price
	10	1	1	5	160	vending machines
	60	60	32	40	60	meals per day
	300	300	300	300	300	days per year
	2.64	2.64	2.64	2.64	2.64	\$/ profit from each meal excluding meat
	0.82	0.82	0.82	0.82		\$/ profit from cooked meat
	3.46	3.46	3.46	3.46	2.64	\$/ total gross profit per meal
	62,311.86	62,311.86	33,232.99	41,541.24	47,511.86	\$/ Total profit from one vending machine at year 1 end
Cumulative	6.4	6.4	11.9	9.5	8.3	Months ROI against initial set up cost
Year 1 \$	590,118.61	29,311.86	232.99	174,706.20	7,568,897.84	\$/ Cumulative cash (gross profit) at year 1 end
Year 2 \$	1,183,237.23	88,623.72	30,465.99	367,412.41	14,690,795.67	\$/ Cumulative cash (gross profit) at year 2 end
Year 3 \$	1,776,355.84	147,935.58	60,698.98	560,118.61	21,812,693.51	\$/ Cumulative cash (gross profit) at year 3 end
Year 4 \$	2,369,474.46	207,247.45	90,931.97	752,824.82	28,934,591.34	\$/ Cumulative cash (gross profit) at year 4 end
Year 5 \$	2,962,593.07	266,559.31	121,164.96	945,531.02	36,056,489.18	\$/ Cumulative cash (gross profit) at year 5 end

**Figure 5.19 A 10 vending machine experimental feasibility as a scale-up process to a commercial operation with 160 vending machines**



## **6 Concluding remarks**

The basis for implementation has been established for a line that potentially produces meat based meals and the process by which meals may be produced and sold in vending machines with high potential of return on investment. It is estimated that an investment in production capability in existing space and vending operation would be less than \$1,5m resulting in the establishment of a new commercial export activity generating over A\$36m over 5 years, when operating 160 vending machines.

This potential can be realised once a number of unknown business and operational parameters have been understood through further investigation, which is to be considered by a possible PIP project.

The key areas that need to be researched involve field trials with one vending machine, leading to trials with one or two Clusters of 5-10 vending machines to establish the knowledge in support of a commercial scale-up business, justifying investment. The key areas for the research include:

- Consumer behaviour
- Ergonomics of interacting with vending machines at a practical level (customers and operators)
- Market positioning and consumer acceptance
- Shipping logistics and integrity of supply (sustainability)
- Export barriers and political, legislative and consumer protection considerations
- Supply chain process of optimum cost supply delivering value and quality
- Security and after sales services
- Shelf life and dealing with products that go out of date
- Waste handling and environmental issues
- Replenishment process and cost constraints in a 24-7 operation
- Cashless vending, credit card transaction processing, telemetry and financial structure
- Exchange rate influences and international money transfer
- Cultural diversity and barriers to business growth
- Meals development process and consumer feedback mechanisms

The CBA performed independently by Greenleaf (Appendix A) shows that for the full supply chain case, the Ready Cooked Meals project has a strong NPV. Even though the costs used in the model from the processing stage were cross-verified against multiple sources, the profit margins in the CBA were assumed. Where Greenleaf compared costs against a few known competitors, the assumed margins in the CBA appear high.

If business risk is brought into the equation, a different picture is shown. It shows that even though the *potential NPV* is high, the business risk is also high. The sensitivity analysis also shows that where the business risk is relatively low, the potential NPV is low. However, if the areas of uncertainty are researched, the assumed margins may change significantly.

A key recommendation by Greenleaf is that research and practical trials is needed to firm up confidence levels.

## 7 Relevant appendices

APPENDIX A Greenleaf report summary

# Greenleaf CBA

Project Code: P.PIP.0461 (Milestone 5 Report)  
Prepared by: Ken Bryan, Phil Green, Tania Swanepoel  
Greenleaf Enterprises Pty Ltd

Date published: September 2015  
PUBLISHED BY  
Frew Group

## Report Lamb Meat in Cooked Meals for Direct Sale – Non Confidential Summary

## Executive Summary

The project involves the use of recovered lamb meat from the H-bone after leg boning, as well as deboned forequarter and leg meat to prepare cooked meals that will be sold directly to the end consumer. These meals are to be sold directly to the end consumer through a hot food channel being explored as a direct route to the market.

The purpose of this report is to assess the foundation and value of this opportunity. To this purpose, a CBA and a business case risk assessment was done.

The project review indicates there is solid potential for this project concept. However, it also identifies a number of risks to the project being successful. We recommend that these risks be quantified with strategies to reduce risk/uncertainty prior to any major investment in capital infrastructure, commercial product development, or investment in the down-stream value-chain.

The CBA was done for a trial case (2017 - 10 vending machines) and for a full-scale case (2023 – 160 vending machines). For the trial case the NPV is in excess of \$2,000,000 with a payback period of just over 2 years. However, the business risk of the entire chain is high. Looking at the four individual supply chain links, it is clear that where the business risk is low in one of the sectors the associated NPV is also low.

Similarly, the NPV for the full-scale case (2023) is high. The NPV is in excess of \$52,000,000 with a payback period of less than 2 months. The potential of this project should it be adopted by the entire lamb meat industry is also very high, estimated at \$33,699,120. However, the business risk is similarly higher than for the 2017 case.

