

FEASIBILITY STUDY: WASTE TECHNOLOGY AND INNOVATION CENTRE

Don Govender, Chris Whyte, Angelique Lazarus
Lindon Consulting (Pty) Ltd, South Africa

KEY FINDINGS

South African municipalities send 90% of waste to landfill, even though an estimated 60-70% of municipal solid waste (MSW) is recyclable and despite national policy that promotes waste reuse, recycling and recovery. Furthermore, there is little regard (or capacity) amongst municipalities to transition to Alternative Waste Treatment (AWT) technologies. This is resulting in a low uptake of AWT technologies, effectively putting South Africa 20-30 years behind most developed countries in the management of waste. However, the immense progress made on AWT technologies globally, would allow South African municipalities to literally “drop” these technologies into their local waste management system, with minor adaptation and localisation. Municipalities acknowledge the absence of, and the need for, technical support in the selection and implementation of context-appropriate AWT technologies in South Africa. Support that can be provided by an independent and affordable Waste Technology and Innovation Centre.

INTRODUCTION

An estimated 2.01 billion tonnes of municipal solid waste were generated globally in 2016, and this number is expected to grow to 3.40 billion tonnes by 2050 (*What a Waste 2.0*, World Bank, 2018). While most developed countries are moving away from waste disposal to resource recovery, developing countries (and some developed countries) still have a number of challenges that prevent them from adopting more sustainable waste management solutions. The low priority given to waste (by municipalities in general) and the limited research, development and innovation (RDI) in the waste sector also plays a significant role. Furthermore, there is little regard (or capacity) amongst municipalities to transition to AWT technologies, resulting in a low uptake of these technologies. As a result, South Africa is losing out on potential socio-economic and environmental benefits.

National Government has explored options that will support the uptake of appropriate AWT technologies in South Africa. One of the possible solutions is to provide municipalities with expert technical advice and technology verification services to assess AWT technologies being introduced into the South African market.

In 2019, a study was commissioned (by DSI/CSIR) to test the feasibility of establishing a National Waste Technology and Innovation Centre (WTiC) that could provide AWT technical support to municipalities.

METHODOLOGY

The objective of the feasibility study was to assess the viability of the proposed national WTiC within the South African context and to present *prima facie* evidence in support of the final recommendations. The key determinants of feasibility were:

- Alignment with relevant policies
- Proven demand for the services
- Ability to access technical resources, either locally or internationally
- Demonstration of value-for-money to clients
- Availability of funding for at least 5 years
- Ability to generate enough revenue to achieve self sufficiency

RESULTS

- Municipalities face a number of waste management challenges such as lack of adequate infrastructure; changing and problematic waste streams; contaminated recyclables; high tonnages of organic waste; low levels of recycling; and lack of adequate environmental legislation, or enforcement of legislation, to regulate waste management.
- The diversion of waste away from landfill towards AWT technologies (i.e. implementation of the waste hierarchy) is embedded in South Africa’s waste policy and legislation.
- South Africa has been identified as one of five emerging markets with “exciting opportunities” in waste management markets, well positioned to transition away from landfilling towards AWT

Technologies. While this has prompted some AWT technology vendors to install technologies, in many cases these have proven to be expensive failures, mainly due to poor customisation of technology and operating procedures to meet local conditions requirements.

- The uptake of AWT technologies in the South African waste sector has generally been slow as demonstrated by the low number of operating plants. Furthermore, when an AWT technology is eventually employed, it tends to be imported, rather than locally-developed.
- Given the resource constraints faced by many local municipalities, the predominant waste management “technology” remains landfilling. Considering the composition of general waste, diverting just 3 of the highest volume waste streams – organic, paper & packaging and construction & demolition waste – away from landfill to AWT technologies, could significantly reduce disposal volumes.
- A number of challenges experienced by municipalities affecting the adoption of AWT technologies were identified.

Through a process of regional engagement with key public and private sector stakeholders, the services that Municipalities identified as essential to support the adoption of AWT Technologies and which could be offered by the WTiC include:

- Assessment of existing AWT technology options against local conditions/requirements
- Technical verification of AWT technology performance standards
- Support for funding applications for AWT technology procurement
- Support the “localization” of AWT technologies through identifying opportunities for local input, customization of technologies, local fabrication of plant, etc.
- Training and continuous professional development (CPD) on latest AWT technologies
- Development of policies and strategies related to AWT technology deployment

- Access/visits to AWT technology demonstration centres
- Research into new AWT technology options
- Support the development of municipal AWT technology ideas and innovations

An assessment of the demand amongst municipalities for the above services revealed that the WTiC could receive as many as 538 enquiries per annum, while it was noted that some requests could be large multi-year projects.

IMPLEMENTATION

It is suggested that the WTiC be implemented in phases over five years as follows:

- Phase 1: Establishment, technology verification and evaluation, localisation, innovation
- Phase 2: Technology demonstration, undertake feasibility studies, develop AWT technology curricula, grow R&D capacity
- Phase 3: Offer “billable” consulting/advisory services, support export of local AWT Technologies, undertake commissioned research

In order to provide these services as cost effectively as possible and reduce the fixed costs, the WTiC will engage external experts to provide additional techno-economic skills on demand. To facilitate engagement, it is recommended that Municipalities be provided with “vouchers”, which they would exchange for the Centre’s services. It is estimated that the establishment of the WTiC could cost approximately R1.6m and take at least 18 months. Annual operational expenses is estimated to be between R8m and R10m.

Acknowledgements: The authors acknowledge the funding received from the Department of Science and Technology under the Waste RDI Roadmap.

Disclaimer: The content and views included in this Briefing Note are based on independent analysis and do not necessarily reflect the position of the Department of Science and Innovation or the CSIR.

This Briefing Note is produced as part of the Waste RDI Roadmap Briefing Note Series, an initiative of the Department of Science and Innovation managed by the CSIR. The Note stems from the findings of a project funded under the Roadmap, entitled “Feasibility Study: Waste Technology and Innovation Centre”.