

# TERMS OF REFERENCE FOR A DIRECTED WRC PROJECT

KEY STRATEGIC AREA	KSA 3: Water Use and Waste Management
THRUST	4: Saniti
PROGRAMME	2: Sanitation Sensitive Design
TITLE	Strategies to recover resources from sanitation waste: Developing a national sanitation resource recovery policy based on material flows (quantity and quality)

## **Objectives:**

## General:

Many cities are not considered sustainable as they do not utilize resources efficiently. There is a desire to transform from linear take-use-dispose consumption of goods and services towards circular economy principles of reducing, reusing, and recycling. The generation and subsequent safe treatment of sanitation waste is an integral part of city planning. The sanitation supply chain is critical aspect of the urban water chain, offers several opportunities to recover resources and the close the resource loop in towns and cities, and a critical component of a sanitation sensitive design. Under conditions of limited natural resources, population growth and rapidly urbanizing populations, a paradigm shift may be required that considers sanitation waste as a resource with potential for material and energy recovery. Opportunities are available for water, organic matter, phosphorus, nitrogen, heavy metals, and energy recovery.

Within South Africa and globally, there is a wide variety of possible technical options for sanitation resource recovery. There is a wide and ever-growing array of technical options. While water, energy and nutrient recovery are known alternatives, there are other options which are emerging, e.g., biorefinery concepts which focus on the recovery of oils, biopolymers, bioplastics, and animal feeds. The potential for sanitation resource recovery is clear; however, the question is aspects and strategies upon which to focus (or combination of strategies) or which would be best suited for South African conditions. This study will assist in identifying and deploying the most sustainable resource recovery option under given technical and cultural contexts and provide an understanding of the quantity and quality of material flows (how much waste is available; reliability of resource supply; market competitiveness, including market value and outlook, for recovered material; policy and legal framework support and gaps). The study will guide technology selection and investment to create sanitation resource factories.

# Specific Aims:

1. Review of local and international regulations and policies that guide sanitation resource recovery. Identifying gaps in local regulations and policies and highlighting lessons from other countries that can be beneficial to South Africa.

- 2. Provide an overview of sanitation resource recovery options successfully implemented in South Africa (covering treatment performance level, resource recovery efficiency, drivers for technology selection and implementation). This will be accompanied by a detailed literature review identifying a list of potential resource recovery options and covering technology readiness level in South Africa and abroad. The review will cover sewered and non-sewered domains.
- 3. Map the value chain for sanitation-derived products, including processes, stakeholders and key players.
- 4. Quantify the current market size and potential market for sanitation-derived products in comparison to market-related products. This will include determining the quantity and quality of material flows (how much waste is available; reliability of resource supply).
- 5. To develop coherent strategies including changes and commitments required for the implementing resource recovery measures. This will include recommend regulatory and policy changes required and investments and incentives needed to unlock potential needed to unlock potential of resource recovery from sanitation waste.
- 6. Produce dissemination material linked to outputs of study.

# **Rationale:**

There is a wide array of technical sanitation resource recovery options. The challenge is not technical; rather it is a lack of a planning and design methodology to identify and deploy the most sustainable resource recovery options for a given context. To explore resource recovery options, coherent and viable strategies regarding resource recovery are required and guided by a scientific understanding of material flows (quantity and quality) and market analysis for recovered materials.

# **Deliverables:**

- 1. Reports on key aspects researched as per specific objectives.
- 2. Workshop/s with key stakeholders
- 3. Policy brief on resource recovery resources from sanitation waste
- 4. Draft Final Report
- 5. Final Report

# Lighthouse:

• Water-Energy-Food

# Impact Areas:

• Water and the Economy; Water and the Environment; Water and Society

# Knowledge Tree

- Informing policy and decision-making
- Sustainable Development Solutions

# Time Frame: 3-years

Total Funds Available: R1 500 000.00 (Year 1: R500,000, Year 2: R500,000, Year 3: R500,000)