

**Submission to the Senate Committee for the  
Inquiry into the Management of Australia's Waste Streams**

**Using Industrial Waste**

**By**

**Robin Branson**

**Qubator Pty Ltd**

**15<sup>th</sup> May 2008**

**Introduction**

This submission is about using industrial waste as an alternative to dumping the stuff.

I outline a view of the current situation in practice and the commercial advantages and the environmental benefits that can accrue from using waste. I give a brief interpretation of the academic concept of industrial symbiosis, an effective management strategy directly related to the general topic but nevertheless one that seems to be significantly underutilised in Australia when compared with the potential for its deployment.

In the context of items c, d & e in the terms of reference for the inquiry, I suggest some measures that would enhance the capacity to exploit industrial symbiosis more widely in this country.

I mention topics in general terms only, on the grounds that details such as company names and academic references would make the submission un-necessarily long for its purpose. In any case, more detail can be provided on another occasion, if needs be.

I do not have the information to compare the financial and environmental cost of dumping industrial waste with the equivalent costs of dumping other types of waste such as mining waste or municipal waste. I cannot therefore offer an assessment of the relative importance of dealing with industrial waste. However, the scope and variety of work being done on waste and its effects on the environment, both in theory and in practice, suggests that the problems generally will be overcome by many different solutions. I contend that industrial symbiosis is one such solution that is worth pursuing.

Since 1989 my business has been finding uses for industrial waste. I write this submission primarily from a point of view that is commercial and practical. However, there is an academic perspective that I want to include which is derived from research I am currently doing at Sydney University for a PhD thesis on the sustainable use of industrial waste.

My business experience before 1987, when I started Qubator Pty. Ltd., includes banking, civil engineering, property development and building renovation. I have a

BSc. Hons. in Civil Engineering from the Imperial College, London University and an MBA from the AGSM, NSW University.

### **Finding uses for industrial waste**

In essence, the business of finding uses for industrial waste is fairly straight forward: A manufacturer dumps its waste; Qubator finds a use for it and manages the arrangements for alternative means of disposal. Occasionally the process works the other way round. Qubator will search for suitable waste on behalf of a user but the end result is the same: Waste is diverted away from landfill or sewer or indefinite storage; production costs are reduced for both the generator and the user and Qubator makes an income.

Although not always so, it is generally the case that if waste is being dumped there is not an established market for it in the way that there is for materials such as scrap metal, paper, glass and some types of plastic. By 'established market' I mean one that comprises a significant number of suppliers and users of waste, between whom a 'going rate' has been established for the material. Once a use for waste has been developed it may evolve into an established market such as occurred with brewer's grain and baked food products. For the most part, diversion from dumping is achieved by a relationship between the generator and a very limited number of corresponding users, if not a single user.

The point about markets is that although a particular waste material may not be traded generally, it may nevertheless be fit for a use that provides a viable alternative to dumping.

Even though industrial waste may be fit for use, it generally has a low intrinsic value. This may be due for example to the impurities it contains or the relatively low concentrations of the useful materials. Waste has to be handled, stored, transported and may also require intermediary processing, all of which incurs costs that are very rarely, if ever covered by its value to the user.

Notwithstanding any theoretical or philosophical views that may be held by observers of industrial behaviour, my experience strongly supports the proposition that the most powerful motivation, if not the only motivation for using industrial waste is the generator's desire to reduce the cost of disposal. The cost of dumping waste is therefore a critical factor in determining whether or not waste will be used, irrespective of the fact that it can be used.

In the context of this motivation to reduce costs, the following observations about disposing of industrial waste summarise the general situation in practice:

- Arrangements to use a particular waste generated in NSW can succeed but yet fail when the same waste is generated in another state such as Victoria or Queensland. The reason is simply that the cost of dumping in NSW is higher than in other states. The difference is enough to finance arrangements for use and still yield a saving to the generator.

- A generator of waste generally requires a significant reduction in the cost of disposal, say 15% minimum; otherwise they won't bother to change their procedures as may be necessary to facilitate use. A marginal reduction in the cost of disposal or no reduction at all would typically not be accepted by the generator.
- Qualitative factors such as not squandering resources or protecting the environment never take precedence over cost as a determinant of management's decision about using waste as opposed to dumping it. This applies as much to the potential user as to the generator. Each expects to reduce operating costs and certainly neither would ever accept an increase in cost in order to protect the environment etc.
- Corporate policy may prevent waste from being used. Where this is the case, it is generally to avoid the possibility of litigation in the event that 'something goes wrong'.

### **An Academic Perspective**

#### **Industrial symbiosis**

Industrial Symbiosis is defined as a relationship between two different, unrelated manufacturing organisations in which the waste from one of them is used as an input to the process of the other.

The benefits are that costs of disposal for the generator of the waste are reduced, the cost to the user of inputs is reduced and 'pressure' on the environment is reduced because it does not have to 'absorb' the material for which dumping has been postponed while it is used again, if not avoided altogether.

That, at least, is the theory. The underlying question is: Can the theory be applied more widely in practice than it is currently in Australia and if so then what is the most effective way of making Industrial Symbiosis happen? These questions constitute the principal focus of my PhD research.

There are locations where Industrial Symbiosis has operated very successfully in practice, most notably at Kalundborg in Denmark, which inspired the theory in the first place. However, in this and other locations the practice evolved over many decades and under very particular circumstances that are not typical of industrial activity generally. The academic task is to find a way to accelerate the process of evolution or more likely, circumvent it altogether by developing processes and tools which do the same job more quickly.

