

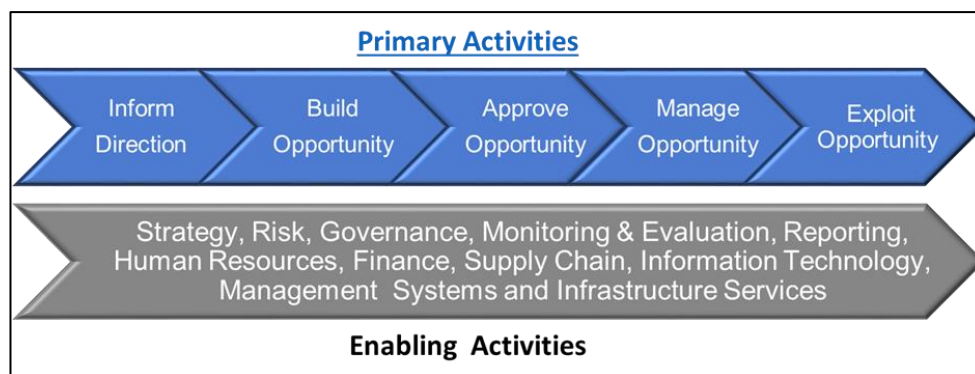


## **BRIEFING DOCUMENT**

# **FOR THE SELECTION OF A HOST INSTITUTION FOR A WASTEWATER BIOREFINERY INNOVATION CLUSTER**

## 1. INTRODUCTION

- 1.1. The National System of Innovation (NSI) in South Africa is still very young and fragmented and the flow of technology and information amongst people, enterprises and institutions is limited. The inability of academic research to reach the market as products and services is limiting economic development especially about technology innovation.
- 1.2. Technology Innovation Agency (TIA) an entity of the Department of Science, Technology and Innovation (DSTI) was established in terms of the TIA Act (Act No. 26 of 2008), with the objective to stimulate and intensify technological innovation in order to improve economic growth and the quality of life of all South Africans by developing and exploiting technological innovations, as the value chain depicted below.



## 2. PURPOSE

- 2.1. TIA seeks to select a host institution for a Wastewater Biorefinery Innovation Cluster.

## 3. RATIONALE

- 3.1. Part of the Bio-economy strategic focus is the need for enabling technologies that provide a feasible conversion of biomass at the industrial scale to a variety of value-added products that would also lead to job creation. Biorefineries are seen by many as key components of a strong, diversified bioeconomy to enable the efficient conversion of a broad range of biomass feedstocks into commercially viable bioproducts. Biorefineries provide the opportunity to introduce greener production processes to develop value-added products in an integrated economic and technically feasible

manner. Biorefinery products may either be integrated into existing value chains where they replace existing products, or bio-based products that are novel and cannot easily be integrated into existing value chains.

- 3.2. An additional strategic focus area is addressing the global challenge of water scarcity. There is a need to seek new ways to conserve and recycle this important resource. The development of bioremediation solutions for wastewater treatment is an important intervention in the conservation of water and preventing the contamination of other natural resources. Wastewater treatment also offers the opportunity to extract useful materials using bio-based solutions.
- 3.3. The goal is to establish a Wastewater Biorefinery Innovation Cluster to address the existing challenges in a synergistic manner via a collaborative multi-stakeholder vehicle. This will require the development of a business case.

#### ***Technology Innovation Cluster Programmes***

- 3.4. Technology Innovation Cluster Programmes (TICPs) refer to collaborations between different players such as entrepreneurs, companies, suppliers, manufacturers and research institutions competing and cooperating in a particular industry. The range of stakeholders play along the value chain; with TIA playing the connector role and therefore being the catalyst for establishing and managing Technology Innovation Cluster Programmes. The purpose is facilitating greater collaboration within the existing ecosystem by leveraging the strengths of respective partnering groups. Different partners are recognised for a particular function and role that they bring to the TICP. The HEIs and Science Councils build research capacity and provide access to technical expertise and specialist resources. Furthermore, they are essential for developing internal capabilities and skills.
- 3.5. Where TICPs are industry-led, industry is expected to provide the bulk of the investment capital required for relevant applied research, development and innovation. The key industry issues that need to be solved will mainly come from large companies, SMEs and entrepreneurs. The programme relies on the financial and non-financial resources,

capabilities and synergies provided by all partners. The primary role of TICPs is to drive a technology solution to address a social and/or economic need.

