



Air Freight Export Council of NSW

Bimodal Freight Review

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1 Executive Summary

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This report responds to a Brief from the Air Freight Export Council of NSW dated May 4th 2005 to undertake a high level desk top review of the potential to use bimodal transport services to further exports of Australian perishable products (primarily horticultural). Bimodal transport is defined as intermodal transport using a combination of containerized sea and air cargo services. The purpose of using such services is to expand the market opportunity and competitiveness of time sensitive products by significantly reducing (halving) the transport cost incurred compared with direct airfreight and the transit time incurred compared with direct sea freight.

The review of air cargo capacity focused primarily on the 17 dedicated all cargo wide-bodied services ex Sydney each week to Asian destinations. This capacity is substantially underutilized and therefore very competitively priced, often at less than 20% of the cost of such services to Europe and those from Asian points to both Europe and North America. Consequently, whilst there is clearly potential for air/sea combinations out of Australia to Europe & North America there is none for sea/air services over Asian transshipment points other than the Middle East, which does provide such opportunities.

Assessment of the potential of perishable export commodities, assisted by Horticulture Australia and the NSW Department of Primary Industries, indicated that fruit with an FOB value in excess of A\$2 per kilo should be the prime target for bimodal services – particularly stonefruit, avocados, mangoes and grapes. Melons and chilled lamb are also products of potential interest.

Sea freight transit times and refrigerated container rates from Australia suggest that the main potential for bimodal services is to Europe (with sea transit times of between 30 – 40 days) and to a lesser extent the Middle East. Asia is not a contender for bimodal services as sea transit times are of the order of 14 days. North America is also unlikely to feature – West Coast transit times are around 18 days and those to the East Coast around 28 days. Import protocols to North America also impede the movement of the products under review other than lamb.

Bimodal transit times of about 20 days are achievable to Europe for a through transport cost of between USD11,000 and USD23,000 per 12,000 kgs/RF20 shipment, depending on routing. This compares with a cost for direct airfreight of between USD33,000 & USD 45,000 depending on carrier. The bimodal saving is somewhat less for smaller shipments (8,000 kgs) and somewhat more for larger shipments (20,000 kgs)

The critical transshipment ports examined were Singapore, HK and Dubai/Jebel Ali. This was done on the basis that air and sea capacity into and out of each of these locations was substantial and frequent; transfer between airport and seaport or v.v. would be less than 60 minutes by road and airport chiller capacity and transshipment procedures are already established and reliable.

Bimodal service opportunities for other states that were identified in this study include avocados ex Queensland, mangoes ex Queensland, NT & WA and melons ex Queensland and WA.

Brief case studies on products originating predominantly in NSW highlight the potential to move cherries by sea/air service over Jebel Ali/Dubai into Europe and plums by air/sea service into the Middle East and Europe over Singapore.

Critical factors that all future assessment of bimodal services should take into account include:

- The ability of the service to halve direct air cargo costs and sea freight transit times;
- The marginal viability of such services when product value is less than the total transport cost;
- A cost benefit analysis of using Automated Fresh Air Management (AFAM) or Controlled Atmosphere (CA) reefer containers by sea and Envirotainers by air, as well as special packaging to prolong product shelf life;
- The respective merits of sea/air v. air/sea combinations given product handling characteristics;
- The intermodal transshipment port's cold chain reliability and cost efficiency;
- The benefits or otherwise associated with the use of Combined Transport Documents, and
- The full involvement of the consignee in any trials or contemplated future use of bimodal services, both in terms of product selected and shipping method even though most such export sales are CIF.

2 Research Brief

2 Research Brief

On May 4th, 2005, the Air Freight Export Council of New South Wales (AFEC) commissioned Thompson Clarke Shipping Pty Ltd to undertake a high level desk top review of the potential opportunities for the effective use of bimodal (air/sea or sea/air) carriage of perishable Australian export products. The prime purpose of this study was to identify potential opportunities whereby use of such services is likely either:

- To increase the competitive edge of such products in current markets (either by reducing the elapsed time in the supply chain or delivering the product into consuming markets in improved condition), or
- To position product into new markets that have not been accessed to date because of unduly lengthy sea transits or unsustainably high airfreight rates.

This review was undertaken in consultation with key members of AFEC (both carriers and exporters) as well as Horticulture Australia Ltd (HAL), the Australian Meat Industry Council (AMIC), Austrade and the NSW Departments of Primary Industries (DPI) and State & Regional Development (DSRD). The contribution of all these parties was vital to this study and this assistance is gratefully acknowledged. In addition, selective consultation was required with ocean carriers and a small number of exporters and Government Departments from other states in Australia. These consultations were by phone other than with the Chairman of AFEC, selected airlines with offices in Sydney, HAL, DPI and DSRD.

From the outset the objective was to seek out bimodal service combinations that could approximately halve:

- The transit time of direct containerized sea services; and
- The freight cost of direct air cargo services.

In order to achieve this it was necessary to focus on developed markets (that could afford freight costs higher than sea freight) and at the same time incurred from Australia the longest sea freight transit times (e.g. Europe @ about 40 days and US East Coast @ about 30 days). It should be noted that on this basis no work was undertaken in respect of the important Asian and US West Coast markets where container shipping transit times by sea vary between 10 and 20 days.

The other reason for focusing on Europe was that Australia's product is available there on a counter-seasonal basis, thus avoiding competition with locally grown produce. This does, however, lead to competition with product from South Africa and Chile, both of which are closer to the EU than Australia in terms of container shipping transit times.

The methodology for the review consisted of six steps:

2.1 Australian Export Air Cargo Opportunities

Seven airlines were interviewed to establish current air cargo services being provided ex Australia and the applicable rates for perishable horticultural products to Europe and North America, both direct and via transit points in Asia and the Middle East.

