EPS Recycling Financial Modelling Guidance

Introduction

This document provides guidance about the financial/cost benefit aspects of EPS recycling. At the time of drafting – March 2014, it provides the best information available to assist those who are considering developing an EPS recycling project. It is provided to help you to develop the financial aspects of your business case. The business modelling guidance provided below is oriented towards the supply end of the EPS recycling chain.

There are two components of this guidance document. This overview provides a background rationale, assumptions and some worked examples so that you can understand more about how to establish the financial implications of your proposed project. Also refer to the the EPS Facility Financial Calculator. This is an Excel spread sheet calculator that is provided so that you can to drop in your own figures and manipulate the data to best meet your situation.

It must be emphasised that learning about the financial modelling will be enhanced as further EPS recycling initiatives are developed and delivered.

Financial Assumptions Underpinning EPS Recycling

In providing guidance to assist you to develop the financial aspects of your business case, understanding the assumptions that underpin the financial modelling are crucial. This document should assist you to consider those assumptions that are applicable to your situation and then use them to develop your business case. Assumptions are detailed below, and are organised under four headings. Your first step in using this advice might be to check off which assumptions are most appropriate to the financial aspect of the business case that you are developing.

1. *Supply - Assumptions*
   - Aggregating more than 10 tonnes per year of compacted EPS in one location is challenging and it takes time to build up supply.
   - The most supply you can expect in one location is unlikely to be more than 50 tonnes per year, except for very large fresh food markets.
   - It is difficult to charge people/businesses that drop off EPS (a gate fee) and still secure supply – because EPS is light weight, and other low cost disposal avenues are usually available.
   - Dedicated collection services for EPS can be fee-for-service but they are unlikely to be profitable.
   - Because of the relatively low tonnages that can be sourced, financial models should not assume significant income on the supply side.
   - Landfill owners/operators will build avoided landfill costs into the model.

2. *Avoided Landfill Costs - Assumptions*
   - Landfill space in NSW is valuable, at least \$140/m^3, and each tonne of EPS takes up at least 18 m^3 of landfill space.

- Owners and operators of landfills will save at least $2,520/tonne of EPS diverted from their landfill. Note that this will be higher in landfills where the owner/operator values space at a higher rate than $140/m^3.
- To encourage separation of EPS, owners and operators of landfills should charge a premium rate at the landfill gate for loads of mixed waste containing a significant percentage of EPS (by volume).
- Currently EPS in the residential waste stream ends up in landfill because householders break it up and dispose of it in the rubbish bin. If this behaviour is to change, reasonable alternative disposal options must exist which capture this product for recycling.
- In some jurisdictions, there are potentially cost savings in that EPS will not be illegally dumped as often. Where appropriate, financial modelling needs to take this into account. For the purpose of this document these savings are nominally costed at $500 per tonne, although may vary across different jurisdictions. For some, this may be a conservative figure if a tonne of broken up, unprocessed EPS had to be cleaned up.
- Financial models should account for all avoided landfill cost savings where they flow to the operator of the EPS recycling service. If however, you plan to sub-contract the EPS recycling service to a business or not for profit community service, then you may need to consider passing on some of these savings to the contractor as an incentive.

3. *Demand - Assumptions*

- There is established international demand for compacted (recovered) EPS.
- It appears likely that new or enhanced local demand for recovered EPS will occur within a two-year timeframe.
- Transport costs for uncompacted EPS are large because of the volume of the product, not its weight.
- A number of contractors are currently offering services to purchase and transport recovered EPS. Refer to the Directory of EPS
- EPS must be kept separate, clean, compacted and well presented for transport, in order to maximise its value.

4. *Operational Matters – Assumptions/Issues*

When considering the financial modelling, it is essential that the following operational matters are considered and where possible, that costs are minimised. These are in addition to assumptions discussed above.

- Labour costs – gate keeping, operating the compactor etc.
- Equipment costs – lease or buy, size of the compactor etc.
- Power costs – running the compactor.
- Maintenance costs – for the compactor, how does this occur under the contract with your contractor (if any)?
- Transport costs.
- Administration costs.

About Financial Modelling

Making a return on investment

Recycling is a business and those offering services need to make a return on investment. A vast range of factors impact upon this for EPS recycling and they differ depending on what involvement you have in the business. Those who own/operate landfills have particular factors at play. These are significantly different from the factors that apply to social enterprise businesses, to EPS transporters, etc.

It is important to note that, in principle, making a return on investment involves an aggregation of making income and making savings. In any comprehensive financial model, both of these issues will be investigated as part of the business case process, and so both are addressed below. It is also important to consider issues like pay-back period. Your EPS recycling service might require seed funding during the establishment phase that can be 'repaid over time.'

