



TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

KEY STRATEGIC AREA	KSA 3
THRUST	4 - SANITI
PROGRAMME	1 – Re-Engineered Toilet
TITLE	Proof-of-Concept for urban, household re-engineered toilet that carbonises human faecal waste.

Objectives:

General:

Progress in sanitation is falling short of time-based targets. Part of the challenge lies in the technology paradigm that has seen little innovation in the last 150 years. The current sanitation paradigm is binary in nature – flush toilets connected to wastewater treatment works via sewerage network and on-site alternatives that mainly serve as containment receptacles in which faecal sludges need to be emptied and transported to a treatment facility. Both approaches have their known technical shortcomings.

There is a strong need to innovate toilet technologies to address the technical limitations of current approaches. These solutions need to safely treat human excreta and match societal needs without relying on sewers and constant water and energy supply. Toilets that utilize “in-situ” treatment processes offer the potential to apply circular economy principles of “reduce, recycle and reuse” processes at household level. This strategy enables households to mitigate against challenges of water supply and reducing the burden of sludge handling. Internationally and locally, standards (ISO 30500 and SANS 30500) have been developed for this purpose and to ensure safety, functionality, usability, reliability and maintainability of the system, and its compatibility with environmental protection goals.

To stimulate localized development of toilet technologies, the SMARTSAN (Smart Sanitation) initiative was established as dedicated funding Re-Engineered Toilet programme within Key Strategic Area 3.

As part of the SMARTSAN initiative, we seek innovative back-end (treatment facility) toilet processes that can match the following criteria:

- Utilize **carbonisation processes as the main treatment process** to safely treat human excreta.
- The toilet design concept should take into consideration urban spatial requirements of office block toilet cubicles, apartment bathrooms or household bathroom.

Specific Aims:

The specific aims of the project are:

1. Proof-of-concept evaluation of the idea / process

Deliverables:

1. Reports on key aspects researched as per specific objectives
2. Draft Final Report
3. Final Report

Lighthouse:

- Water-Energy-Food Nexus
- The Green Economy

Knowledge Tree

- New Products and Services for Economic Development
- Sustainable Development Solutions

Budget: R600,000.00 (VAT inclusive). Year 1: R400,000, Year 2: R200,000.

Time Frame: 2-Years**Additional Notes:**

- Conceptualized back-end processes can be designed to either be manufactured as one package, or manufactured as a set of prefabricated elements designed to be assembled in one location without further fabrication or modification that influences the system function
- While primarily applicable to the development of back-end treatment systems that are not connected to water and electricity networks, it can also be applied to systems that can utilize water mains and/or electricity (stable or unstable).