2.2 Overseas Market Review for Selected Perishable Products

In conjunction with HAL, AMIC, Austrade and DPI, commodities and overseas market opportunities that might benefit from bimodal services were identified.

2.3 Matching Carrier Opportunity with Export Product Demand

The third step was to review the degree of match between air carrier capacity and rate opportunities for a bimodal service with the indicative requirements of the selected perishable export commodities and the potential to reduce dedicated sea transit times.

2.4 Review of Likely Potential Bimodal Interchange Ports

Four potential overseas interchange points were investigated for the feasibility of using them for the interchange between air and sea services and their related reliability was assessed.

2.5 Selective Consultation with Relevant Stakeholders in Other States

While the focus of the review was intended to relate primarily to freight capacity and services from Sydney, in conjunction with perishable products emanating from NSW, selective consultation was undertaken with potentially interested stakeholders in other states where there could be potential bimodal service benefits.

2.6 Submission of Findings in a Final Report

The report was required to provide 2 case studies, one relating to air sea and one to sea air, to evaluate the bimodal concept and summarise the key principles that need to be adhered to in any future application of bimodal services to perishable export market development.

3 Export Air Cargo Capacity and Rates

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Based on data from seven international airlines (Qantas, Singapore Airlines, Cathay Pacific, Malaysian Airlines, Korean Airlines, Martinair and Emirates) the air cargo capacity on offer to Australian exporters was established. The principle focus was on all freighter services (B747F with approximate payload, depending on route and aircraft configuration, of around 100,000kgs, and offering main deck pallets of 6,000 kg capacity each). The reason for this emphasis was that such main deck pallets can carry 6 Europallets, each made up of 1,000 kilos of horticultural product, so that the payload of 2 such aircraft pallets is compatible with that of 1 x 20 foot ISO reefer container deployed by international shipping lines. It should be noted that this was the loading configuration of the Panda Ranch P/L air sea trial in 2002, when 12,000kgs of nectarines were carried to UK.

3.1 Air Cargo Capacity

Six of the selected carriers currently have wide bodied all freighter services ex Sydney, with more limited coverage of other Australian airports. Their combined service offering is detailed in Annex 1. Sydney enjoys 17 all cargo services weekly to potential bimodal service transit points in Asia, provided by these six carriers, with over 50% of this capacity being accounted for by flights on Tuesday (day 2) and Saturday (day 6). Hong Kong (6 flights weekly) and Shanghai (5 flights weekly) are the most popular destinations.

In comparison, Melbourne enjoys 6 all cargo flights to Asia, four of which are shared with Sydney, and Adelaide has 2 (provided by Singapore Airlines). Other capital cities in Australia are not currently served by wide-bodied all cargo services.

In addition to the above, Emirates' capacity was reviewed. This was driven by the need to find a bimodal interchange location, which is closer to Europe than SE and NE Asia, since even though major air cargo and container shipping capacity exists from such points to both Europe and North America, cargo demand is also much heavier than that from Australia. This results in air cargo freight rates ex-Asian airports to both Europe and North America being at least as high if not higher than air rates to these same destinations ex Australia direct.

It should be noted that while Emirates does not currently operate an all cargo freighter service ex-Australia, it nevertheless has substantial belly capacity to Dubai in their passenger planes:

- Ex Sydney: Daily A340-500 & B777 services each with about 16,000 kg capacity
- Melbourne: Daily A340-500 service with about 16,000 kg capacity
- Ex Brisbane: Daily B777 service with similar capacity
- Ex Perth: Daily A340 -300 service with slightly less capacity.

3.2 Air Cargo Rates

As of June 30th, 2005, rates per kilo for perishable air cargo (including fuel and security surcharges) on long haul routes to Europe, varied between US\$2.80 & US\$3.80 (depending on carrier and commodity) and to North America they were in excess of US\$2.00 per kilo. Air rates ex Asian points to the same destinations were comparable (refer Annex 2). By contrast, rates out of Sydney to Asian airports including Dubai varied between a little less than US\$0.50 and US\$0.90 per kilo. For on carriage by air from Dubai to EU ports, rates varied between US\$1.58 and US\$1.70.

As of the same date, for a standard 20 foot refrigerated container (RF20) ocean freight rates (again including bunker, security and terminal handling charges) were just under US\$4,000 to NW Europe from Australia and a little less from Singapore. Comparable rates from Australia to Jebel Ali (Dubai) were just under US\$3,500 and just under US\$3,000 from Jebel Ali to NW Europe. Comparable rates to Singapore ex Australia were a little under US\$2,000 per twenty foot reefer (refer Annex 2).

These ocean costs compared with air cargo costs of between US\$33,000 & US\$45,000 (dependent on carrier) for 12,000 kgs of horticultural product that should be capable of being carried in an RF20. These air costs were 33% less for an 8,000 kgs shipment (which would also move by sea in an RF20), and 66% higher for 20,000 kgs (which would have to move by sea in an RF40).

4 Perishable Product Profiles

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Australian horticultural production in 2002/3 was worth some A\$6.4 billion, involving over 17,000 enterprises, and employed 64,000 people (20% of the total agricultural sector). Some 12% of this output (\$778 million) was exported.