The business case risk assessment allows for investment opportunities to be assessed based on risk and NPV. It also shows where areas of research, trials or outsiders are needed to improve confidence levels. For a very low risk appetite, the meat recovery and cooking parts of the supply chain are more suitable as the associated relative confidence levels are high, 90% and 72% respectively with NPV values of \$12,767 and \$2,106,215. For a high risk appetite, the meals production and export part of the supply chain is more suitable with a relative confidence level of 45% and NPV of \$30,150,227.

## Background

The project has involved the use of recovered meat from the H-bone after leg boning, as well as deboned forequarter and leg meat. There is a possibility to recover 80g-85g of lean meat 80-82% CL from the H-bone; forequarter and leg meat recovered has the same CL. These meals are to be sold directly to the end consumer through a hot food channel being explored as a direct route to the market.

The purpose of this report is to assess the foundation and value of this opportunity. The document outlines the objectives, methodology and the results from the CBA and Sensitivity Analysis. The report closes with key findings and recommendations.

## Objectives

The objectives of this project were to:

1. Complete a cost benefit analysis (CBA) to quantify the business proposition including detailed analysis at each stage in the process from boning through processing, cooking, packaging and distribution.
2. Confirm the costs and value of products to be produced and the likely improvement in value.
3. Evaluate the robustness of the business case, provide additional insights where possible around areas of opportunity, and highlight sensitivities within the business case that require closer attention or risk management.

## Methodology

### Data Sources

An end to end supply chain model was built that included costs and values from the following sources:

1. Calculations and data supplied from practical trials including cooking and processing figures:
  - a. Labour, ingredient, packaging cost inputs,
  - b. Process performance including cooking and yield losses,
  - c. Other figures supplied from trials;
2. Greenleaf provided alternative operational figures to compare with trial data as a sensitivity or robustness check on the numbers;
3. Operational costings and processing assumptions had been supplied to Greenleaf in the past and were used to build up the model.

### Cost Benefit Model (CBM)

The Cost Benefit Model (CBM) used the operational costings and assumptions from the various sources of data as per paragraph 0 to calculate the value, volume and financial performance along the supply chain.

The aspects that were considered for inclusion in the calculation of the financial benefits are:

- **Meat recovery (cost and yield).**
- **Product formulations** - in order to identify the costs and potential sales values of the proposed products.



- **Competitive analysis** - along the supply chain in the form of comparative costs.
- **Costs** - associated with the development, production and marketing of products. Production costs included operating costs such as staff, processing and equipment costs.
- **Meat product cuts and quality** - an investigation of the meat product cuts and quality allowed for an assessment of possible trade-offs between the product cost and the target market. It was also the basis of cost comparisons for raw materials, ingredients and other input costs, as well as packaging costs.

The CBM was also used to validate the assumptions supplied by the development team and to cross-check results and findings against external data sources for robustness.

### **Sensitivity Analysis**

**A sensitivity analysis** was conducted to identify what assumptions and performance parameters are the greatest risk to the business case. These risks were considered at each stage of the supply chain and were incorporated in the CBA in the form of confidence levels.

**Process Improvements** - Additional costing alternatives were provided where Greenleaf was able to use other non-confidential costing work to test possible future processing improvements.

### **Key Findings and Recommendations**

The CBA shows that for the full supply chain case, the Ready Cooked Meals project has a strong NPV for both the trial and full roll-out scenarios, titled 2017 and 2023. Even though the costs used in the model from the processing stage were cross-verified against multiple sources, the profit margins in the CBA were assumed. Where Greenleaf compared costs against a few known competitors, the assumed margins in the CBA appear high.

If business risk is brought into the equation, a different picture is shown. It shows that even though the *potential NPV* is high, the business risk is also high. The sensitivity analysis also shows that where the business risk is relatively low, the potential NPV is low. However, if the areas of uncertainty are researched, the assumed margins may change significantly.

A key recommendation is that research and practical trials is needed to firm up confidence levels. Alternatively, the calculated confidence levels can show where the use of outsiders (partners, subcontractors, etc.) may be the most beneficial. Finally, the main difference between the 2017 and 2023 cases is not the year but rather the amount of meals being sold. The difference in NPV for the entire chain is huge but not linear: **\$2,373,457** against **\$52,075,316**. The number of meals is thus a highly sensitive parameter and is another reason to firm up consumer adoption research.

The project review indicates there is solid potential for this project concept. However, it also identifies a number of risks to the project being successful. We recommend that these risks be quantified with strategies to reduce risk/uncertainty prior to any

major investment in capital infrastructure, commercial product development, or investment in the down-stream value-chain.

Further to this, Greenleaf recommends the following:

1. Risk minimising activities should be a key consideration in the evaluation of the opportunity. It would require a clear definition of acceptable risk.
2. This project should be considered against other investment opportunities currently available.
3. An NPD (New Product Development) process should be developed specific to the Processor or interested party and followed to improve success rate and minimise risk.
4. Research and trials in the next stage of the project should be targeted to the supply chain section that is most appealing and should be extensive to the point that it would minimise the specific unknowns and risks of that section.

## **Bibliography**

*City Country Distribution Foodservice : Specials.* (2008). Retrieved from City Country Distribution Foodservice: <http://www.citycountry.net.au/>

Kotler P, K. K. (2013). *Marketing Management: An Asian Perspective.* Singapore: Pearson Education.

