DCLM Innovation Challenges
- Information Session/Q&A -
Agenda

09.00 BST / 10.00 SAST – Welcome and Housekeeping
09.10 BST / 10.10 SAST – Introduction to Global Alliance Africa and Open Innovation
09.20 BST / 10.20 SAST – Introduction to DCLM
09.30 BST / 10.30 SAST – DCLM Open Innovation challenges
10.00 BST / 11.00 SAST – Q&A
10.20 BST / 11.20 SAST – Next steps
10.30 BST / 11.30 SAST – Close
Housekeeping

- The Information Session will last up to 1.5 hours
- Please use Zoom chat for submitting your questions
- This session will be recorded and shared later
Positive Change Commitments

Positive Change
We create diverse connections to drive positive change

Deep Expertise
We have wide-ranging expertise and convene the expertise of others

Powerful Connections
We drive powerful connections with businesses at the heart of what we do

Future Shaping
We shape the innovation communities of the future

Our People
We provide an exceptional place of work for our exceptional people

We will collaborate globally to create valuable international connections for innovators.

We will extend our activity beyond economic prosperity to also deliver sustainable societal & environmental benefit.
<table>
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<tr>
<th>OUR NETWORK</th>
<th>SECTORS</th>
<th>CROSS-CUTTING AREAS</th>
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<tbody>
<tr>
<td>TRULY CROSS-CUTTING NETWORK</td>
<td><strong>We create diverse connections in the following sectors and areas of focus to drive positive change</strong></td>
<td>GLOBAL INNOVATION</td>
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| +40K UNIQUE ORGANISATIONS | • AgriFood  
• Biotechnology  
• Chemistry  
• Creative Industries  
• Design  
• Digital  
• Electronics  
• Energy  
• Geospatial  
• Health  
• Industrial Maths | DIVERSITY AND INCLUSION |
| 90% SMES | • Infrastructure  
• Manufacturing  
• Materials  
• Photonics  
• Quantum  
• Robotics and AI  
• Security and Defence  
• Sensors  
• Space  
• Transport  
• Water | PLACE |
| +273K INNOVATORS IN THE UK | OVER 30 COUNTRIES | NET ZERO |
| WWW.KTN-UK.ORG | | ADOPTION AND DIFFUSION |
Impact to innovation

- **66%**
  - Introduced by KTN go on to **collaborate**

- **42%**
  - Reach outcomes **faster** by 1-2 years

- **60%**
  - Increased **investment** in R&D as a direct result from KTN engagement

- **£100m**
  - Per year increased **investment** in R&D
Building UK-Africa Partnership through…

Local to Global
Open Innovation
Place-Based Innovation

Access to Funding
Collaborative R&D Funding
Strengthening the Investment Pipeline

Connected Innovation
Global Innovation Network

Deep Expertise
* Manufacturing & Materials | Transport & Mobility | AgriFood | Health | Climate Technologies | Digital Economy *

* Sector coverage subject to funding level & project priorities
Open Innovation (OI) programme
Local Empowerment Through Collaboration

Innovation Exchange is a KTN programme specially designed to introduce company with technical challenges to innovators who are already working on the solutions.

**Sector Technical Challenges**

Large organisations, OEMS and Local Authorities have:

- Confidential challenges to solve with no time to explore markets
- Low exposure to companies outside the traditional industry supply chain

**Innovative solutions *from other sectors***

Solution providers find it difficult to:

- Open the right doors at a large org, OEM or local authority
- Prove the value proposition of products
- Understand customer’s time constraints

**Challenge owners**

**Solution providers**
Previous Challenge Holders
The iX process

(1) Challenge translation
Identify and translate innovation challenges with KTN

(2) Competition
Prepare and release competition to extended KTN and innovation networks

(3) Solution selection
Filter and select responses by Solution Providers to the call

(4) Relationship building
Engage with chosen companies and identify routes for technology development

(5) Pilot project
Run collaborative pilot project with KTN seed funding

Workshop → Public competition → Selection and pitching → Technology development → Milestones

Workshop → KTN → KTN & Challenger → KTN support → KTN support
Benefits for Challenge Holders

Supply Chain Strengthening
It helps build a route for greater and more diverse innovation content in supply chains

Quick and simple exposure to new technologies and markets
KTN delivers technology solutions from areas to which challenge holders do not normally have exposure (both in- and cross-sector)

Time efficient
It requires little time commitment, with the bulk of the resource and time provided by GAA

Expertise at no charge
We are fully funded by the UK Government and there is no charge to you for our professional services
Benefits for Solution Providers

Immediate access to large business
Successful applicants will be given the opportunity to pitch their solution to the Challenge Holder