Taking account of the assumptions discussed above, the following key points are important in the context of making a return on your investment:

1. There are opportunities for new business and investment in recovery of EPS.
2. Increasing the understanding of people in the supply chain, in the community and in business, that EPS can be (and should be) recycled is an essential early and continuing step in any successful program because it will result in an optimised level of supply.
3. *'Securing supply of recovered EPS is much more of a challenge than securing demand.'* (quote from key informant) Learning from the Pilot Project made it clear that landfill owners and operators found it challenging to source supply in sufficient quantities.
4. If you own/operate a landfill it makes sense to introduce an EPS recycling service and to make it free to drop off separated EPS. In this circumstance, the visibility of your collection cages and systems and other communication/education activity, will have a significant impact on the amount of EPS supplied for recycling. Setting a higher gate charge for mixed loads that include significant amounts of EPS by volume would incentivise customers to source separate.
5. Acknowledge that EPS recycling programs need time to gain traction with those who supply raw EPS for recycling and financial planning needs to take account of this.
6. Your largest potential up-front cost will be in obtaining a compactor. The following information is provided to assist you to consider your options and you should read it in conjunction with the Steps identified in the section below.

An important note about obtaining a compactor

The most financially challenging aspect of business planning for your EPA recycling initiative will be in obtaining your compactor. A part of this challenge is determining the size of the compactor best suited to your needs.

You have a number of options for obtaining a compactor:

- Purchase a new machine
- Purchase a second hand machine. Note: that this is a relatively new industry and so there are few second hand machines available
- Lease a machine. Note: that the cost benefits of leasing need to be considered fully because of the over time continuing impost.
- Reach a partnership agreement with a neighbour to source supply raw EPs to them for compacting. Note: this will become a more viable option as larger landfill owner operators obtain compactors.

If a rebate or a grant could be obtained, the cost of purchase becomes a much more viable option. Note a rebate means that payment occurs after purchase; grants generally provide funding up-front. At the time of publication programs of this sort are currently being considered in some jurisdictions and part of the Research Step in this Guide will involve you in identifying potential funding opportunities.

With respect to the Calculator, you should note that in each quote (for different size compactors), amortises the capital costs over five years (you can vary the number of years and the interest rate, if you like), so the cost of the equipment is already spread evenly over each tonne and each year.

Undertaking your financial planning using this Guidance

A simple task-by-task approach is recommended for best use of this Financial Modelling Guidance and developing your financial business case.

Task 1. Think about your proposed project and determine which of the assumptions detailed above, will apply to it. Make a note of these.

Task 2. Review the worked examples, below, to see if any are similar to your proposed situation. Extract issues for consideration from these.

Task 3. Use the EPS Facility Business Case Calculator to determine the financial modelling data that you need for your particular proposal.

An EPS Facility Financial Calculator is included as an Excel spread sheet and is provided for you to drop in your own figures and manipulate the data to best meet your situation. It is strongly recommended that you use this Calculator to build your own financial model. To do so your need to understand that the Calculator contains three spread sheets (called Quote 1 Quote 2 and Quote 3); the difference between each is the size and cost of the compactor. The current examples are based on equipment currently commercially available, but you should change the assumptions based on your situation and the equipment you are investigating (quoted specifications).

Each Quote contains within the Calculator has three tables:

i. The first of these contains the Financial Assumptions on which the calculations are based. These are in line with those outlined above.
ii. The second table calculates the financial savings that the project might achieve.
iii. The third table calculates the Income (and savings) achieved and Expenditure that will be required to deliver the project. It calculates a bottom line for one year of operation of an EPS recycling service within the specifications and costs provided.

When you use the Calculator the grey cells should not be manipulated. Data in these cells is calculated from the assumptions.

All other cells allow entry of your local data. By changing the data in one of these cells, you will amend the information in Income and Expenditure table. For example, if landfill space in your area is valued at $160 per cubic metre and you enter this figure in the Income table, it will automatically alter the calculations. Similarly if labour is costing you $20 per hour and you

Task 4. Save your final worked version of the EPS Facility Financial Calculator to a separate file and then extract the relevant data from it and use as required in your business case. You might choose to present this in a similar manner to the worked examples below, or as tables lifted direct from the Calculator or in some other form.

Task 5. As indicated above and in the worked examples below, most business cases require that financial modelling considers data at the establishment phase (Year 1 of the project) and then over the out years. This helps to determine ongoing costs, payback periods etc. To do this using the Calculator, you will need to develop separate spread sheets for Year 2 another for Year 3 etc. This is because of the higher up-front costs of establishing an EPS recycling service, cost of purchase of a compactor and cages etc.

Task 6. Review any other material that might be appropriate and include it in the financial component of your business case, for example:

Information about contractors providing services in EPS Recycling is contained in the Directory produced as a part of this Guide.