With the assistance of HAL and DPI, summary profiles of the sectors likely to be prime candidates with a potential interest in bimodal services were drawn up. Given that:

- Long haul bimodal services were likely to be the only ones to be cost beneficial to exporters;
- Cost per kilo for such services were likely to be somewhat less than USD2 (or c\$20,000 for 12,000 kilos of cargo); and
- Most vegetable products have a higher tolerance for long haul sea transits than fruit.

it quickly became apparent that the commodity sector for prime review was fruit with a FOB value in excess of A\$2 per kilo. Based on the latest HAL data (2002/3 season) Annex 3 profiles six products above this threshold, plus melons where industry feedback suggested there could also be potential. The key characteristics of these seven horticultural products are summarised below:

- The commodities produced in greatest quantities were melons and table grapes – 188,000 and 86,000 tons p.a. respectively. These were also the products enjoying the largest export tonnage (13,600 and 39,700 tons p.a. respectively).
- NSW was the dominant producer of only 2 commodities, cherries and plums (57% and 35% share respectively). It also accounted for about 20% of nectarine and melon production, while its share of mango production was insignificant.
- Queensland was by far the largest producer of mangoes and melons and Victoria of table grapes and nectarines.
- All the products exported in the 2003/4 season had an FOB value between A\$2 & \$3 per kilo except cherries at A\$7.45 and melons at A\$1.23.
- Exports represented a significant share (>25%) of four products – grapes, plums, nectarines, and cherries, with mangoes, melons and avocados much less significant (10% or less, and therefore very prone to their export effort being inversely related to their domestic demand).
- Dominant export markets were HK, Taiwan, Singapore and Malaysia, all within 2 weeks range by sea and therefore not candidates for bimodal services.
- Europe imported small quantities of plums, cherries, mangoes and nectarines, while the Middle East accounted for somewhat greater quantities of melons, mangoes and plums.
- Avocados, grapes and melons did not feature in exports to Europe and in the case of the Middle East neither did grapes (owing to competitive supply from markets adjacent to Europe or from South Africa and Chile).
- Five of the seven products require consistent shipping temperatures in the 0C to 2C range – mangoes and avocados are the exception demanding 12C and 5C respectively. Most producers spoken with emphasized the need for consistency of temperature over and above precise achievement of optimal temperature.
- Transit time tolerance was greatest with grapes (>28 days), such that there are few markets that cannot be satisfactorily served by sea, particularly if the latest cool chain technology, Automated Fresh Air Management (AFAM) or Controlled Atmosphere (CA) containers, is used.
- Cherries, nectarines, and avocados have a lesser time tolerance (14 – 21 days) together with certain types of melons and mangoes. It should be noted that AFAM and CA technology can indicatively extend the transit time tolerance of most products by at least 7 days and in the case of CA in most cases by 15 days or more.

In addition to these horticultural products, fresh lamb (mainly legs with a current CIF value of A\$7 – 8 per kg) destined for top end niche European markets for the Christmas and Easter seasons could be a candidate for bimodal freight. In 2004, Australia exported some 12,000 tons of lamb to Europe or about 10% of total lamb exports – 16% of this export production originated in NSW (compared with almost two thirds originating in Victoria and South Australia). Chilled product represented about 20% of the total sold to Europe or some 2,500 tons, currently moving by sea in RF40. UK, France, Belgium and Switzerland are the main destination markets – however, the last refuses to accept fresh lamb more than 40 days old, which makes supply by sea problematic, while the air cargo alternative is

prohibitively expensive. From time to time, in order to reduce transit times, shipments are discharged at Mediterranean (in lieu of North European) ports and trucked to destination – such overland costs in Europe frequently equal or exceed the sea freight costs from Australia.

From this product range cherries and plums were selected as case studies for potential sea/air and air/sea services for the following reasons:

- NSW is the leading producer of both products;
- A substantial proportion of the output of both sectors is exported;
- Both commodities are already testing the European market; and
- Each of these products has different handling characteristics and overseas consumer market profiles.

5 Carrier Opportunity and Export Market Demand

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5.1 Sea Transits

Annex 4 details typical port to port transit times for container shipping services from Sydney to UK and USA - 38 days to the former and 17 or 26 days to the latter (depending on whether it is West Coast or East Coast). The degree to which transit times from other major Australian ports vary from the Sydney transits to Europe and the Middle East are also given, with Brisbane, Fremantle and Darwin enjoying up to a week less than Sydney to Europe, but only a couple of days less to the Middle East (due to the need to transship in Singapore, or at Tanjung Pelepas in the case of Maersk). It should be noted that with the imminent takeover of P&O Nedlloyd by Maersk Sealand significant changes could occur within the next 12 months to container shipping services to Europe and elsewhere.

Sea transit times are also given between Sydney and a number of Asian ports, which have the potential to act as a transshipment point, and so are the transit times from those transshipment ports to Europe and North America.

5.2 Bimodal Transit Times

A comparison of the transit times in Annex 5 makes it clear that Europe is the standout candidate market for bimodal services. An air leg allowing 48 hours for transshipment and oncarriage when added to sea services to Asia (shortest 11 days to Singapore v the longest of 22 days to Jebel Ali) can at least halve direct sea transit times. However, sea air other than over Jebel Ali is not viable for air cargo rate reasons (refer Annex 2).

Onward shipping by sea to Europe from Singapore is 20 days, and whilst less efficient in reducing transit times compared with shipping by sea as the first leg to Singapore (only 11 days), it still compares reasonably well with direct sea shipment transit times.

A number of the producers of horticultural products stressed the importance of moving their product by sea in the first leg of a bimodal movement rather than the other way round. The principal reason for this was the importance of ensuring that the correct temperature for carriage was established before the start of the total transport chain and then maintained on a consistent basis for the majority of the journey. This is much harder to achieve if the air leg precedes the sea leg, given that in the airfreight cold chain blankets and dry ice, or even Envirotainers, are less reliable than marine reefer containers.