Thompson AA, P. M. (2014). *Crafting & Executing Strategy: The Quest for Competitive Advantage.* New York: McGraw-Hill.

## APPENDIX B: List of Meals

Dukkah Lamb Steaks with Roast Beetroot & Macadamia Salad	Roast Leg of Lamb with Lemon Potatoes
Rosemary & Chilli Lamb Chops with Chargrilled Polenta	Roast Lamb with Rosemary Chips
Greek Lamb Gyros	Masala Lamb Kofta Curry
Indian Lamb with Yellow Rice Salad	Lamb Sausage Rolls with Tahini Sauce
Lamb Fattoush Salad	Honey-Roasted Broccoli & Winter Vegetables with Chargrilled Lamb Cutlets
Classic Lamb Roast	Cheats Pastitsio
Pita Pockets with Minted Lamb Patties	Mexican Roast Lamb with Homemade Adobo & Sweet Potato Sauce
Tandoori Lamb Cutlets with Crispy Naan & Man Salsa	Pumpkin, Baked Beans & Lamb
Greek Lamb Chops with Risoni Salad	Tuscan Lamb Casserole
Moroccan Lamb Loin Chops with Man Couscous	Lamb & Chickpea Bites with Minty Yoghurt & Couscous
Souvlaki Pizza	Curried Meatball Pots
Chargrilled Vegetable & Lamb Salad	Garlic & Rosemary Roast Lamb with Winter Vegies
Herb Crusted Lamb Cutlets	Roasted Lamb Shepherd's Pie
Sweet Lamb Loin Chops with Coleslaw & Corn	Moroccan Lamb with Apricots & Almonds
Sweet Lamb Forequarter Chops with Coleslaw & Corn	Lamb Shanks with Cheesy Polenta
Spicy Lamb Flatbreads	Stracci Pasta with Braised Lamb Ragu & Chilli Gremolata
Lamb & Harissa Sausage Rolls	Indian Style Lamb Koftas with Asian Salad
Sumac Lamb Cutlets with Chickpeas & Pumpkin	Five-Spice Lamb with Snow Pea Salad
Slow-Roasted Lamb Shoulder	Lamb Skewers with Minted Tzatziki
Mini Lamb Pies with Smashed Peas	Tapenade Crunchy Lamb Cutlets
Seared Lamb Shoulder Chops with Braised Spring Greens	Greek Lamb Meatballs
Moroccan Spiced Lamb Cutlets with Lentil-Chickpea Salad	One-Pot Moroccan Lamb Couscous
Barbecued Lamb Skewers with Asparagus, Baby Spinach & Fetta	Spanish Lamb Burgers
Basil & at's Cheese Lamb Racks	Warm Lamb, Pesto & Antipasto Salad
Greek Roasted Lamb	Lamb, Silverbeet & Feta zleme
Lamb Steak Sandwich with Roasted Garlic Mayo & Tomatoes	Grilled Lamb & Strawberry Salad
Lamb, Pumpkin & Haloumi zleme	Lamb Souvlaki Cups
Hazelnut Dukkah Lamb Cutlets with Broad Bean & Fetta Salad	Greek Lamb Pizza
Pan-Seared Lamb Chops with Peas & Mint-Basil Pistou	Rosemary & Garlic Lamb Chops
Glazed Pomegranate Lamb Rack with Cucumber & Mint Salad and Eggplant Puree	Roast Lamb with Kalamata Salsa Verde & Shallot-Mint Yoghurt Sauce
Lamb, Harissa and Pine Nut Spiral Borek	Roasted Rack of Lamb with Cannelloni Bean & Savoy Cabbage
Warm Yoghurt & Lamb Kofta Soup	Chargrilled Lamb with Baby Spinach & Rocket Salad
Braised Lamb Shanks with Polenta, Broccoli & Cauliflower	Middle Eastern Inspired Radish & Carrot Salad
Spiced Lamb & Pumpkin Soup	Slow Roasted Lamb with Rosemary
Northern-Style Slow-Cooked Lamb Curry	Parsley-crusted Lamb with Lentil Salad
Marinated Butterflied Lamb	Lamb, Pomegranate & Pistachio Pilaf
Butterflied Lamb	Lamb kebabs with hommus
Lamb Hot Pot	Lamb & Kidney Bean Cassoulet
Lamb Sliders	Honey-Baked Lamb Shoulder
Seared Loin Chops	Lamb Souvlaki
Lamb Cutlets with Fetta & Prosciutto	Lamb Tagine & Plums
Grilled Lamb Steaks	Indian-Style Lamb & Coriander Salad
Grilled Lamb Burgers with Mint Aioli & Caramelised Onions	Lamb Pizza
Lamb, Cauliflower and Coconut Curry	Spiced Lamb with Hommus & Preserved Lemon
Lamb Roast & Olive Couscous	Rosemary Lamb Skewers
Shepherd's Pie	Grilled Lamb Burgers
Lamb Kofta Mini Burgers with Haloumi	Grilled Lamb Loin Chops
Roast Lamb Gnocchi	Lamb Parmigiana Bake
Lamb Cutlets with Spicy Roast Pumpkin & Harissa	Mediterranean Lamb Sandwich
Hommus Dip	
Corn & Lamb Bake with Tomato	Indian-Spiced Lamb Cutlets