Expanded Polystyrene Australia (EPSA) has developed advice regarding the purchase and lease of EPS compactors. You will find this material at http://www.epsa.org.au

Some worked examples

Following are some worked examples of financial modelling in action. These are provided to show what a simple financial model looks like.

Each of the worked examples below, assumes a supply of ten tonnes of compacted EPS per annum. The Calculator, in its static form, essentially provides a 20 tonne worked example. The decision to select 10 tonnes for these worked examples is to demonstrate that there are circumstances where delivering an EPS recycling service is possible even when the yield is low.

It is noted that that worked examples are not provided for businesses on the demand side of the chain, transporters, logistics companies or contractors who accept and market compacted EFS. These businesses work within the construct of supply and how that supply is generated and at what cost, but market forces drive financial modelling within this side of the chain.

Financial Modelling Issues and worked example **for landfill owners and operators**

Depending on location, the nature of their core business, the amount of product sourced and their capacity to store, manage and transport it to market, it is possible for both public and private landfill owners/operators to provide an EPS recycling service at a profit or, at worst, cost neutrally, over time. In particular, labour costs and transport costs need to be carefully managed. The table below contains a worked example of the financial model cost savings/income in action in one landfill, where 10 tonnes of EPS can be sourced each year.

Worked example 1.

Income Table

Description	**Quantity**	**Units**
Total value of space taken by EPS $2,520.00/tonne in landfill	$25,200	10 tonnes
Savings on clean-up costs	$500	Assume 1 tonne
Income 10 tonnes	$5,000	10 tonnes at $500/tonne
Total estimated income and savings per annum	**$30,700 p/a**	

Notes: EPS density in landfill = 18m^3/tonne
See discussion above re why a yield of ten tonne p/a has been selected for this example.

Expenditure table

Description	**Quantity**	**Units**	**Cost per/ annum**
Processing time - Labour cost	33.33	hours per tonne	
	17.5	hours per week	
	5	hours per day	
Cost at $30 per hour for 10 tonnes p/a			$9,990
Power cost	$9.04	$ per day	
	$45.19	$ per week	
	$66.67	$ per tonne	
Total /annum		$ per 10 tonne per year	$ 668
Maintenance cost [Compactor]			$ 400
Equipment cost (Compactor: quote 1)*	Quote 1 year 1		$8,000
Administration cost			$ 320
Travel costs		500 km per year	$4,000
Marketing the service budget/education costs*			$3,000
TOTAL COSTS			**$**26,378**

Note: *This model does not include cage or container costs, which are one-off costs and may be already available. It also does not include costs for developing education and communication material, because these are available elsewhere in this Guide.

It does include costs for education and marketing the service note these are not included in the Calculator. It should be noted that a number of other costs might not be included in the Calculator but need to be considered, for example site rental, other infrastructure costs etc.

**Hence, this model shows that a small profit of $4,322 can be achieved in Year 1 at a source supply of EPS as 10 tonnes per annum. This should be able to be maintained beyond Year 1, if supply of EPS remains at a constant or increased level and other costs do not rise.

A case study

In order to understand some of the factors involved in financial decisions that must be considered, the following email exchange taken from the Pilot Program between a waste contractor who was a grant recipient (not the landfill owner) and the EPA project manager, sheds some light on the problem in one location. This is reported upon only to provide an example:

> *Presently we are transitioning into the new waste management facility in Orange (ORRRC) and organising the new organics processing facility at Euchareena Rd, Molong (ERRRC). J.R. Richards have some issues with the achievable productivity and the viability of the EPS processor and the fundamentals of our involvement on EPS recycling in Orange. During the fulfilment of our grant obligations we have calculated that the labour costs to collect, process, transport and manage EPS, results in a negative financial outcome for us as a commercial enterprise. With this in mind and the obvious positives EPS recycling would bring to Orange City Council and their waste management practices, we have advised council that it would be most appropriate if the processing equipment was controlled by council waste facility staff and primarily, their sub contractor, Wangarang Industries.*
>
> *Council have agreed to manage the EPS processor in conjunction with Wangarang Industries (a not for profit community service) as Wangarang are in the ideal situation, operating the waste facility weighbridge and organising the assessment and direction of all wastes transitioning through the Ophir Road site.* (Glynn Stewart, Regional Manager JR Richards Orange)

With regard to the issue raised above, the EPA Project Manager (Angus Johnston) indicates that in this case landfill savings were clear, but the benefits flow to Council not JR Richards. The following notes are direct quotes

> *Glynn points out a key learning of the project below. The small compaction units that we funded....impose a relatively large labour cost on the operator (in the order of $1,200/tonne), which is not commercially viable UNLESS:*
>
> 1. *The landfill space savings ($2,500/tonne) flows to the operator (and is recognised as a genuine saving).*
> 2. *The operator utilises staff that needed to be at the site anyway (and get paid), but are often underutilised.*
> 3. *The operator has an objective/responsibility to provide low skill employment/training (like Wangarang).*

OR a combination of the above

Financial Modelling Issues and worked example for **social enterprise businesses**

Social enterprise businesses are generally focused on developing opportunities that advance the lives of people with a disability; they assist people to achieve life goals and provide access to others and improved wellbeing. With regard to EPS recycling, they can offer collection, storage and compacting services at a significantly reduced rate, because wages are lower than those paid by Councils and other employers.