5.3 Bimodal Cost Comparisons

The cost comparison in Annex 5 makes it clear that bimodal services to Europe, be they air sea over Singapore, or air sea or sea air over Jebel Ali/Dubai, are likely to be between 33% and 66% of the cost of the cheapest direct air freight for a 12,000 kgs shipment (between US\$11,000 and US\$23,000 per movement depending on which model is adopted v. air freight of between US\$33,000 and US\$45,000). They are, however, 2.5 – 5 times more costly than sea freight at under US\$4,000 for an RF 20 carrying 12,000 kilos.

The bimodal v air comparison is less favourable for smaller shipments (e.g. 8,000 kilos) with the bimodal movement varying between 40% and 85% of the cheapest direct air cost – again depending on which service is adopted. For larger shipments of 20,000 kgs the comparative bimodal cost is more favorable, i.e. between 30% and 60% of the cheapest direct air cost

It should be noted that improved temperature control can be achieved for air cargo by using Envirotainers, and improved shelf life can be achieved by sea using AFAM or CA technology (refer Annex 3). These handling enhancements do not make a significant difference to the cost comparisons, although Envirotainers required for a 12,000 kilo shipment at US\$2,500 are roughly twice as expensive as the premium for a CA RF20 and 10 times as expensive as that for an AFAM RF 20.

6 Bimodal Transshipment Points

6 Bimodal Transshipment Points

A large majority of exporters contacted stressed the critical importance of the efficiency and reliability in the cold chain at the transshipment point between air and sea or v.v. from a number of aspects:

- Proximity – as a result only locations where the airport is less than 1 hour by road from the container terminal were considered,
- Availability of efficient and selective cool chamber capacity at the relevant airport,
- Straightforward documentation and administration procedures, and
- Competent resources to oversee all the elements of the local cold chain from airside to stuffing of the marine container and placing the container on power in the port or v.v.

On a desk top basis, prima facie there appear to be only 3 locations in Asia that meet all these criteria – Singapore, Hong Kong and Dubai/Jebel Ali. Both Kuala Lumpur and Seoul airports are too far from the container terminal and the reliability of the logistics between seaport and airport are also unproven. Annex 6 summarises the key aspects and costs in US\$ of the interface between air and sea transport in each of the 3 selected locations.

Singapore appears to be the cheapest and in light of previous trials probably the most efficient and reliable location for transshipments. Annex 7 details the six steps and parties responsible for handling an air sea bimodal shipment in Singapore between Changi Airport and PSA Container Terminals. This data is based on a visit to and information provided by Singapore Air Sea Transit Services (SASTS), a division of FAF Flying Transportation (S) Pte Ltd. It should be noted that

- Movement from airside to chiller store normally takes a maximum of 90 minutes
- Storage in the airport chiller store normally does not exceed the free storage time of 24 hours
- Container stuffing at the handling agent's warehouse is normally less than 2 – 3 hours
- Container drayage on power from airport to container port takes less than 60 minutes and
- Delivery at the container port is required not less than 24 hours prior to vessel departure.

It should be noted that temperature checks are made of the cargo on at least 3 occasions (on arrival at the airport chiller warehouse from airside, on pick up from the chiller rooms prior to marine container stuffing, and prior to closing and sealing the container door). Thereafter the container should be on continuous power (with temperature logging) other than for the few minutes the container is transferred between truck and terminal and terminal and ship or v.v. No review was undertaken of handling for sea air shipments as the cost of air cargo carriage from Singapore makes such an option uncompetitive v. direct air ex Australia.

Dubai is untested and concerns have been expressed about the size (too large) and temperature inflexibility of the airport chiller rooms. Detailed field inspection of the facilities at Dubai/Jebel Ali provided by Consolidated Shipping Services need to be made before any bimodal trial shipments are made over the Middle East.

Hong Kong is the most expensive transshipment port and for European cargo moving by air/sea is 4 or 5 days further from destination than Singapore and would also be inferior in total transit time v. Dubai. Consequently Hong Kong has not been investigated further at this stage.

It should be noted that in making the bimodal transit and cost comparisons 48 hours was allowed in each case for the transshipment process and US\$3,000 for the transshipment costs (including documentation, container packing or unpacking and supervision).

Within the project time and budget available it was not possible to investigate the degree to which use of a Combined Transport Shipping Document would improve the speed and efficiency of cargo transfer between air and sea modes at the selected transshipment point. Given the critical need for a reliable transshipment cargo handling agent/forwarder at this stage of the supply chain, investigation of the merits of using such a shipping document ought to be undertaken if further more detailed research into bimodal movements is undertaken.

7 Bimodal Potential in States other than NSW

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From Annex 3, it is clear that there are a number of potentially significant opportunities for the use of bimodal services for horticultural products, which are largely produced in other Australian states:

7.1 Avocados from Queensland

There are two basic varieties of avocados grown in Australia – dark skin (Haas) and green skin (Reed) but also four other lesser varieties. Exports are small, only 2% of production, and 20% of overseas orders on a tonnage basis are accounted for by demand from the Middle East. Europe currently scarcely features as a market for Australian avocados. Haas is the preferred export variety, other than in Germany where green skin types are preferred, and it also has a higher export value of A\$16 - \$18 per 5kg tray versus \$11 - \$13 for green skin. It is also worth noting that Haas travels better than green skin varieties, and has a much longer harvest season, running from April to January, compared with green skin which is available for less than 6 months.

According to Avocados Australia Ltd long distance markets to date have largely been served by airfreight, given a typical acceptable transit window of about 3 weeks.

The Middle East already accounts for about 20% of export by tonnage and there is a window in the European market in the third quarter of the year (i.e. when the Spanish crop has finished), that is inadequately served by other main suppliers (Israel and Mexico in the northern hemisphere and Chile & South Africa in the southern). In addition, it would appear that air/sea services would be preferred to sea/air, making a bimodal service to both the Middle East and Europe over Singapore worth investigating.