Ongoing collaboration on project
The selected Solution Provider/s will collaborate with the Challenge Holder and gain access to local facilities, eg: farmland to carry out trials for piloting the solution

Seed Funding provision
Up to GBP 25,000 seed funding to work on the solution for this specific challenge in collaboration with the Challenge Holder

Pitching and development support
Support from KTN and mentoring from our development partners throughout the challenge process
Global Alliance Africa Open Innovation Challenges FY21/22

• Kenya
  • Flamingo Horticulture
    • False Codling Moth detection
    • False Codling Moth control
  • WEEE Centre
    • CRT recycling – new products
    • CRT recycling – energy reduction

• South Africa
  • Unilever
    • Plastic packaging reuse for online retail
    • Plastic packaging reuse for small traders
Global Alliance Africa Open Innovation Challenges FY22/23

• Kenya
  • Airport navigation Web3 challenge
  • Improved packaging for sea freight
  • Unilever challenges TBC

• Nigeria
  • Battery second life challenge
  • Battery inventory system challenge
  • Bird management challenge
  • Unilever challenges TBC

• South Africa
  • WTR drying challenge
  • WTR beneficiation challenge
  • Leachate concentration challenge
  • Paper waste valorisation challenge
Introduction to DCLM
**DCLM ABOUT US**

**Acquisition of the landfill site by DCLM**
- DCLM was acquired during 2007, contracted to Wasteman for a period of 5 years
- 2 main clients: Kwadukuza Mun. & Wasteman (for all other 3rd party waste)

**2006**

- Acquisition of the landfill site by DCLM

**2012**

- Commence Operations as a H:H Facility
  - ISO 14001 & OHSAS Certifications
  - Signature of substantial contracts with prominent industrial clients: Samancor, BHP Billiton, Mondi etc.

**2013**

- DCLM Management Team
  - Award of H:H (Class A) License & Conversion from General Waste to High Hazard Landfill
  - DCLM becomes a Level 2 BBBEE Contributor

**2014**

- Sealing of Cell 1 (600,000m³) and commence operation of Cell 2 (1,160,000m³)
  - Leachate Treatment Plant
  - Operation of Laboratory
  - ISO 17025 Laboratory Certification

**2017**

- Renewal of Class A License for 10 years
  - Dam 3 Construction
  - Cell 3 Construction
  - Upgrade LTP
  - Integration & Development

**2019**

- Veolia acquisition

**2020**

- Operation of Laboratory
  - ISO 17025 Laboratory Certification
  - Upgrade LTP
  - Integration & Development

- Veolia acquisition
With nearly **179,000 employees** worldwide, Veolia Group designs and provides water, waste and energy management solutions which contribute to the sustainable development of communities and industries.

Through its three complementary business activities, Veolia helps to develop access to resources, preserve available resources, and replenish them.

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<td><strong>95 million</strong></td>
<td>people with drinking water</td>
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<td><strong>62 million</strong></td>
<td>people with wastewater service</td>
</tr>
<tr>
<td><strong>43 million</strong></td>
<td>megawatt hours of energy</td>
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<tr>
<td><strong>47 million</strong></td>
<td>metric tons of waste</td>
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Veolia’s success is founded upon its usefulness to all its stakeholders:

- Planet
- Customers
- Shareholders
- Employees
- Society

Maximizing Veolia’s impact for all with five performance aspects:

- Economic and financial performance
- Commercial performance
- Social performance
- Societal performance
- Environmental performance
Total Land Area: 144.6 hectares
Total Landfilling permitted: 49.2 hectares
Total Airspace, up to: 15 million $m^3$
Total no. of cells in the future: 13
Airspace:
Cell 1: 700,000m$^3$ / Temporarily capped in 2014
Cell 2: 1,3000,000 m$^3$ / Temporary Capping underway
Cell 3: 1,550,000 m$^3$ (approx.) / phase 1 complete
Management Systems Certification

As an accredited service provider, we have a responsibility to ensure the correct handling, classification, analysis, transportation and disposal of hazardous waste. DCLM further recognizes that these operations have an impact on the health and safety of our employees, and we therefore identify such risks to minimize, reduce and eliminate any harm to employees and any other persons associated with any of our business activities.