The EPA Pilot Project had a number of projects built around social enterprise businesses. There is important learning from these projects that relate to financial modelling. In the main challenges were:

- Arranging a collection run for compacted material
- Getting information to businesses and residents on how to prepare EPS for recycling.

Despite offering significant benefits through reduced wages, there is little opportunity for a stand-alone social enterprise business to make a profit from EPS recycling, unless they can generate substantial supply. This is because its only income source would be the sale of EPS and it would have to generate substantial quantities to be successful. This might involve contracts with local businesses to source supply and a number of EPS drop-off points situated around the area and emptied regularly. For example: note the following simplified worked example below.

Worked Example 2.

Income and expenditure table

Income per annum	**Income projected**	**Expenditure per annum**	**Expenditure projected**
Sale of EPS. Assume 10 tonnes per annum	$5,000		
		Power	$ 668
		Compactor purchase*	$8,000
		Cages etc.*	$2,000
		Labour 33 hours per tonne and $15 per hour	$4,950
		Transport	$3,000
		Marketing/Education	$3,000
Total Income	**$5,000**	**Total year 1**	**$21,618**

Note:* In this worked example, cages and the compactor would cost in Year 1 only, $10,000 in total. While in Year 2 expenditure would be reduced somewhat, because cages are a one-off costs, this is still considerably higher than the projected income from the project. While wages are cheaper there are no cost savings her because the social enterprise is not a landfill owner.

In this worked example the business would run at a loss of $16,618 in Year 1. The loss in Year 2 and subsequent years would be less unless supply could be substantially increased or other costs transport and marketing/education, reduced.

The bottom line of this situation would be improved if the social enterprise joins with Council or a private landfill operator, to provide a jointly managed model, where the social enterprise provided labour. If you refer to the table above in Worked Example 1, the labour related costs could be substantially reduced. It should be noted that this model exists with AFFORD and to a certain extent with the Great Lakes City Council. Note also, that from the Pilot Project, the Mai–Wel Group now has a strategic partnership with Hunter Resource Recovery (representing councils across the Hunter).

The situation would also be improved if the social enterprise formed a partnership with a business or businesses that generate significant quantities of EPS, hence increasing supply and generating more than 10 tonnes per annum.

Financial Modelling Issues and worked examples for **source suppliers**

There are a number of individual businesses that are high generators of EPS. In the Pilot Project, examples of these were Fuji Xerox and the Sydney Fish Markets. In both of these cases, because of the high volume of product available and the fact that sourcing this product was relatively low cost, it was cost effective to compact EPS on-site and to on-sell the recycled product. Transport costs are low and labour costs can be accommodated on-site.

Depending on the amount of EPS that could be sourced and the projected income, companies need to make a decision about whether to buy or lease a compactor and at what cost. See information at www.epsa.org.au

The following is a generic worked example for businesses of this type.

Worked Example 3

Income table - Year 1

Description	Quantity	Units
Income 60 tonnes projected	$30,000	60 tonnes at $500/tonne

Expenditure table -Year 1

Item	Cost per year	Explanatory Notes
Equipment cost*	$14,500	Purchase to be determined. Quote 3
Container cost*	$3,000	Nominal - $ per 20 tonne containers
Power costs	$3,330	$ 66.67 per tonne
Maintenance etc.	$1,000	Machine maintenance
Transport costs	$3,000	Low kilometres only
Labour costs	$10,500	Nominal cost depends on size/throughput of equipment. May be reduced in real terms because the business can assign underemployed operational staff to this task. Costed at $350 per tonne; $35 per hour.
Total Expenditure	$35,330	

* For the EPS source supply business the cages are one-off costs, so appear in year 1 only. Labour costs are reduced because of the capacity of the business to use underemployed staff

Hence in Year 1 (figures above) the program would generate an income of $30,000 and at the maximum the expenditure would be $35,330. Hence in Year 1 the program would require a subsidy of $5,330. But, assuming cages are purchased, more material was sourced and other costs were reduced at the margins, it would run as a cost neutral project or produce a small income stream of less than $5,000 per annum. This would mean a short pay-back period of one to two years for the Year 1 subsidised expenditure.