Issues to be considered include:

- The absence of dedicated air cargo services ex Queensland,
- The tendency of the producing industry to abandon smaller, more complicated export markets when domestic demand is strong,
- The need to produce the avocado variety the overseas market prefers (Haas predominantly in Europe v. greenskin preferred in Asia and Germany),
- The comparative cost benefits of using AFAM+ or CA marine reefer containers, and
- Tolerance of variations from the preferred shipping temperature of 5C.

7.2 Mangoes from Queensland, NT & WA

The principal mango growing states are Queensland and the Northern Territory, with WA becoming more important particularly in the Kimberley. There are four principal types of mango grown, with Kensington Pride the most popular – longest season (October to February), best flavour and best suited to shipping overseas. Dry climate producing areas such as Katherine and Kununurra are preferred for exports (which account for 10% of total production) over high humidity areas round Darwin and on the Queensland coast (by reason of longer shelf life and fewer fungal problems). Asia accounts for the bulk of exports but the Middle East is already a significant market accounting for nearly 13% of export tonnage; and trials by sea to Europe using Maersk RF40 CA containers ex both Fremantle and Darwin and controlled ripening at Green Box in Holland prior to onward distribution are ongoing. Neither routing is ideal given the long truck journey (and related cost) to Fremantle and the shortage of shipping services ex Darwin (2 carriers offering weekly services to Singapore).

Investigation of sea air bimodal shipping services over the Middle East for direct delivery by air into a range of European countries would appear worthwhile, particularly if the first leg by sea can be combined with shipping of product destined to the Middle East out of NT, WA or Queensland. Issues to be considered include:

- The tendency of the mango industry to abandon smaller, more complicated export markets when domestic demand is strong,
- The ability to produce the mango type that is most suited to overseas market needs,
- The capacity to focus dry climate producing areas on export markets,

- The comparative cost benefits of using AFAM+ or CA marine reefer containers,
- Tolerance of temperature variations from the preferred shipping temperature of 13C; and
- The comparative benefits of bimodal services over Dubai for direct delivery by air into individual European markets v. direct sea service into Rotterdam for ripening and onward distribution by Green Box. This should include analysis of the issue raised by Parker Point Plantations of the excessive capacity and temperature inflexibility of the cool rooms at Dubai airport.

7.3 Melons from Queensland & WA

Almost 75% of Australian melon production originates in Queensland (55%) and WA (20%), and exports account for some 7% of total output. Again Asia is the principal market but the Middle East accounts for about 12% of exports. Australia produces four principal varieties of melons with Eastern Star having the longest season from June to January, and better shelf life than other varieties such as Hot Shot. As an overall guide, rock melon (cantaloupe) has the shortest shelf life (which can be as little as 10 days) and honeydew the longest (as much as 6 weeks). Shelf life, as with mangoes, can also be significantly influenced by the climatic conditions of growing areas, with fruit from low humidity desert areas being much more robust than that grown in high humidity coastal regions.

Product sweetness also tends to increase towards the end of the season and given this factor and the need to be counter seasonal to Northern Hemisphere production it was suggested that the preferred export window is October to December. Long distance markets are being served selectively by air (to Europe and Middle East) and ex WA to the Middle East by sea. According to the Melon Growers Association of Australia, in principle air sea services would be preferable, thus making testing of such services over Singapore to both the Middle East and Europe worth further investigation.

Again a number of issues would need to be checked:

- The absence of dedicated air cargo services ex Queensland and WA,
- The tendency of the producing industry to abandon smaller, more complicated export markets when domestic demand is strong,
- The need to produce the melon type the overseas market prefers in climatically suitable areas,
- The comparative cost benefits of using AFAM+ or CA marine reefer containers, and
- Tolerance of variations from preferred shipping temperatures, which varies according to type of melon.

8 Bimodal Case Studies

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As stipulated in the project brief this report concludes with a couple of case studies focused on products originating primarily from NSW.

8.1 Cherries to Europe by Sea Air over Jebel Ali/ Dubai

8.1.1 Production

NSW accounted in 2002/3 for over half of Australia's crop of 6,700 tons.

8.1.2 Seasonality

currently runs from November to January across some 11 varieties.

8.1.3 Exports

account for one quarter of output - according to HAL data, Europe accounted for nearly 10% of exports (primarily UK, Germany, France, Italy and Holland), and the Middle East for a further 5%.

8.1.4 Supplier Competition

comes from Chile and South Africa, being the other prime Northern Hemisphere counterseasonal suppliers, both of which can use sea freight to supply European markets and tend to prioritise exports (80% of production), over the domestic market (in marked contrast with Australia).

8.1.5 Shipment ex Australia

to both areas is currently by air (usually in 1,300kg consignments by AVE 4 or 5 times weekly, both because of constraints of supply and the need to avoid flooding the destination market and adversely impacting prices). To Asia 1,584 trays of 5 kg each (i.e. about 8,000kgs in total) are shipped quite satisfactorily in RF 20 containers.

8.1.6 Temperature

consistency is more important than adherence to the stipulated 0 – 1C, due to the risk of skin splitting with temperature or humidity variances, to which the fruit is very sensitive due to its small mass.

8.1.7 Transit Time

required is 2 – 3 weeks unless life span bags are used or AFAM or CA containers, all of which can double this time frame.

8.1.8 Packaging

is either 2kg or 5kg trays or boxes with life span bags.

8.1.9 FOB Value and Terms of Sale

about A\$8 – 10 per kilo - normally CIF.

8.1.10 Freight Costs

are around A\$3 per kilo for airfreight with landed cost of the product in Europe around A\$60 - 70 per 5kg tray.