3.6 The key drivers of the TICPs are:

- i. An existing innovation research base (research organisations, human capital, adequacy of funding for applied research and commercial deployment)
- ii. A receptive industry base (existence of SMEs and entrepreneurs, large companies, industry associations)
- iii. The presence of a skills base and workforce involved in technology innovation
- iv. A certain level of infrastructure and capital base
- v. A supportive policy and regulatory environment

3.7 The main objective of Technology Innovation Cluster Programmes is to address national priorities or areas of strategic social and economic importance through the utilisation of technology innovation. Additional objectives of TICPs include:

- i. To accelerate the commercialisation of technologies and facilitate transfer to industry
- ii. To facilitate the creation and expansion of local manufacturing/production capacity
- iii. To improve the competitiveness of local technology-based industries
- iv. To enhance collaboration and networking among private sector industry, SMMEs and academia to leverage local excellence and expertise
- v. To offer incubation services in order to encourage and stimulate interest to commercialise developed intellectual property
- vi. To leverage funds including international funding sources.

3.8 TICPs are designed to support, promote, and accelerate innovation through the formation of strategic partnerships between enterprises, research organisations, government and government agencies. The following is the criteria for establishing a TICP.

- i. High impact, with the technology solution being applied at a national or international level.
- ii. High relevance to industry and the potential to address a critical economic or social issue.

- iii. Strong RDI competence across a number of private and public institutions (SMEs, HEIs, Science councils, funders, large companies etc.) which when integrated amplifies the outcome.
- iv. Identification of excellence along a technology development value chain to give rise to a multi-disciplinary programme that involves different stakeholders fulfilling different functions.
- v. Consortium-led approach characterised by resource pooling, collaborative RDI effort, and knowledge exchange.
- vi. The potential to create new commercial and research opportunities as well as to develop competitive IP.
- vii. A human capital and capacity development component to ensure continued skills development, especially in emerging areas.

3.9 The desired outcomes of TICPs include:

- i. Development of industries and strategic innovation programme areas.
- ii. New technologies brought to market and society to address specific problem areas.
- iii. Capacity and capabilities developed around identified areas of need.
- iv. A vibrant NSI.

The desired impact of TICPs includes:

- i. Role players are linked and enabled to leverage on one another's creations and innovations.
- ii. Position technologies as central player in economic development
- iii. Global competitiveness of SA technologies and industries
- iv. Improved quality of life

Given the complexities of wastewater biorefineries it was determined that an innovation cluster would be the most effective vehicle for achieving the highest impact.

#### **4.0 BACKGROUND**

To support the establishment of a Wastewater Biorefinery Innovation Cluster (WWBR-IC), a series of engagements was held, both in person and virtually, to identify and



engage with stakeholders required to provide information that will support the establishment of the WWBR-IC. Thereafter, a workshop with the stakeholders was held to discuss the establishment of the Cluster.

The purpose of the workshop was to bring together key stakeholders to explore and develop a shared vision for the establishment of a WWBR-IC in South Africa. Among the attendees were representatives from academia, industry, government and science councils. During the workshop participants engaged in structured discussions, including breakout sessions focused on defining the Cluster's vision and goals, identifying areas for innovation and fostering effective stakeholder collaboration. The workshop laid the groundwork for a strategic action plan, encompassing stakeholder mapping, organisational structuring, funding models, and priorities for technological development.

Following the workshop, a consultant was appointed to develop a business case. This business case includes local and international case studies, a macroeconomic analysis and potential commercial opportunities. Also presented is a high-level implementation plan. The goal of the associated Expression of Interest is to identify the most suitable implementing partner.