P.PIP.0451 Lamb meat in meals

Lamb Cutlets with Glazed Nectarines	Rosemary Dijon Leg of Lamb
Chilli Crusted Lamb Cutlets	Herb-stuffed Lamb Leg with Orange Mint Gremolata
Lamb Cutlets with Char-grilled Vegetable Cous Cous	Oregano & Lemon Roast Lamb
Lamb and Corn Quesadilla	Celebration Lamb
Middle Eastern Lamb Mince	Mozzarella & Pine Nut Stuffed Rack of Lamb
Lamb kofta	Classic Lamb Burgers
Slow-cooked Lamb Leg	Glazed Lamb Rumps
Lamb & Date Tagine With Couscous	Spicy Lamb Puffs
Greek Lamb & Veggie Tray Bake	Greek-Style Meatballs
Lamb Kofta with Yoghurt Sauce	Honey and Balsamic Glazed Lamb Shanks
Dijon & Herb-crusted Lamb with Bacon	Roast Turkey with Sage Stuffing and Lamb Chipolatas
Potato-topped Lamb Casserole	Herb-crusted Lamb Cutlets with Tomato Chutney
Slow-cooked Lamb Shoulder	Lamb Rack with Ratatouille
Moroccan Lamb Pot Pies	Mediterranean Mini Lamb Roast
Lamb, Spinach and Potato Curry	Lamb and Lentil Cottage Pie
Lamb Leg with Pomegranate and Pistachios	Lamb, Spinach and Lentil Soup
Turkish Lamb Pastries	Mini Meatloaves
Lamb Shank Braised Lentils with Sweet Potato and Spinach	Easy Lamb Roast
Dry Lamb Mince Curry	Sausage and Corn Pilaf
Lemon and Oregano Stuffed Lamb	Pepper Lamb Salad with Basil Yoghurt and Walnut Dressing
Beef and Lamb Dumplings	Warm Lamb Salad with Cheese Croutons
Mezze Platter with Lamb Souvlaki	Lamb Korma
Barbecued Spiced Lamb Leg	Baked Mediterranean Lamb Chops
Lemon Oregano Lamb with Grilled Bread Salad	Moussaka
Corn & Lamb Mini Panini	Barbecued Lamb with Lentil Salad
Easy Lamb and Bean Casserole	Lamb Burger with Tomato Sauce
Meatballs with a Greek Yoghurt Dipping Sauce	Pastitsio
Tandoori Lamb Cutlets	Indian-style Curried Lamb Shanks
Rosemary Lamb Skewers	Lamb & Broccoli Stir Fry
Lamb Shanks	Parmesan Lamb Cutlets with Herb Salsa
Curried Spice Lamb Chops	Lamb with Garlic and Lemon & Chickpea Salad
Grilled Lamb and Spring Onion Skewers	Lamb & Guacamole Burgers
Char-grilled Lamb Chops with Greek Salad	BBQ Butterflied Leg of Lamb
Speedy lamb dinner	Lamb Chops with Greek-style Salad
Spring Feta & Lamb Salad	Lamb & Honey Meatballs
Lamb and Roasted Vegetable Pie	Lamb medallions with potato & avocado salad
Dijon and Herb Crusted Lamb Rack	Lamb Cutlets with Bean Salad
Red Wine Braised Lamb Shoulder	Herb-crusted roast lamb
Chickpea Casserole with Lamb & Potato	Lamb & Chickpea Tagine
Easy-carve Roast Lamb	
Lamb Burger on Sourdough Bread	
Lamb Fillet Puree	
Easy Shepherd's Pie	
Grilled Lamb with Kiwifruit & Lime Dressing	
Slow-baked Lamb Shanks with Mushrooms	
Free-form Moroccan Lamb Pie	
Quick Cottage Pies	
Lamb and Lemon Skewers with Cucumber Dipping Sauce	
Lamb Curry with Cabbage Slaw	
Butterflied Leg of Lamb with Pineapple Salsa	
Minted Yoghurt Cutlets	
Family Meatloaf	
Shiitake-Crusted Lamb Backstrap	
Maple Rosemary Rack of Lamb	
Kofta with Tabouli	
Lamb Broccolini and Chilli Stir Fry	
Char-grilled Lamb and Eggplant Salad	
Char Siu Lamb Cutlets with Fried Rice	
Honey Mustard Mini Roast with Peperonata	
Moroccan Backstraps with Pilaf	
Lemon and Thyme Lamb Chops	

APPENDIX C – BOM for selected meals (Feb 2015)

## a) Lamb Tikka masala

<b>Lamb Tikka Masala with Veg</b>	<b>340g</b>		<b>Breakdown</b>	
<b>Estimated meal cost inc packaging</b>	<b>4.63</b>	<b>AUD</b>	<b>AUD</b>	<b>Item</b>
Description	Quantites	Unit	1.80	Meat cost
<b>Meat</b>	<b>0.18</b>	KG	0.38	Packaging cost
<b>Sauce</b>	<b>0.10</b>	KG	0.80	Sauce
<b>Vegetable Medley</b>	<b>0.06</b>	KG	-	Starch
			0.61	Veg
<b>Sauce</b>		<b>1kg</b>	<b>1.04</b>	<b>Assembly</b>
Description	Quantites	Unit		
Tandoori Paste	0.0100	KG		
Water	0.1000	KG		
Cashew Nuts	0.0250	KG		
Chilli Kashmiri	0.0003	KG		
Honey	0.0150	KG		
Cardarmon (Ground)	0.0006	KG		
Tomato Paste Leggos	0.0170	KG		
Pepper Black Milled Coarse	0.0001	KG		
Salt (Cooking)	0.0030	KG		
Sugar Brown	0.0150	KG		
Tomato Crushed	0.6545	KG		
Cooking Cream	0.1500	KG		
Cumin (ground)	0.0050	KG		
Garam Masala Ground	0.0060	KG		
Garlic Crushed	0.0100	KG		
Ginger Crushed (Minced)	0.0100	KG		
Ghee	0.0096	KG		
Shallots Dried	0.0340	KG		
Oil Rice Bran	0.0250	KG		