8.1.11 Buyers

in UK are absolutely dominated by supermarket (Tesco, Sainsbury) demands, which are very exacting and inflexible in terms of quality, price and packaging, so other European markets are seen as easier to deal with where traders have more flexibility in buying criteria.

8.1.12 Bimodal Opportunity

There would appear to be reason to investigate shipment by sea in life span packs (or failing which AFAM or CA containers) either out of Sydney or Melbourne via Singapore to Jebel Ali. This could combine orders for the Middle East and Europe in the one container and provide onward delivery ex Dubai by air into a range of different European end markets. This is reinforced by the fact that recent plantings of cherries in Tasmania will not only extend the season (cooler climate) until February but also increase output by at least a third, which the domestic market will not absorb. However, effective and reliable intermodal transfer in Dubai will be critical and it should be noted that while the Middle East takes 22mm cherries Europe insists on 26mm as the standard.

8.2 Plums to UK by Air Sea over Singapore

8.2.1 Production

NSW accounted in 2002/2003 for a third of Australia's crop of 25,500 tons.

8.2.2 Seasonality

currently runs from November to April across some 20 varieties, which differ from European varieties and are either Japanese or Californian in type.

8.2.3 Exports

account for over 40% of output - according to HAL data, Europe accounted for only 4% of exports (primarily UK), and the Middle East for over 10%.

8.2.4 Supplier Competition

comes from Chile and South Africa, the other prime Northern Hemisphere counterseasonal suppliers, both of which use sea freight to supply European markets and tend to prioritise exports (80% of production), over the domestic market (in marked contrast with Australia).

8.2.5 Shipment ex Australia

is primarily by sea freight to both areas. To Asia 2,028 cartons of 10 kg each are shipped quite satisfactorily in RF 40 containers carrying just over 20,000kgs.

8.2.6 Temperature

consistency is more important than adherence to the stipulated 0 – 1C.

8.2.7 Transit time

required is normally 4 weeks unless life span bags are used or AFAM or CA containers, all of which can extend this time frame by up to 50%.

8.2.8 Packaging

10kg trays or boxes with life span bags.

8.2.9 FOB Value and Terms of Sale

about A\$3.00 per kilo and generally CIF

8.2.10 Freight Costs

are around \$0.35 per kilo for sea freight with landed cost of the product in Europe around A\$35 per 10kg tray.

8.2.11 Buyers

In UK are absolutely dominated by supermarket (Tesco, Sainsbury) demands, which are very exacting and inflexible in terms of quality, price and packaging and will be critical to any decision to test bimodal shipping services.

8.2.12 Bimodal Opportunity

There would appear to be reason to investigate shipment by air freighter service either out of Sydney, or Melbourne via Singapore and thence to Europe by standard reefer container. This would more than halve the transit times required for direct sea freight for a modest increase in total freight costs and reduce total transit time to a level comparable to Chilean and South African competition. Careful investigation with producers and buyers would be needed to ensure that of the plum types available in the first quarter of the year those most suited both to market taste and to this form of transport were trialled.

ANNEXURES

ANNEX 1: Air Cargo 747 Freighter Services ex Australia to Asia Q3 2005

Ex Sydney

Day	1	2	3	4	5	6	7
QF		PVG HKG	PVG		PVG	PVG HKG	PVG
SQ		SIN				SIN	
CX	HKG	HKG					
MH		KUL			KUL		
KE	SEL			SEL			
TOTAL	2	6	2	1	2	3	1

Ex Melbourne

Day	1	2	3	4	5	6	7
QF				PVG			
SQ						SIN	
CX	HKG*	HKG*					
MH		KUL*			KUL*		
TOTAL	1	2	-	1	1	1	-

* Same aircraft as Sydney service.

Ex Adelaide

Day	1	2	3	4	5	6	7
SQ		SIN			SIN		
TOTAL	-	1	-	-	1	-	-

NB There are no pure freighter services ex Brisbane, Perth or Darwin.

Carrier Codes: QF – Qantas; SQ – Singapore Airlines; CX – Cathay Pacific; MH – Malaysian Airlines; KE – Korean Airlines; MP – Martinair

Airport Codes: HKG – Hong Kong; KUL – Kuala Lumpur; PVG – Shanghai; SEL – Seoul; SIN – Singapore

Day 1 = Monday, Day 2 = Tuesday etc

ANNEX 2: Bimodal Air & Sea Rates

Bimodal Air Rates (US\$ per kg including surcharges as of 30 June 2005: A\$1 = US\$0.76)

Origin	Destination	\$ per kg
Long Haul		
Ex Sydney	UK	\$2.80 - \$3.80
	USEC	\$2.50
	USWC	\$2.35
To Transshipment Point		
Sydney	HK	\$0.46
	Pusan	\$0.90
	Singapore	\$0.50
	Dubai	\$0.80
Ex Transshipment Point		
HK	USEC	c.\$3.50
	USWC	c.\$3.00
Seoul	USEC	\$3.50
	Moscow	\$3.00
Singapore	UK	>\$3.00
	USEC	c.\$3.50
Dubai	EU	c.\$1.60

Bimodal Sea Rates (US\$ including surcharges)

Origin	Destination	\$ per RF20	\$ per RF40
Long Haul			
Ex Sydney	UK	3,750	6,500
To Transshipment Point			
Sydney	Singapore	1,770	3,500
	Jebel Ali	3,300	5,050
Ex Transshipment Point			
Jebel Ali	UK	2,875	3,650
Singapore	UK	3,500	5,900

NB Sea Rates ex Australia are common for all container ports other than Darwin.
RF20 = 20' ISO marine refrigerated container; RF40 = 40' ISO marine refrigerated container.

