GreenCape Webinar Dialogue: Innovative brine management solutions

11 June 2020





CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD

In partnership with

GreenCape



GreenCape works with business, government and academia, removing barriers to catalyse the large-scale uptake and spread of economically viable green economy solutions and infrastructure. A non-profit organisation, our vision is a thriving prosperous Africa, mobilised by the green economy

Purpose of today's webinar:

Brine wastewater management is a significant challenge for many companies.

This event is an opportunity to discuss viable options as well as a call to action to find innovative, cost-effective solutions



Agenda

10.15 – 10.35: Background to the challenge

10.35 – 10.55: Brine management options

10.55 – 11.25: Presentations from companies that have explored brine management solutions (Interwaste and de Beer and Associates)

11.25 – 11.55: Q&A and panel discussion with Dr Valerie Naidoo (Water Research Commission), Dr Henry Roman (Department of Science and Innovation), Nigel Bester (Interwaste) and Forrester de Beer (de Beer and Associates)

11.55 – 12.00: Closing and way forward



Who is attending this webinar?



Government includes DEFF, DEADP and City of Cape Town



Rules for the webinar

- 1. Change your name to include your organization (Click on Participants, then click on your name, and select rename. Add your organization name in brackets)
- 2. Keep your camera and mic off unless you are a speaker/panelist and are speaking
- 3. Use the chat function to ask questions. The questions will be answered in the dedicated Q&A session at the end of the webinar



Introducing GreenCape's speakers



Jane Reddick Senior Water Analyst



Sam Smout Waste Sector Desk



Yaseen Salie Bio-energy Analyst



Background to the challenge of brine



What is brine?

- Brine is a high concentration solution of salt in water
- As a waste stream, it typically emanates from reverse osmosis or wastewater treatment processes from industries
- Brine waste streams are under-reported and there is a low level of confidence in the data (State of Waste, DEA, 2018)
- 2009 study suggests ~1,000,000 kl/day generated in SA (of which ~50% disposed via sea outfall)
- Projections estimate a 5-6 fold increase in brine waste over period 2009-2029, entirely due to mining



Brine production by sector (salt load to the environment, excl. via sea outfalls)



Focus of this webinar

- Brine generated by businesses from:
 - the treatment of saline groundwater
 - industrial processes
- Many of these companies have been struggling to find well-suited, cost-effective solutions to manage their brine
- This dialogue aims to highlight the need for innovative brine solutions
- GreenCape has compiled an industry brief: <u>https://www.greencape.co.za/assets/Uploads/Brine-</u> <u>Industry-Brief-WEB-12-4-2019.pdf</u>



Wastewater and Waste Regulations



Wastewater discharge regulations

- Each municipality has its own wastewater by-laws
- For example, the City of Cape Town's industrial effluent limits are:

SCHEDULE 1

Maximum limits of permitted discharges

	Section A: General	Not less than	Not to exceed
1.	Temperature at point of entry	0 °C	40 °C
2.	Electrical conductivity at 25 °C	(500 mS/m
3.	pH Value at 25 °C	5.5	12.0
4.	Chemical oxygen demand		5 000 mg/l

- A discharge permit is required to discharge brine or other industrial effluent to sewer
- Authorisations are also required for discharge to land (e.g. irrigation), water resources or sea (via sea outfall)

Source: City of Cape Town's Wastewater and Industrial Effluent By-law, 2013









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(2017). Historical Revi

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The National Norms and Standards for the Disposal of Waste to Landfill (R636 of 2013)

Waste disposal regulations: N&S for the disposal of waste to landfill

- Min Req. for Waste Disposal by Landfill
- Landfill classifications

gases in a landfill Flammable (as defined)

Waste with a p⊢ of <6 or >12

- Containment barrier design
- Acceptance criteria for landfilling
- Waste disposal restrictions Section 5 Pipeline