Recycling 'tradable' waste such as scrap metal, plastic, cellulose fibre, brewer's grain and the like is a form of Industrial Symbiosis that has certainly been a feature of manufacturing for at least 150 years. However, the range of 'tradeable' waste is limited in comparison with the variety and amount of waste that could be used, even though it may not satisfy a broad market in the way that tradeable waste does.

The academic literature written about using industrial waste includes research on the value of doing so instead of dumping the stuff. A study of recycling plastic and glass packaging done in 2004 in the UK calculated the energy expended in pursuing each option using life cycle analysis (LCA). The authors' conclusion in this particular case is that recycling is the better option. However, it has to be acknowledged that had some assumptions been made differently the conclusions may not have been in favour of reuse.

The point in mentioning this aspect of the academic debate on using waste is to suggest that computational techniques such as LCA and ecological footprint analysis are not good at dealing with qualitative variables and that in practice intuition may be a surer guide for effective strategy.

### **Industrial Ecosystems**

I want to draw a distinction between industrial ecosystems and industrial symbiosis because ecosystems are much more complicated structures which involve issues that are not relevant to industrial symbiosis, yet may be construed as being so and hence obscure the value of symbiosis as a viable strategy.

While industrial symbiosis is simply a relationship between two unrelated organisations for the sole purpose of using waste, industrial ecosystems comprise a (larger) number of organisations that form a network through which various resources, including waste, may be exchanged.

Industrial ecosystems may evolve naturally, as a result perhaps of multiple symbioses or they may be designed, for example as eco-industrial parks. Whatever their origin, industrial ecosystems have common characteristics which distinguish them from industrial symbiosis. For example: the organisations in an ecosystem are co-located or at least in close geographic proximity; there may be strong commercial inter-dependence between two or more of the organisations; services such as cleaning and maintenance may be shared; raw materials and other 'commercial inputs' may be purchased collectively. None of these characteristics pertain to industrial symbiosis.

### **Government Policy**

In the context of industrial waste, it seems that Government (at all levels) must maintain two general policy positions that are the antithesis of one another. In the interests of society as a whole, Government has an overarching responsibility to protect the environment. There is abundant evidence, from my experience alone, indicating emphatically that Government is the only institution that is willing to protect the environment and has the power to do so.

It is self-evident that Government also has a responsibility to support industry which conflicts with that of environmental protection. No matter what is done in practice, it will cost more to protect the environment than not to protect it. The underlying question is: Who pays? The inevitable response from both Government and industry is: Not me! But inevitably someone has to pay and the concept of equity suggests that both should.

The conflict between these policies, as they relate to the environment in general and to costs in particular, may be mitigated by strategy, if not resolved completely. There are precedents for this approach in other parts of the world, for example in Belgium where tax relief is available for environmental initiatives and some States in the USA where relief from penalties for environmental transgressions is available if the remedy 'goes beyond compliance'. The essence of these approaches is to transform conflict between industry and the authorities into powerful co-operation that benefits every member of the community as a whole.

### **Strategy**

The strategic approach I am proposing for Government has two aspects: make dumping industrial waste more expensive and then offer cost relief and other incentives to avoid dumping.

Industrial symbiosis is essentially a management strategy, as distinct from one used primarily to protect the environment, notwithstanding that the strategy does produce significant environmental benefits. I draw this distinction in the context of motivation. Industrial symbiosis simply will not happen in practice unless there is a financial incentive to use it. Environmental protection and social responsibility may be 'feel good' factors for management but they are very rarely, if ever, sufficient motivation on their own for implementing industrial symbiosis.

Government strategies that would provide effective inducements to industry include:

- Increase the cost of dumping waste.
- Prevent the dumping of waste that can be used. For example: if it can be demonstrated that technically and economically a waste material is fit for a particular use then dumping it would be banned for as long as that use endured. A precedent for this strategy is the refusal at some tips in NSW to accept un-segregated demolition waste.
- Provide tax incentives to the generator of waste for arranging uses for the stuff or for re-using it on site. A precedent for this strategy is the tax incentive offered for funding R&D.
- Offer 'rewards' to organisations that 'go beyond compliance' i.e. significantly exceed the environmental requirements of prevailing legislation. Examples of such rewards are relief from penalties incurred for transgressing current environmental regulations or reduction in surveillance by the authorities and hence the costs of monitoring environmental performance.
- Offer co-operation with industry in finding uses for industrial waste. This might involve services such as liaison between Government departments, search for and retrieval of information or more direct involvement such as joint development of facilities to render industrial waste as well as some municipal waste fit for use.
- Provide a legal framework in which industrial symbiosis can operate effectively and in which, inter alia, the responsibilities and liabilities are defined unambiguously.
- Support various forms of training for middle and senior operational management in the general topic of using waste.

## **Conclusion**

The points raised in this submission that I would like to emphasise in conclusion are these:

- Industrial waste in Australia that can potentially be used is nevertheless being dumped, very much to the detriment of the environment and industry.
- Arranging uses for waste is not a complicated business and is well within Australia's collective industrial capability to accomplish, when it is sufficiently motivated to do so.
- The power of Government to protect the environment and particularly to regulate the cost of dumping is the only force which motivates industry to avoid dumping waste.
- Industrial symbiosis and collaboration between industry and Government are effective strategies for mitigating environmental damage and conserving resources.
- Legislation that facilitates these strategies would significantly enhance the results of their deployment.