## b) Lamb Navarin (British sauce)

<b>Lamb Navarin</b>	<b>300</b>		<b>Breakdown</b>	
<b>Estimated meal cost inc packaging</b>	3.76	AUD	<b>AUD</b>	<b>Item</b>
Description	Quantites	Unit	1.80	Meat cost
Meat	0.180	KG	0.38	Packaging cost
Potato Mashed Instant SA	0.060	KG	0.23	Starch
Basic British Sauce	0.035	KG	0.10	Sauce
Aussie Bean Mix	0.025	kg	0.21	Veg
			1.04	Assembly
<b>Basic Brittish Sauce</b>		<b>1kg</b>		
Description	Quantites	Unit		
Vegetable Mix Frozen	0.0200	KG		
Carrots Sliced 5mm x 40mm diam	0.0970	KG		
ModifiedFoodStarch GelproHC715	0.0260	KG		
Water	0.0750	KG		
Thyme Dried Leaf	0.0001	KG		
Parsley Dried Leaf	0.0007	KG		
Pepper Black Milled Coarse	0.0011	KG		
Vegetable Stock Powder	0.0053	KG		
Worcestershire Sauce	0.0010	KG		
Soy Sauce Premium	0.0110	KG		
Wine Red	0.0300	KG		
Water	0.4690	KG		
Flour Plain	0.0100	KG		
Water	0.0270	KG		
Tomato Crushed	0.0300	KG		
Tomato Paste Leggos	0.0100	KG		
Leek Sliced 5mm	0.0520	KG		
Onion Brown Sliced 5mm	0.0970	KG		
Celery Sliced 5mm	0.0520	KG		
Ghee	0.0070	KG		

c) Lamb meat balls with sauce.

<b>Meatballs (Napoli Sauce)</b>		<b>340g</b>	<b>Breakdown</b>		
<b>Estimated meal cost inc packaging</b>		<b>3.63</b>	AUD	<b>AUD</b>	<b>Item</b>
Description	Quantites	Unit			
Meat	0.180	KG	1.80		Meat cost
Sauce	0.125	KG	0.38		Packaging cost
			0.41		Sauce
			-		Starch
			-		Veg
<b>Italian Tomato Sauce (Napoli)</b>		<b>1kg</b>	1.04		Assembly
Description	Quantites	Unit			
Sugar Castor	0.0100	KG			
ModifiedFoodStarch GelproHC715	0.0100	KG			
Water	0.1950	KG			
Pepper White Ground	0.0008	KG			
Salt (Cooking)	0.0080	KG			
Basil Dried Leaf	0.0005	KG			
Butter Salted (Western Star)	0.0050	KG			
Carrots Diced (10mmx10mm)	0.1200	KG			
Tomato Crushed	0.6050	KG			
Garlic Crushed	0.0100	KG			
Onion Brown Diced (10mmx10mm)	0.1700	KG			
Oil Rice Bran	0.0200	KG			

## d) Lamb and mash (with onion and gravy)

<b>Lamb and Mash with Onion Gravy</b>	<b>300g</b>		<b>Breakdown</b>	
<b>Estimated meal cost inc packaging</b>	<b>3.65</b>		<b>AUD</b>	<b>Item</b>
Description	Quantites	Unit	1.80	Meat cost
Meat	0.18	KG	0.38	Packaging cost
Onion Sauce	0.06	KG	0.29	Sauce
Potato Mashed Instant SA	0.06	KG	0.14	Starch
			-	Veg
			1.04	Assembly
<b>Onion Gravy</b>		<b>1kg</b>		
Description	Quantites	Unit		
Mustard Dijon Smooth	0.0020	KG		
Water	0.1100	KG		
Flour Plain	0.0080	KG		
ModifiedFoodStarch GelproHC715	0.0120	KG		
Water	0.6000	KG		
Gravy Mix	0.0550	KG		
Pepper Black Milled Coarse	0.0004	KG		
Stock Powder Beef (Massel)	0.0060	KG		
Vinegar Balsamic	0.0030	LT		
Wine Red	0.0300	LT		
Tomato Paste Leggos	0.0200	KG		
Onion Brown Sliced 5mm	0.2000	KG		
Oil Rice Bran	0.0100	LT		