(n)	Hazardous Waste Electric and Electronic Equipment (WEEE) - Other.	Eight (8) years
(0)	Waste tyres: Whole.	Immediate
(p)	Waste tyres: Quartered.	Five (5) years
(q)	 Liquid waste– (i) Waste which has an angle of repose of less than 5 degrees, or becomes free-flowing at or below 60 °C or when it is transported, or is not generally capable of being picked up by a spade or shovel; or (ii) Waste with a moisture content of >40% or that liberates moisture under pressure in landfill conditions, and which has not been stabilised by treatment. 	Six (6) years
(r)	Hazardous waste with a calorific value of: (i) > 25 MJ/kg. (ii) > 20 MJ/kg. (iii) > 10 MJ/kg. (iv) > 6% TOC.	Four (4) years Six (6) years Twelve (12) years Fifteen (15) years
(s)	Brine or waste with a high salt content (TDS > 5%), and a leachable concentration for TDS of more than 100 000 mg/l.	Eight (8) years
(t)	 Disposal of garden waste: (i) 25% diversion from the baseline at a particular landfill of separated garden waste. (ii) 50% diversion from the baseline at a particular landfill of separated garden waste 	Five (5) years Ten (10) years



Brine Management Options



Key treatment and disposal options*



*This is not an exhaustive list of options

** MLD: Million litres per day



Brine opportunity scanning





Background

- WISP focuses on under-utilised resources
- Brine increased as an under-utilised resource as alternative water sourcing plans were implemented during the drought
- An opportunity scanning exercise was conducted to assist in adding value to brine and/or the byproducts produce in brine treatment/disposal



© WISP Ashes to Brick



WISP worked with Apollo Brick and Pallet Cycle to help divert 55 tonnes of charred wood and ash from going to landfill in a once-off exchange

The Organisations

Apollo Brick and Pallet Cycle Experiments and deservation has a de

Apollo Brick, a brick manufacturing company manufactures approximately 200 million brids per annur using the taxificianal process of mining, clay beneficiation, extrusion, open air diving and clam burning.

Pallet Cycle, a company that previously made wooden pallets from vigin material, have transitioned to manufacturing quality recycled pallets using selected second-hand triber. Pallet Cycle has been working with WSP since the commencement of the programme after WSP had identified the business opportunity for the recycling of disuased pallets from other commonies.

The Challenge

An accidental free over one of the holdsys bound down Pailet Cycle strongs in Gitywacherg haf the stored pailet into a hand leaving the mart partially burnt into charnel accosed. The first endeeted his burnt pailet unaable, there was no chance to a subrag ensurement of the pailet. Failet Cycle new reached to dispose of the burnt wood and approached WSP to find out if there was a site and into the store of the first and alternative and and approached WSP to find out if there was a site advector to the store in the meand of the advectore. A tenness of material them readed to be advectored.

The Solution

Contrary to some preceptions that may exist, the day brick industry is one of the most programics exciton in the Watern Cape. The industry has a forward thinking landsmith plate wants to be at the foreboot of increasion. It wait efforts to deviate high plane quality more affordable brick that are also more sustainable, the comparise have demonstrated a willingeness over the years to by and set variance anticide addiorant material additionary environmentarities efforts are additional material additionary environmentarities efforts and additional material additionary environmentarities efforts and additional material materials as they can be blanded into the raw mix to produce brids with verying properties. WSP approached Apollo Brids with the proposal to take the bount material from Pallet Cysle. After inspecting the quality and doing a cost benefit

After inspecting the quarky and doing a cost benefit weaking Apple docided they could use the material. Apple Bink used revene logistics to transport the material back to their facility. The salt was incorporated into the brids as traditionally done in the industry and the perially bount wood was used as fault in the Kih backuas of the energy content.

to enhance the seathetics and quality of their products

The Benefits

Economic Benefits

An annual seving of F24 750 by Pallet Cycle being able to avoid transport and disposal costs.

 Apoilo Brick can continue to make quality environmentally friendly brieds at low cost thanks to cheaper fuel and additional freed material obtained at less than cost price.

Environmental Benefits

A total of 55 tonnes of waste diverted from landfill.

- A total saving of 16 tonnes of fossil greenhouse gases (CO2e).
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- The recycling and reuse of burnt wood means a reduction in the use of virgin materials.



Opportunities explored

Non existent solutions





Barriers encountered







Thank You

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