

Submission Date	9/23/2019 1:27:00 PM
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Question 1 - What are the key issues facing the NSW waste system?

Firstly, a lot of the waste that ends up in sorting facilities has been wrongly collected. In many Australian cities, up to 50 percent of general rubbish ends up in the yellow bins designated for plastic and other recyclables, including packaging waste that needs to be separated from the valuable plastics. Secondly, plastic packaging is often made from a variety of polymer types. For example, meat packaging includes several protective layers to avoid discolouration of the contents, although only single-variety plastics can be recycled. Automated facilities are unable to sort food containers made from different types of plastic, resulting in much mixed plastic packaging ending up being discarded, and this a problem across most developing nations. Our current system focuses almost exclusively on putting a range of recyclables in the one bin (a practice that dates back to early 1990). This approach has failed us, as we lose 15% - 20% on average according to the data based on collection. However, it has been discovered that the data collected is inaccurate, SKM in Victoria is a case in point, where for years all the recyclables from 30 councils were reported by government authorities as being recycled when in actual fact it was stockpiled in warehouses. Additionally, we lose a third of the glass we present through excessive breakages. We also seriously contaminate the paper and cardboard with glass fragments, undermining paper recycling and damaging the paper-making equipment. At the moment when recyclables are delivered to Material Recycling Facilities (MRF), the majority of these facilities export a high percentage of these recyclables since it's cheaper and avoids them from paying landfill levy, so in fact we provide no incentive for these facilities to invest into or sell their products locally to other industries as they need to prove its being diverted therefore adding a further burden and cost in their structure.

Question 2 - What are the main barriers to improving the NSW waste system?

Australia can no longer sustain resource recovery technologies that only provide single stream recycling as they have demonstrated their inefficiency due to their 100% dependency on household's behaviour, attitude and knowledge towards recycling. To illustrate this, if a MRF receives dirty material it will produce dirty material also needing to landfill between 20%-30% of its input. If an MBT facility receives dirty material it will produce a dirty output and if an Incinerator receives dirty material it will be less efficient and contaminate. Secondly government and industry organisations are not enforcing the purchase of recycled materials in the form of new products. Brand owners need to increase the recycled content of their packaging to the technical limits. Government agencies need to receive ministerial direction to prioritise the use of recycled content and other materials in all procurement activities.

Question 3 - How can we best reduce waste?

This can be achieved by government and industry organisations enforcing the purchase of recycled materials in the form of new products. Brand owners need to increase the recycled content of their packaging to the technical limits. Government agencies need to receive ministerial direction to prioritise the use of recycled content and other materials in all procurement activities. Funds collected from landfill levies need to help fund this transition to a robust, world-leading approach, including support for establishing resource recovery plants at council level. Continuous promotion of container deposit scheme that must cover all beverages. The deposits need to be redeemed for material flowing through our kerbside system to increase its economic value, and not be confined to a limited number of reverse vending machines. To support circularity and close the loop in products life cycle, the integration of innovative recycling technologies must play a more essential role in any strategy. Investment, integration and facilitating the implementation of these technologies from

government agencies is a must. It is no secret that the reason for kerbside recycling not achieving the desired results is mainly attributed to the large percentage of product contamination and MRF's not having the capability to process all recyclables contained in the bin. Therefore, having a technology like Bioelektra that can address these challenges will help set the industry back on its track.

Question 4 - How can we recycle better?

We can improve our recycling rate by introducing innovative technologies like ours which are designed to target the contamination problem faced by single stream recycling, the idea behind the technology is to be able to have a multi input with multi output process that is able to recover resources from different waste streams, turning them into process ready materials in one single process. Bioelektra developed a waste treatment technology that unveils resource potential in waste. It allows for simple methods of waste collection and does not require further segregation-at-source. The process is based on a separation method known as mechanical heat treatment, which involves sterilising waste streams with steam. This is the key to the process as by having the materials sterilised prior to sorting enables us to process dirty multi-stream inputs and turn them into clean multi stream outputs. The recovered individual fractions (Biomass, Refuse Derived Fuel RDF, glass, plastics and metals) are then process ready and sent to recyclers. The most significant point of difference of our technology is the commercial grade of recovered materials. The quality of the material creates an ample appetite from existing and emerging markets which in turn stimulates local economic activity through the creation of jobs, new products, retains valuable resources within the local economy, reduces reliance on virgin materials and stops the need of stockpiling driven by downturns in international market demand. Our ongoing collaborative R&D with Melbourne University, RMIT and local businesses have provided the emergence of innovative alternative use and applications for recycled materials, mainly coming from the building and construction industry. This reinforces our efforts of developing reliable end markets where they currently do not exist. The most affluent market for the recovered glass, plastic and biomass is in the form of aggregate for the manufacturing of bricks, road base and cement render. This is all supported by the trials conducted by the University of Melbourne and RMIT who have indicated the possibility of using MSW as a main ingredient in construction material for non-load bearing elements, temporary works and road construction. Established local manufacturers are also a reliable local end market for recycled plastic and metals, as we can supply businesses with commercial grade materials that are almost ready to use

Question 5 - What are the main opportunities for improving the NSW waste system?

Bioelektra technology can provide the following benefits and improvements to the NSW waste system: 1. Divert over 90% of the waste from landfill. 2. Recycling over 65% of the mixed waste without manual handling or further source separation. The only technology in the world that can achieve this high result. 3. Make recyclers more efficient as they don't have to worry about levels of material contamination that could affect their process and bottom line. This will also revitalise the recycling industry by providing clean products of commercial grade 4. We can provide uncontaminated materials to EfW technologies 5. 100% of workforce required for each facility is sourced locally, providing 200 short-term and over 34 long-term employment opportunities per 100,000 tonnes of MSW processed. 6. Provide environmental benefits through the diversion of organic waste from landfill. 7. Provide a sustainable waste management solution for commercial waste generators as an alternative to landfilling. 8. Produce low cost alternative energy, generating 8mw for every 100,000 tons of waste processed. 9. Save the environment, 400kg of Co2 emissions per tonne of waste processed at the facility rather than landfilled. 10. Drive investment to regions, increased visitation, and business opportunities. 11. Embracing innovation and new generation technologies stimulating creativity, collaboration and encouraging business partnerships. 12. Developing markets for innovative products from output materials: I. Biomass with potential

application as a fuel to produce green energy II. Recovery of plastics isolated into PET, PP and PE + PS and provision of washed and fragmented plastic flakes III. Separation of glass for production IV. Separation of pre-solid refuse fuel (SRF) fraction for alternative fuel production and recovery in form the of energy

Question 6 - Any other information that you would like to contribute to the waste strategy initiative?

Please refer to full feedback submission emailed by Bioelektra Australia