## d) Shepherds pie (or cottage pie)

<b>Shepherds Pie</b>	<b>330g</b>		<b>Breakdown</b>	
<b>Estimated meal cost inc packaging</b>	<b>3.56</b>	<b>AUD</b>	<b>AUD</b>	<b>Item</b>
Description	Quantites	Unit		
Meat	0.18	KG	1.80	Meat cost
Potato Mashed Instant SA	0.07	KG	0.38	Packaging cost
Sauce	0.08	KG	0.34	Sauce
			-	Starch
			-	Veg
<b>Lamb Cottage Pie Mix</b>		<b>1kg</b>	<b>1.04</b>	<b>Assembly</b>
Description	Quantites	Unit		
Mixed Herbs	0.001	KG		
Garlic Crushed	0.008	KG		
Tomato Paste Leggos	0.005	KG		
Vegetable Stock Powder	0.005	KG		
Worcestershire Sauce	0.002	LT		
Water	0.225	KG		
ModifiedFoodStarch GelproHC715	0.018	KG		
Stock Powder Beef (Massel)	0.008	KG		
Wine Red	0.020	LT		
Tomato Crushed	0.230	KG		
Celery Diced (5mmx5mm)	0.070	KG		
Zucchini Diced (10mmx10mm)	0.020	KG		
Carrots Diced (5mmx5mm)	0.090	KG		
Ginger Crushed (Minced)	0.004	KG		
Onion Brown Diced (5mmx5mm)	0.100	KG		
Oil Rice Bran	0.010	LT		

APPENDIX D – Food Manufacture Article

<http://www.foodmanufacture.co.uk/Business-News/Food-vending-set-to-take-off-in-the-UK>

## Vending machines to stock healthier items

By Rick Pendrous , 05-Dec-2014  
Last updated on 05-Dec-2014 at 16:12 GMT



Related tags: Vending machines, Healthy foods, Hot foods, Dr Morgaine Gaye, Futurologist, Snacking, Leatherhead Food Research

Vending machines are about to undergo a revolution in the UK with new hot and cold food offerings set to create a completely new sales channel for manufacturers.

That's the view of 'futurologist' Dr Morgaine Gaye, who works with a number of leading food and drink brands. Over a three-year time horizon, Gaye claims a 99% success rate for her predictions.

However, in response to widespread criticism about the sale of 'unhealthy' food and drink in outlets ranging from hospitals to sports centres, the vending industry is supporting the development of new healthier vending options.

"Vending is really going to come into the UK in a big way," said Gaye, speaking at Leatherhead Food Research's Taste Trends conference this week (December 3). "It still hasn't even hit yet. It's massive in the States; it's coming through from California in a big way."

Growth in the use of vending machines will be driven by the trend for us to snack more and eat more often, added Gaye. "We are changing our meal times and we are changing the way we eat."

**'Eating on the go and snacking'**

"We are eating on-the-go and we are snacking more," said Gaye. "And there are some brilliant ideas around the world and some interesting things happening in vending."

She cited Japan as a leader in the field of vending, even selling products that grow up to the point of purchase. Holland and Belgium were also heavily into the vending of hot snacks, she added. "We are going to see a lot more of that coming through. At the moment, we can only really get a soggy sandwich or a bag of crisps but we are going to start seeing hot snack vending being much more available."

In France, one baker tired of people knocking on his door in the early hours wanting fresh baguettes, even came up with the idea of a par-baked baguette vending machine which finished them off once people had paid for them, before dispensing them hot.

"We are really going to see vending coming into its own in the UK," she said. Everything from freshly prepared and vended juices to warm gluten-free cup cakes would become available, she added.

### Healthy snack vending

In response to the lack of healthy snacking choices available in vending machines today, the Automatic Vending Association (AVA) has come together with obesity surgeon Dr Sally Norton, leading food and drink companies and University College Birmingham to create healthier snack products and help promote healthier vending.

Next Tuesday (December 9), the 'Culinary Product Development Challenge' is taking place at University College Birmingham. The competition is among third-year students who have developed tasty products containing no more than 250 calories that are suitable for vending. Winners will be selected by judges from Unilever, Mondelēz, 24Vend and Coinadrink.

The winning products will then go on sale at Dr Norton's Trust – Bristol NHS – as part of a healthy vending trial. The long term vision is for this to be extended across the UK as part of a new generation of healthy vending products.

APPENDIX E: Vending operations for hot food around the World

<http://www.revivevending.co.uk/hot-food-vending-machines.php>

**REVIVE**

## Hot Food Vending Machines

Not simply drinks, snack vending machines, & food vending machines.

Home About Us **Vending Machines** Schools Healthy Vending Blog Contact Us Online Shop

browse our machines and  
give us a call: **01725 513082**

Coffee Machines Snack Vending Machines Drink Vending Machines Food Vending Machines Water Coolers **Hot Food Vending**

### hot food vending machines

Everyone appreciates hot food at work, there is nothing like a good hearty meal to help you get through the working day. But what if no canteen or kitchen facilities exist to provide such meals? We have a solution which will provide Hot Food 24/7 unmanned with no mess or wastage.

How it works...

A glass fronted vending machine similar to a snack machine holds the meals. The restaurant quality meals are prepared using fresh ingredients and contain no 'E' numbers. These meals are 'air blast frozen' to retain taste and nutrition. The meals are kept frozen in the Food Vending Machine. Users can choose from the many meals including healthy options and vegetarian meals.

The meals are placed in industrial microwaves until they are piping hot and ready to serve. The menu offers great choice and can be changed in accordance to taste, requirements and seasons. Please contact us for more information.

**watercoolers**

Click the link below to find out about Revive's Borg & Overstrom water cooler.