SHEQ Certifications / Professional Affiliations:

- SANAS (South African National Accreditation System) 17025
- ISO (International Organization for Standardization) 14001
- ISO (International Organization for Standardization) 45001
- IWMSA (Institute of Waste Management of South Africa) Member
- CAIA (Chemical & Allied Industries Association) Member
OUR STRATEGY

- Accompany the Republic of South Africa to achieve its **sustainable development goals** by managing carefully its **resources**

- Design a **viable, durable & environmental friendly** waste management global system for the future

- Bring the **entire range of waste & hazardous waste solutions** to South Africa

- Adapt the **treatment processes** to the waste typologies & quantities produced
THANK YOU
DCLM – Innovation Challenge for Solidification of Leachate Concentrate
DCLM (operated by Veolia) would like to find more environmentally friendly and economically viable ways to solidify the concentrate of their effluent treatment plant. They are seeking solutions utilising innovative solidification agents that can deal with large and increasing volumes of concentrate.
DCLM operates a hazardous waste landfill site and one of the challenges of landfill sites is the production of leachate. Leachate is produced when water percolates through the waste disposal site, accumulating the contaminants, which creates the highly concentrated hazardous liquid. The leachate must be effectively treated by concentration and solidification, and accommodate larger volume increases as the landfill capacity increases.

DCLM are seeking practical, feasible, and economically viable ways to solidify the concentrated leachate from the effluent treatment plant, comprising approx. 8,750m$^3$ per annum. These solutions should aim to solidify the concentrate utilising innovative solidification agents (alternatives to the current agents: ash and lime) in an environmentally friendly way. The goal is to effectively block any toxins from causing ground contamination.
DCLM will provide current leachate analysis for technical specs (requiring NDA). Following solidification, innovative methods of concentrate valorisation would be particularly welcome for industry use. Using any by-products from alternate industries will produce higher value solutions in terms of business responsibility.

The current treatment process removes impurities and suspended solids, thereby separating the leachate into a permeate stream and a concentrate which contains the hazardous impurities removed, as per the diagram below.
Background

Current Treatment Process

- Landfill
  - Leachate
  - Solidified Concentrate

- Leachate Dam
- Feed Tanks
- Solidification (Concentrate)
- Treatment Plant
  - Clean Water to Sewerage System
Background

The concentrate composition is **variable depending on the waste streams involved.** However, the salinity remains about the same. Samples, full spectrum analysis and further information on the treatment process are available upon request (requires NDA).

Separation processes are of interest if they can **generate industrial value.** A Circular Economy perspective would be most valuable as the ability to reuse, repurpose or recycle into another value change would create a genuine difference. The game changing waste industry innovation would be the creation of a fraction or process ingredient that reduces reliance on natural resources.

The focus of this challenge is to solidify the concentrate. However, solutions involving water treatment to make the extracted water (from Treatment Plant to sewerage system) **viable as drinking water** would also be considered alongside the primary intervention.
Solutions are invited from, but not limited to, the following sectors:

- Waste management
- Transport
- Water
- Environmental services
- Manufacturing
- Chemistry
- Engineering
- Industrial biology
The identified solution must/should address the following:

- Deal with **40m$^3$ of concentrate** per working day.
- Be applicable on **DCLM landfill site**
- Be able to be **integrated** with DCLM’s current effluent treatment plant
- Be practical for the **South African environment**
- Solution must be applicable in **modular format**, so it may be scaled progressively
- Please detail any **new infrastructure** requirements for this solution
Technical Requirements

- Solutions must be able to solidify the concentrate in **1 to 2 days** (high priority)
- Solution must be able to deal with **hazardous** materials
- Solution must be **sustainable** with the intent to reduce carbon emissions.
- Solution to be **non-exothermic**
- **By-products** from alternative industries are desirable
- Solutions involving **valorisation** for industrial use are desirable

[A site visit can be arranged upon request]
DCLM – Innovation Challenge for Valorisation of Paper Industry Waste
This Innovation Exchange challenge, delivered by Innovate UK KTN through the Global Alliance Africa project, is supporting DCLM (operated by Veolia) to find economically viable ways to valorise paper industry waste. They are seeking solutions utilising innovative methods to transform waste materials into resources with internal or external commercial value.
Background

There are vast quantities of materials that may be recycled to extract commercial value. DCLM, through their long standing work in the Waste Management industry has identified several waste streams that have the potential to be valorised and contribute to a more sustainable waste industry. One of the industries identified is the pulp and paper industry that has two waste streams currently being landfilled, namely, effluent fibre and dregs.

Veolia is seeking practical, feasible and economically viable ways to utilise both of these waste streams productively, aligned with new waste regulations related to the Circular Economy. They are looking for solutions harnessing the beneficiation or valorisation possibilities of these materials. Veolia will share technical specs of current waste streams. Any solutions must be scalable across 10,000 tons per annum and be cost-neutral or profitable.
Local solutions are preferable to minimise storage requirements of waste and to reduce transport costs. Solutions may lie within the fields of chemistry and industrial biology.

The waste composition is slightly variable and tonnages are dependent on production. Samples and full spectrum analysis are available upon request (requires NDA agreement). The SVOC and VOC analysis both indicate that all determinants for volatile organic compounds measured were below detection limits.

