**Waste 2017 Abstract Submission**

**<<Managing Landfill Gas at Kimbriki: The path to Best Practice>>**

*My presentation is relevant to the following topic area(s).*

🞎 Circular economy 🞎 Overseas experiences

🞎 Collection (inc MUD’s, transient population areas) 🞎 Problem/Hazardous waste (inc asbestos, clinical &

🞎 Container Deposit Schemes medical, ocean plastics, paint, tyres etc)

🞎 Economics (inc business cases, data gathering, 🞎 Product Stewardship

monitoring performance) 🞎 Regional issues

🞎 Education (inc community engagement) 🞎 Recycling (inc CRC’s, collection)

🞎 E-Waste 🞎 Regulations and levies

🞎 Grants (outcomes and processes) 🞎 Social enterprise

🞎 Infrastructure (inc major waste grants, EfW, organics) 🞎 State based issues (eg. Fit for the Future NSW)

√ Innovative projects (case studies preferred) 🞎 Technology

√ Landfill (inc operations, regulations) 🞎 Tenders and contracts

🞎 Litter and/or illegal dumping (inc litter initiatives) 🞎 Other 🞎 Organics (inc collection, processing)

**Presenter information**

**Presenter name:** Belinda Lau

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**Biography**

Belinda is a project engineer at Kimbriki Environmental Enterprises Pty Ltd and has been involved in a wide range of landfill engineering planning, design and construction activities since joining Kimbriki in 2015. This has included evaluating the performance of the site landfill gas extraction system (on a monthly basis), preparing Kimbriki’s NGER reports, landfill gas monitoring, undertaking a detailed assessment of the risks presented by landfill gas at the Kimbriki site (on site and off site), developing a new landfill gas monitoring program, designing horizontal gas collection trenches and evaluating the performance of a trial (and then full scale) temporary landfill biocover. Other work experience has included landfill planning (using 3D modelling software), landfill cell design and costing, landfill cell construction, including CQA, and stormwater drainage design. Belinda is a member of WMAA and graduated with first class honours from UNSW with a Bachelor of Civil and Environmental Engineering.

**Abstract Summary**

The Kimbriki Resource Recovery Centre is located on Sydney’s Northern Beaches and incorporates a range of resource recovery facilities and a non-putrescible waste landfill. Approximately 3.5 million tonnes of waste has been landfilled at the site since operations commenced in 1974. In 2012 an action plan was developed and steps taken to aggressively reduce landfill gas emissions at the site, which, in addition to a conventional gas extraction and flaring system, included progressive installation of horizontal gas collection trenches (during landfilling) and the strategic application of biocovers. These measures have led to a >55% reduction in landfill gas emissions at the site.

**Abstract**

Kimbriki Environmental Enterprises Pty Ltd (KEE) operates the Kimbriki Resource Recovery Centre, on Sydney’s Northern Beaches. The Centre incorporates a range of resource recovery facilities and a non-putrescible waste landfill. In 2015/16 the Centre received a total of 332,000 tonnes of waste, landfilling 59,700 tonnes. Since commencing operations in 1974 about 3.5 million tonnes of waste has been landfilled at the site.

In 2009, when KEE took over operation of the facility, landfill gas management essentially comprised compaction and covering the landfilled waste. In the same year KEE commissioned an initial assessment of gas emissions using flux boxes, which concluded that a very low volume of gas was being emitted from the site, although future works showed this assessment to be flawed.

In 2012, in preparation for the introduction of the carbon tax, KEE commissioned a review of landfill gas generation, emissions and management options at the site. The outcome of the review was an action plan to reduce fugitive landfill gas emissions at the site sufficiently to avoid any potential financial liability under the then proposed Carbon Pollution Reduction Scheme.

In late 2013 KEE installed a conventional gas extraction and flaring system comprising 19 vertical gas wells and a flare that initially recovered 120m3 of landfill gas per hour as well as delivering immediate benefits in odour reduction. Despite the termination of the Carbon Pollution Reduction Scheme the landfill gas capture system has been progressively expanded via 4 additional vertical gas wells and 5 horizontal gas collection trenches progressively installed in the active landfill cell, plus connections to parts of the existing leachate drainage system. These measures have led to an increase in landfill gas capture from 120m3/hour to approximately 450m3/hour and a reduction in fugitive landfill gas emissions of more than 25,000 tCO2-e in 2015/16. Interestingly the 5 horizontal trenches installed in the active landfill cell are collecting approximately 180 m3/hour (~ 40% of the total gas flow), and the whole gas collection system is currently collecting more than 60% of the “modelled” landfill gas generation.

Due to the performance of the landfill gas capture system in late 2015 KEE entered a Carbon Abatement Contract under the Emissions Reduction Fund to provide carbon credits to the Australian government. KEE is currently submitting it first claim for carbon credits.

During the process of optimising the gas management system KEE began a program of surface scanning to identify high emissions areas. This scanning was particularly focussed on intermediate and perimeter batter slopes and other areas where installation of an active extraction system is not suitable. Informed by this work KEE, in consultation with the NSW EPA, installed a trial biocover over ~2,500m2 of intermediate covered batter slope in mid-2014. Monitoring shared with the NSW EPA showed the efficacy of this treatment, reducing fugitive emissions from the interim batter slope by 96%. Subsequently the NSW EPA issued a licence variation to allow for the extended application of biocover layers and KEE now has approximately 11,300m2 of biocover installed on the site, which also greatly reduces potential erosion from these areas.

Currently, KEE is reviewing its landfill gas management and monitoring measures following the release of the revised version of the NSW EPA’s Environmental Guideline: Solid Waste Landfills, which contains substantial new requirements in relation to landfill gas management. This includes undertaking a comprehensive assessment of the risk landfill gas presents to people and infrastructure on site as well as off site. KEE has also commissioned an evaluation of various options for using the landfill gas for power generation, for both on site use and potentially export.

This paper will describe in more detail the process and steps taken to reduce landfill gas emissions at the site by more than 55%. It will also outline KEE’s future plans.