**callus: 01725 513082**

**foodvendingmachines**

Find out about the chilled Food Vending and Hot Food Vending Machines Revive offer. Simply click the link below for more.

**vendingmachines**

- Cafe Italia Plus Coffee Vending Machine
- Cafe Italia Coffee Vending Machine
- Cino Coffee Vending Machine
- E24 Snack Vending Machine
- E40 Snack Vending Machine
- Flavia Coffee Vending Machine
- Pour Moi Coffee Vending Machine
- Cafe Italia TT Coffee Vending Machine
- Refresh10 Drink Vending Machine
- Refresh45 Drink Vending Machine
- RefreshX Drink Vending Machine
- Energize Food Vending Machine
- Borg Water Cooler

**bonn appetite menu**

Click the image below to view the full menu.

**tuna pasta bake** (340g) **fresh** **bonn appetit**

**cheddar cheese pasta** (280g) **smooth** **bonn appetit**



http://www.feastpoint.com/

We use cookies on this website, you can read about them here. To use the website as intended please... [ACCEPT COOKIES](#)

**feast** POINT  
**Fresh Food Vending**  
*Ready in Minutes*

[Home](#) [About Us](#) [What We Offer](#) [Services](#) [The Feast Point](#)  
[Downloads](#) [Contact](#)

**FRESH FOOD VENDING**  
*ready in minutes*

**EAST**  
 — EASY TO USE  
 — APPROVED  
 — SERVICED  
 — TASTY

[Enquire about Feast Point](#)

---

**HEALTHIER FRESH FOOD VENDING SERVED IN MINUTES**

**Quality Vending Machines**

[Enquire about Feast Point](#)

**National Coverage Fully Managed Service Unique Offer**

Feast Point's range of high quality vending machines dispense hand-prepared hot meals, soups, breakfast products, snacks, chilled food and healthy drinks directly to the consumer. Our menu has been carefully selected for its quality and flavour and is changed every two weeks in order to ensure menu variety. All of the products in our food vending machines are dispensed in special Feast Point branded packaging, allowing the food to be hand-held even when hot.

With distribution depots across mainland UK we can service your food and drink vending requirements wherever you are located.

Our team do everything for you including replenishing, restocking, cleaning and maintaining the food dispensers.

Feast Point vending machines are custom-made and dispense high quality fresh food, healthy drinks and chilled products. This together with our fully managed automated catering service makes us a unique vending solution for your office, factory or warehouse.

**The System**

- Feast Point is a unique vending machine that dispenses hot and chilled food and drink directly to the consumer.
- Each of our hot food dispensers is designed with a digital LCD display that shows the menu, nutritional information, allergy advice, ingredients and FSA daily guidelines.
- Every Feast Point food product includes nutritional information, allergy advice, ingredients and FSA daily guideline amounts.
- Our food vending machines feature pre-programmed cooking times.
- The maximum cooking time is two minutes, with the option to take the product away chilled.



<http://hot-food-vending.info/index>

## Cut your catering costs and extend your service to 24/7 with Hot Food Vending!



**Just fill in your details to receive your free guide**

Does your business have an efficient **hot food catering service**?

Do you need to **cut catering costs but increase** the range of **healthy and tasty food** you offer **in the workplace**?

**Bon Appetit** is the UK's leading automated hot food catering service with all the convenience of the vending industry.

To discover how to cost of your catering while increasing the range of food you offer, *and* extend your service to 24 hours a day, 7 days week, download your FREE guide '**11 top tips on how hot food vending can benefit your workplace**' now.

<http://www.purefoodssystems.co.uk/>

# PURE FOODS SYSTEMS

We cover all your vending needs









### 1455 Hot selling frozen food vending machine

US \$3000-16000 / Set ( FOB Price)

1 Set (Min. Order)

Place of Origin: CN;HEN

Model Number: HF-P120

Power supply: AC110/240 volts-30 A...

Brand Name: whirlston

Type: frozen food vending machine

Dimension(H\*W\*D): 1950\*1500\*700

☆Favorites + Compare



### hot new products for 2015 Hot Sale fast food vending machine

US \$4000-5000 / Set ( FOB Price)

1 Set (Min. Order)

Weight: 100KG.(Single tank)

Place of Origin: CN;ZHE

Model Number: X07416

Voltage: AC 100-240V, 50/60Hz

Brand Name: NOVO

Type: fast food vending machine

Tags: Fast Food Vending Machine | Combo Vending Machine | Mechanical Vending Machines

☆Favorites + Compare



### Hot selling food/ pizza /sandwiches vending machine

US \$1-10 / Set ( FOB Price)

1 Set (Min. Order)

Weight: 390KG

Dimension: H: 1950mm, W: 1500mm,...

Brand Name: U-First

Capacity: Holds 120 pizzas(box food)

Place of Origin: CN;HEN

Model Number: UF-PZ01

Tags: Sandwiches Vending Machine

☆Favorites + Compare



### OEM Best-seller hot food vending machine for sale with CE Certificate

1 Piece (Min. Order)

Power: AC220V/50Hz Maximum

Brand Name: RE

Standby: 600W/40W

Place of Origin: CN;HEN

Model Number: 205A,RE-205A

Standard interface: MDB

Tags: Vending Machine | Automatic Vending Machine | Vending Machines For Sale

☆Favorites + Compare



<http://popupcity.net/next-generation-vending-machines-dispense-healthy-food/>

## Next Generation Vending Machines Dispense Healthy Food

Monday 3 February 2014 by Joop de Boer




**T**he vending machine as an urban phenomenon has a strong traditional connection with candy bars, soft drinks and other types of junk food. But the good ol' vending machine slightly starts to gain a position in the distribution of healthy food as well. A while ago we stumbled upon a couple of initiatives that aim to automatically dispense healthy food to urbanites.