A Circular Economy perspective would be most valuable as the ability to reuse, repurpose or recycle into another value chain would create a genuine difference. The game changing waste industry innovation would be the creation of a fraction or process ingredient that reduces reliance on natural resources and/or contributes in the reduction of waste to landfill.
During the Kraft pulp process, black and green liquor dregs are produced. These dregs are then sent to a furnace for drying, and once cooled this material is then sent to landfill in a filter cake like consistency.

Process flow diagram of Dregs by-product formation (ONLINE)

Analysis on Composition - based on waste classification of metal content (ONLINE)
Effluent Fibre Overview

Effluents from pulp and paper mills contain solids and dissolved matter. The paper industry uses a variety of effluent treatment systems. The preferred process combination for each individual case depends on the grade-specific quality of the effluent that is going to be treated.

Before disposal to landfill the effluent fibre goes through a screw press separator designed to mechanically separate solid and liquid fractions of the fibre-rich effluent, before being sun dried. The sun dried, cotton-texture material is then disposed of.

Analysis on Composition - based on waste classification of solid material (ONLINE)
Target Audiences

Solutions are invited from, but not limited to, the following sectors:

- Waste management
- Transport
- Water
- Environmental services
- Manufacturing
- Chemistry
- Engineering
- Industrial biology
Functional Requirements

The identified solution must/should address the following:

- Provide a **sustainable solution** with the intent to reduce carbon emissions
- Possible solutions into the *sale or re-use* of the waste streams.
- Solutions must be practical for **South African environment**
- Solutions must deal with **10,000t of dregs and 10,000t of effluent** annually
- Solutions must be applicable on **DCLM or client sites**
Technical Requirements

• Solutions can be incorporated into the landfill site
• Be able to treat approximately **10-15,000 tons** per annum
• Please detail any new **infrastructure requirements** for this solution
• Solution must be able to deal with **hazardous materials**
• Solution must be applicable in **modular format**, so it may be scaled progressively

[A site visit can be arranged upon request]
Operating Conditions – BOTH CHALLENGES

• Solutions to be able to be used or operated between **Monday and Friday 7am to 3.30pm**
• Solution to be implemented in **wet and dry** weather conditions
• Solution must **not be odorous**
• Solution should operate in normal **temperatures and light** levels
• Solutions must be to able to **recover or re-use 100%** of the waste stream (Valorisation)
Cost Requirement & Market Opportunity – BOTH CHALLENGES

- Decrease the cost of landfilling. **Cost reduction** on the current process is essential.
- The solution must be able to treat the **required volume and be able to expand** as the feed capacity expands.
- Opportunity to be expanded to the **paper & pulp industry** (Valorisation)
- Winning solution providers will become **long-term partners**, gaining access to DCLM/Veolia’s facilities
- For Circular Economy interventions, please include costings for the **full lifespan** of treatment.
Out of Scope – BOTH CHALLENGES

Proposed solutions will not be viable if they cannot deal with common scenarios including:

• Unable to deal with **variability** of wastestream composition
• Unable to deal with **variable rates** of wastestream production
Application Information
Deployment Timescale

• 18 May 2023 - Competition Launch
• 20 Jun 2023 – Information session/Q&A (TBC)
• **14 July 2023 - Deadline for applications**
• Jul 2023 - Selection and notification of finalists
• Aug 2023 - Pitch days and Selection of Winners
• Aug 2023 – Collaboration Discussions
• Sep 2023 – Pilot programme activated
Eligibility

Applicants must be:
• **Established** businesses, start-ups, SMEs, individual entrepreneurs or academics.
• **Collaborative** solutions (Business to Business B2B and B2R&D) are valid applications. If collaborative solutions are being submitted, a single lead organisation (industrial or academic partner) needs to register the application.
• **Africa-based entrants, UK-based entrants and those from RoW** are invited to apply
Applications will be assessed on:

- **Relevance** to the topic
- **Innovative** nature of the subject
- **Coherence** of the proposed business model
- **Feasibility**/economic viability
- **Development potential**
- **Maturity** of project/solution
- **Ease of implementation**/ability to launch project quickly
- **Suitability** for the African Market
Rewards & Benefits

- Up to **GBP 25,000** seed funding (Subject to T&C)
- Opportunity to pitch your solution and **collaboration/partnership** with DCLM
- **Access to materials** and DCLM facilities
- **Technical support** from DCLM team
- **Mentorship programme** facilitated by IUK KTN
- **Sector expertise** from IUK KTN
- **Support in the development** of a prototype or pilot
- Invitation to attend or present at **IUK KTN events**
- **Investor** introductions (if investment is required)
Q&A Session
Thank you.

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