ANNEX 3: Selected Horticultural Product Profile

Item	Avocado	Cherries	Grapes	Mangoes	Melons	Nectarines	Plums
Production Tons pa	28,485	6,701	86,523	40,972	188,075	28,823	25,485
NSW	3,363	3,849	11,078	259	36,492	6,472	8,883
% share	11.8	57.4	12.8	0.6	19.4	22.5	34.9
QLD	21,147	23	7,864	32,361	102,477	3,413	2,095
Vic	720	1,334	56,428	-	6,567	13,442	7,565
Tasmania	-	542	-	-	-	2	N/A
SA	673	843	2,679	-	847	2,644	2,735
WA	2,582	110	4,621	2,281	38,061	2,850	4,194
NT	-	-	3,853	6,071	3,631	-	-
Exports Tons p.a.	389	1,720	39,752	4,266	13,624	7,972	10,773
% of Production	1.4	25.7	45.9	10.4	7.2	27.7	42.1
Key Overseas Markets	Singapore, HK	HK, Taiwan Singapore	HK, Spore Malaysia Indonesia	Singapore HK	NZ, HK Singapore, UAE	Taiwan, HK	HK, Taiwan Malaysia, Singapore
Europe	?	148	-	127	-	106	425
% share	?	8.6	-	3.0	-	1.3	3.9
Middle East	75	75	-	544	1,623	140	452
% share	19.3	4.4	-	12.8	11.9	0.2	10.8
FOB Value \$ /kg	\$2.24	\$7.45	\$2.35	\$2.78	\$1.23	\$2.85	\$2.44
Shipping Temp.	5.0 C	0 C	0 C	12.8 C	2.2 C	0 C	0 C
Shelf Life (days)	14 - 21	15 days	> 28 days	14 - 21 days	10 - 20 days	14 days	28 days
S/Life Rf AFAM+	21 days	21 days	28 days	28 days	21 - 35 days	21 days	35 days
S/Life Reefer CA	28 - 42 days	21 - 28 days	N/A	<35 days	21 - 35 days	28 - 35 days	35 - 42 days

NB Trade data based on HIAL statistics for 2002 season, other than exports (2003)

ANNEX 4: Bimodal Sea Transits (days as of 30/6/05)

Origin	Destination	Days
Long Haul		
Ex Sydney	UK	38*
	USEC	26
	USWC	17
To Transhipment Point		
Sydney	HK	14
	Pusan	16
	Singapore	11
	Jebel Ali	22
Ex Transhipment Point		
HK	USEC	24
	USWC	13
Seoul	USEC	25
	USWC	9
Singapore	UK	20
	USEC	30
Jebel Ali	EU	22

NB * transshipment via Singapore < 6 days less.

Transits to NW Europe ex Melbourne 2 days less; ex WA 8 days less.

Ex Brisbane 8 days less; ex Darwin 5 days less (both with transshipment over Singapore)

Transits to Jebel Ali ex Melbourne 6 days more; ex Brisbane, Fremantle, WA and Darwin 2 days less.

All with transshipment over Singapore.

ANNEX 5: Bimodal Comparative Transits & Costs as of 30 June, 2005

(a) Transits (days)

Origin	Destination	Intermodal Port	Direct Sea	Air Sea	Sea Air
Sydney	UK	Singapore	38	22	13
		Dubai/Jebel Ali		24	24
	USEC	Seoul/Pusan	26	27	18
USWC	USWC	Seoul/Pusan	17	11	18
		HK	17	16	15

NB: Air/Sea and Sea/Air allow 48 hours for air transit & transshipment; routings in bold viable in terms of reduced transit.

(b) Transport Costs (USD)

Origin	Destination	Intermodal Port	Air Direct			Bimodal			Sea Direct						
			8,000 kgs	12,000 kgs	20,000 kgs	8,000 kgs	12,000 kgs	20,000 kgs	8 tons/ RF20	12tons/ RF20	20tons RF40				
Sydney	UK	Singapore (air/sea)	\$22,000	\$33,000	\$56,000	\$9,000	\$11,000	\$17,000	\$12,000	\$16,000	\$23,000	<\$4,000	<\$4,000	<\$4,000	\$6,500
		Dubai/Jebel Ali (air/sea)	to	to	to	\$12,500	\$16,000	\$23,000							
		Jebel Ali/Dubai (sea/air)	\$30,000	\$45,000	\$76,000	\$19,300	\$22,800	\$35,800							

- NB:
- (a) Air costs based on 8,000 kgs (cherries), 12,000 kgs (nectarines) and 20,000 kgs (plums); if Envirotainer is used additional equipment hire costs of between \$1,200 to \$2,000 would be incurred depended on whether RKN or RAP units are used.
 - (b) Bimodal costs are based on 8,000, 12,000 and 20,000kgs shipments, relevant air/sea tariffs and an allowance of USD3,000 for transshipment.
 - (c) Sea cost based on RF20 & RF40 container costs; if AFAM+ used there is a premium of \$250 for RF20 and \$500 – \$750 for RF 40; for CA container the premium \$800 - \$1,500.

