



# **KHANYISA PROJECTS CASE STUDY**

## **GENERATION 2 REINVENTED TOILET (G2RT) PROJECT**

### **AT A GLANCE**

#### **FUNDERS**

Led by Georgia Institute of Technology through a grant from the Bill and Melinda Gates Foundation.

#### **TIMELINE**

Phase 2 Front End testing took place during 2021 while Phase 3 Full SURT Testing takes place during 2022.

#### **AREA**

The front end has already been successfully tested in eThekweni (Durban) South Africa, while the full SURT (front end and back end) will be tested at two new sites in the City in 2022.

"EOOS NEXT has relied on Khanyisa Projects for field testing of novel sanitation solutions. The team has great technical knowledge and contributes to the successful execution of projects through rapid and deliberate action. Direct communication and well prepared reports give a good overview of project status and facilitate remote collaboration" "

**LOTTE KRISTOFERITSCH**

EOOS NEXT

Austria

### **OBJECTIVES**

**What:** The Generation 2 Reinvented Toilet (G2RT) project builds on the toilet innovations developed during the Bill and Melinda Gates Foundation's original Reinvent the Toilet Challenge (RTC) to develop next generation onsite sanitation solutions. The key RTT challenges given to technology developers were to develop front end pedestals and back end processing systems that did not require a sewer, water or electrical connection, that offered the same level of user experience as a regular flush toilet, were aspirational, affordable and would contribute to the circular economy.

**Why:** The ultimate goal of the G2RT project is to bring the various efforts of technology developers, field testing teams and manufacturers together to focus on testing, demonstrating and developing a Single User Reinvented Toilet (SURT) that the world's poorest regions can afford.

**Where:** Khanyisa Projects partnered with UKZN WASH R & D Centre to test the front and back end systems that have been developed in the US, Switzerland and Austria.

### **KEY SURT ELEMENTS:**

- Front end pedestal with separation of waste elements and low flush with vacuum
- Back end treatment unit using volume reduction and combustion
- Back end using micro super-critical water oxidation processes

**SEE SERVICES & IMAGES ON PAGE 2**



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### SERVICES:

- Stakeholder engagement
- Testing site selection and preparation
- Import of Prototypes
- Performance monitoring and reporting
- Collection of user feedback
- Operation, maintenance and troubleshooting of faults
- Analysis of laboratory test results on inputs and outputs to the SURT
- Demonstration
- Decommissioning

### LESSONS LEARNED FROM PHASE 2 FRONT END TESTING

- Each household has a unique toilet use pattern, which may not necessarily match the assumptions made during predictive modelling of toilet use. Individual household treatment systems (SURT) need to be able to cope with a wide range of inputs to the system, whereas centralised treatment plants see variations averaged out over thousands of users
- Faecal simulant and real faeces can behave very differently during system testing. Extended testing with real faeces and real users is critical to producing meaningful, reliable results
- Finding a suitable test site can be challenging – the system needs to fit into the test room, with additional clearance for access inside the unit during testing
- Systems behave differently under field conditions, e.g. variations were found between flush volumes in the field and those of a twin unit in the lab in Austria