Over the last years, healthy products were largely presented in healthy looking eco packages at farmer markets and in hipster eco supermarkets, but now the market seems to be opening up. Healthy food is increasingly available in an on-the-go mode. Obviously, the idea here is to reach out to a new group of customers that likes to eat healthy but sticks to the to fast-food habits that are deeply rooted in their lifestyles.



Save on GIO Car Insurance without compromising on quality.

[Find out more >](#)



Terms and Conditions Apply.

<http://www.yelp.com.au/biz/febo-amsterdam-2>

<http://www.buzzfeed.com/arielknutson/vending-machines-you-wont-believe-exist#.qbWR2kRE8>

Note: **ONLY selected items have been included.** Connect to source site by using the above web link.

### 1. Live Crab Vending Machine In China



geeky-gadgets.com

This vending machine in Nanjing, China sells live "fresh" crabs. The machine maintains an internal temperature of 41F to keep the crabs in a hibernation state without killing them. If you receive a dead crab from the vending machine, the company says it will compensate you with three live ones.



## 2. Caviar Vending Machine In Los Angeles



enater.com

Consider yourself in luck if you have a sudden craving for Imperial River Beluga Caviar wandering around Beverly Hills, Los Angeles — as long as it hits before 2 AM. A few machines in the neighborhood's malls will sell you an ounce of the roe for a cool \$500. They also have escargot, truffles, and even a \$4 mother of pearl spoon. Thank goodness!

## 4. Pizza Vending Machine In Europe



nickiloyd.blogspot.com

Let's Pizza serves 10.5" "fresh" pies 24 hours a day for \$6 each. The machine kneads the dough, sauces the pizza, adds toppings (you have a choice of three), and heats pizza in an oven in less than three minutes.

## 6. Mashed Potato Vending Machine In Singapore



huffingtonpost.com

This mashed potato vending machine lives in a 7-11 in Singapore. It costs one dollar to fill your cup with hot mashed potatoes and a vat of gravy. A DOLLAR WELL SPENT.

## 5. Banana Vending Machine In Japan



tofugu.com

Located in Tokyo's Shibuya train station, this machine dispenses both single bananas and bananas in bunches. Both are wrapped in plastic. At \$1.50 per banana, they do cost more than what you would pay at the average Japanese grocery. BUT, Dole conveniently provides bins on the side of the vending machine where you can discard peels.

7. French Fries Vending Machine In Australia



delish.com

The machine stores frozen potatoes. When an order comes in, the robot genius who lives inside will flash fry them for two minutes then season them before serving. It will cost you between \$1.50-\$2.00. What a deal.

11. Hot Bread Vending Machine In Germany



yum sugar.com

This German vending machine heats up partially baked bread in seconds.

14. Burger Vending Machine In Moscow



yellow-glasses.tumblr.com

Spotted: burger vending machine in Moscow's shermetyevo international airport. Never miss your plane again!

18. The "Hot Menu" Vending Machine In Japan



forrestbrown.com

There is one vending machine for every 23 people in Japan according to the country's [Vending Machine Manufacturers Association](#). This one in Osaka dispenses hot food like fried chicken, squid balls, and fish fillet.



16. Hot Dog Vending Machine In The United States



delish.com

For \$2, Leon's Grill vending machine will warm a hot dog and bun then give it to you.

18. The "Hot Menu" Vending Machine In Japan



forrestbrown.com

There is one vending machine for every 23 people in Japan according to the country's [Vending Machine Manufacturers Association](#). This one in Osaka dispenses hot food like fried chicken, squid balls, and fish fillet.

20. Vending Machine Restaurant In The Netherlands



members.virtueltoerist.com

Fast food is faster in Amsterdam with FEBO, a chain Automat that dispenses food through a vending machine. The menu includes things like croquettes stuffed with veal or beef. Everything at this restaurant costs less than \$10.

24. Vending Machine Restaurant ("Automat") in NYC



newyork.grubstreet.com

Automats — restaurants that serve food out of vending machines — were all the rage in 20th century America until about the 1980s or so. A spot called "Bamn" in NYC's East Village tried to revive the trend in 2006, it was short lived and closed by 2009. Pictured above, it served mostly sandwiches and burgers.

25. This Is The Worst And It Has Never Changed



memorial.com



APPENDIX F: Locations for hot meal 24-hour automatic vending machines

- **Hospitals, large schools/colleges**
- **Events (concerts, marathons, flea markets, etc.)**
- **Airports**
- **Train or bus stations**
- **Service stations (Motorway services; petrol stations)**
- **Theme parks and leisure centres**
- **University sites**
- **Company canteens, office complexes**
- **Shopping centres**
- **Main high streets**
- **Sports complexes, stadiums**
- **Zoos, cinema complexes**
- **Sea side resorts, funfairs, attractions, museums, art galleries**
- **Hotels, motels, holiday camps**
- **Exhibition centres, local market places**
- **Other**