ANNEX 6: Transit Ports (as of 30 June, 2005)

Item	Singapore	HK	Dubai/Jebel Ali
Airport Free Storage	24 hours	48 hours	48 hours?
Airport Chiller Facility	Yes	Yes	Yes
Handling Charges*	\$355 (RF20) \$888 (RF40)	\$3,737	\$817
Container Stuffing	Included in Handling	\$325	Included in Handling
Trucking Charges #	Included in Handling	\$145	\$95
Documentation/ Admin Charges*	\$293 (RF20) \$586 (RF40)	\$80	\$1,950
Seaport Free Storage	48 hours	72 hours	72 hours
Required Transshipment Documentation^	Packing List, Commercial Invoice	Packing List, Commercial Invoice Certificate of Origin Health Certificate/ Phytosanitary Docs	Packing List, Commercial Invoice Certificate of Origin Health Certificate/ Phytosanitary Docs
Exchange Rate to US\$	S\$1.69	HK\$7.77	AED3.67

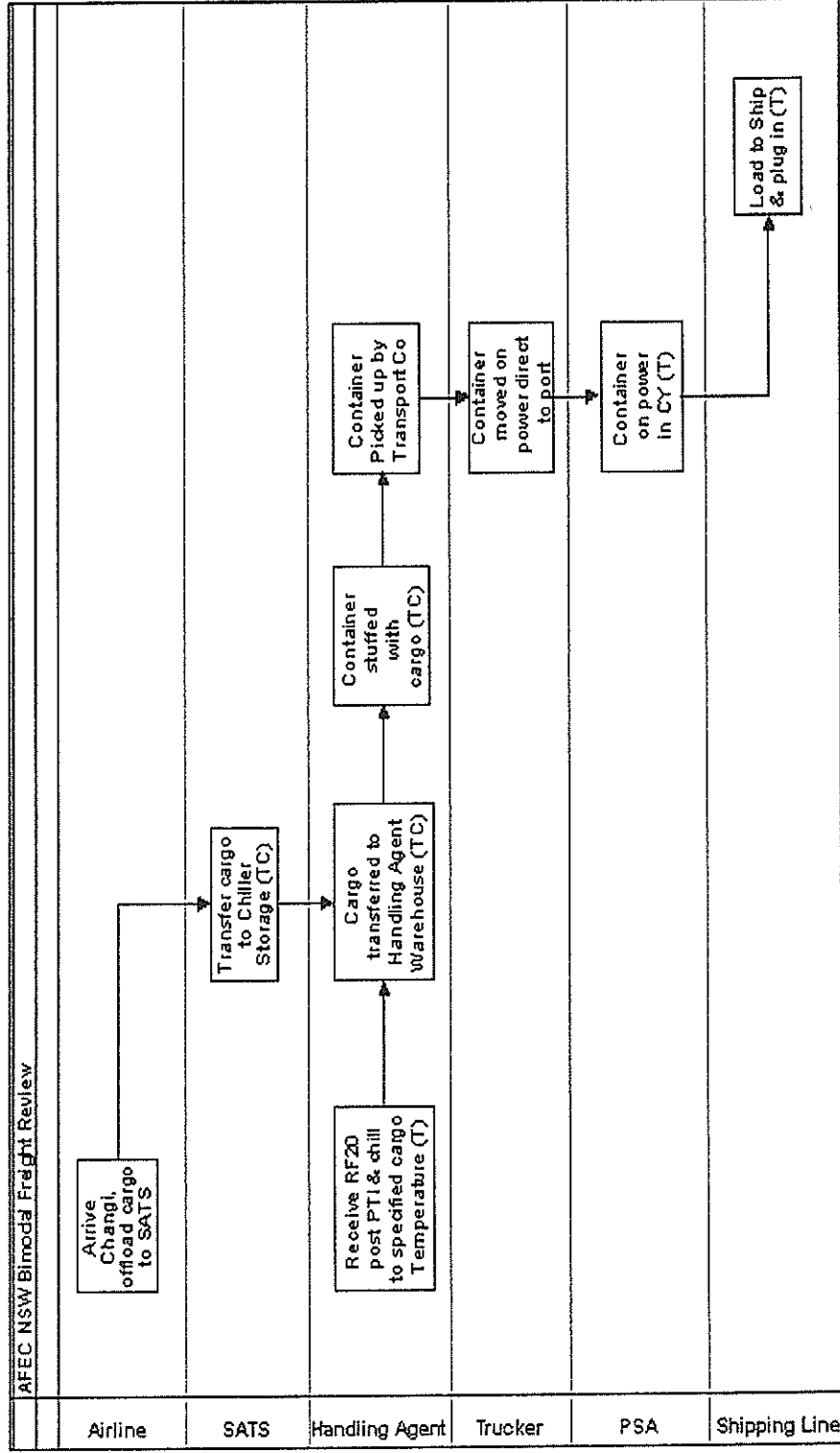
* Based on 12,000 kgs/25m³ stuffing, other than Singapore where rates for RF 40 or 20,000 kgs are also given.

per 20 foot container

^ Singapore also require the first leg AWB to be consigned to the handling agent, and a flight pre alert at least 24 hours prior to flight departure.

ANNEX 7: SIN Bimodal Handling

SINGAPORE Bimodal Freight Handling Changi/PSA



TC = physical check of cargo temperature by handling agent T = continuous temperature control by marine container

ANNEX 8: Organisations consulted

Airlines: Qantas, Cathay Pacific, Korean, Singapore, Malaysian, Emirates, Martinair

Shipping Lines: Maersk Sealand, P&ONL, Pacific International Lines

Forwarders & Equipment Suppliers: Danzas Air & Ocean, Raitt International Freight, Envirotainer Services, SASTS Singapore, Consolidated Shipping Services Dubai.

Growers & Exporters: Panda Ranch, EJ Cunich, John Holman & Co, Parker Point Plantations, Global Fresh Marketing, Sunfresh, Antico International, Ernest Parady & Sons, Tatiara Meat Company,

Industry Bodies: Horticulture Australia Ltd, Australian Meat Industry Council, Melon Growers Association, Avocados Australia, Ord River Mango Growers Association

Government: NSW Department of State & Regional Development, NSW Department of Primary Industries, NT Department of the Chief Minister, Austrade.