



# Chisai Innovations Center (T) Ltd

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## WASTE TREATMENT FACILITY INFORMATION BULLETIN

**Not just a Waste Treatment Company, but also Hazardous Waste Management Consultants and Manufacturers of High-Tech Hazardous Waste Incinerators**

### 1.0 EXECUTIVE SUMMARY

#### 1.1 Purpose

The purpose of this Business Plan is to:

1. Set a course for the Company's management to successfully manage, operate, and administer the business of waste treatment facility.
2. To manage and increase the volume of existing contracts and customer base.
3. Inform financing sources of the capital requirements being requested by CIC, in addition to its history, its projected future, and how the requested funding would give the CIC the ability to add value to the local economy, generate tax revenues for local and central government, and help put people back to work.

#### 1.2 The Company

CHISAI INNOVATION CENTER encompasses three major components in its business model.

1. CIC is the sole manufacturer of High-Tech Hazardous Waste Incineration Facilities with Air Pollution Control Devices (APCD).
2. CIC is one of the largest waste treatment facilities in Tanzania.
3. The company operates the WTF that receive all waste products, treats the waste product and delivers ashes to the landfills.
4. CIC is one of the largest producers of Waste Heat in Tanzania, expecting to transform this energy in electrical power generation.

Additionally, CIC is expanding its exposure through effective marketing as well as introducing the area to all market segments that have not yet discovered the CIC.

#### 1.3 Services

- a) CIC operates the Waste Treatment Facility.
- b) In terms of Hazardous Waste Management, CIC practices responsible hazardous waste management. All waste generated by our clients is classified and analysed before selecting the appropriate treatment and/or disposal method.

## 1.4 The Market

- 1.4.1 CIC's target market strategies are tri-fold and involve becoming the destination of choice for companies in the Six Major Cities in the country as well as the Nearby Countries in need of environmental management and waste management services. These customers prefer certain services and quality and it's the CIC's duty to deliver on their expectations.
- 1.4.2 To increase/takeover management services of existing and new waste transfer stations.

## 2.0 THE TECHNOLOGIES IN USE

### 2.1 Design Details



### 2.2 Process Description

- 1) Incineration is a process involving treatment of waste by combustion and detoxifies the hazardous components contained in waste converting into ash, gas and heat energy.
- 2) The diesel-fired incinerator is suitable for healthcare waste, industrial waste and can prove safe treatment of other specified waste kinds. The equipment is compliant with all requirements for installation in Tanzania. All components for installation have been included to perform concomitantly each serving its purpose.
- 3) For the technical evaluation, not only the treatment plant but the entire system will have been considered. The system is fully compliant for environmental and occupational health aspects, including all necessary secondary systems and additional equipment.
- 4) The system has been designed to operate normally under the conditions of different regions in Tanzania. The conditions include power supply, climate, temperature, humidity, etc.

- 5) All text, parameters etc. on all control operating interfaces as well as on information displays and on print-outs are in the English language. Future plans involve adding labels in Swahili language parallel to the English.
- 6) The manufacturer, that is, CIC, provides all the necessary documentation in order to facilitate the legal requirements for the installation and proper operation of the equipment.
- 7) The following waste streams can also be treated at the WTF:
  - Infectious waste
  - Sharps waste
  - Pathological waste
  - Pharmaceutical waste including cytotoxic or genotoxic waste
  - Chemical waste
  - Industrial waste
  - Obsolete pesticides,
  - etc.
- 8) Destruction Efficiency:
- 9) For the main incineration process, a static, two chamber system is in use with one main combustion chamber and one flue gas afterburning chamber. The incinerator is able to meet the following parameters:
- 10) Waste Loading and incineration capacity:

**Treatment capacity of:**

- LINE 1: up to 700 kg waste per hour for up to 4 cycles per day (2.8 tons/day)
- LINE 2: up to 1500 kg waste per hour for up to 3 cycles per day (6.0 tons/day).
- This amounts to 8.8 tons/day x 300 working days/year = 2,640 tons/year

**11) Temperature:**

- Main combustion chamber up to 1250°C, and in the second chamber 1300 °C, depending on settings which are normally selected depending on the type of waste loaded in the primary chamber and also on the control of emissions needed in the secondary chamber
- Retention Time: more than 2 seconds in the second chamber, provided by
- A 99.99% destruction and removal efficiency (DRE) for each principal organic hazardous constituent (POHC) in the waste feed is reached.

**12) Medical Waste Treatment:**

- 98% weight reduction
- 95% volume reduction

**13) WTF Incineration Efficiency**

Waste treatment facilities (WTF) are capable of incinerating hazardous waste at high efficiency up to 98.5% reduction by weight per cycle for industrial waste. The facility has scrubbing systems for screening of emitted gaseous from incinerator chambers which operates at high temperature up to 1250°C.

- 14) The combustion chambers (including secondary combustion chambers,) dimensions are large enough to provide for an effective combination of gas residence time and temperature such that combustion reactions may approach completion and result in low and stable CO and VOC emissions.

- 15) In order to avoid the generation of waste, the incinerator combines the gasification or pyrolysis stage with a subsequent combustion stage with flue-gas treatment in the secondary

chamber that provides for operational emission levels to air within the associated emission ranges specified in the standards for incinerators.

- 16) Where grates are used, it is preferred that the design incorporates sufficient cooling of the grate such that it permits the variation of the primary air supply for the main purpose of combustion control, rather than for the cooling of the grate itself.

### 3.0 THE WASTE TREATMENT FACILITY OPERATIONS

#### 3.1 What types of waste can the WTF destroy?

The high temperature incineration facility with air pollution control devices (APCD) can destroy a wide range of wastes including:

- a) Industrial solid and semi-solid wastes
- b) Industrial liquid wastes
- c) Chemical waste
- d) Laboratory wastes
- e) Hospital/medical waste

The advantage of the WTF plants is the ability to set temperature range according to the waste type, based on installed temperature control system.

#### 3.2 What are the advantages of incineration?

Incineration at high temperature has more advantages such as: volume and weight reduction (up to 95% by weight and 98% volume reduction) hence reducing the waste dump burden, high level of disinfection, followed by acid gas cleaning if wet scrubbers are used like those applied at CIC waste facility (multi-stage wet scrubbers). Heat energy as one of the output from the process can be used to provide hot water that might be applied in other special activities such as sanitations, cleanness, laundry, also further application of Heat Energy led to generation of thermoelectricity to supply in the National grid. The ash generated after the completion of the process is disposed by landfilling in authorised dumpsite. However CIC is continue with research on conversion of ash into fertilizer.



#### 3.3 Assured Treatment Efficacy

Data on temperature profiles, loading capacity, weight reduction and wet scrubber performance has been part of the long-term research. While some information on performance has been published, there is a multitude of data on incineration performance for various incinerator sizes and capacities.



### **3.4 What are the estimated costs of the destroying the waste at CIC-WTF?**

It is well known that clients will use a waste collection service if it is reasonably convenient and well-priced. Industries and health facilities are willing to commit time and pay reasonable fees provided the service is consistent and tailored to their needs, such as services offered by CIC. Depending on the quantities generated by a health facility, the estimated price for medical waste will range between 3,000 and 5,000 TZS only. For industrial waste, also depending on generation or contract amount, the negotiable quoted price will range between 1,500 and 2500 TZS/kg.

### **3.5 Why are the costs of destruction of the waste footed by the Generators?**

This is in accordance to the polluter pays principal. Keeping waste collection fees at the generator level is a key to making the collection system function successfully. CIC pledges to perform this task to client's satisfaction.

### **3.6 Which convenient way is used by CIC-WTF for waste collection given the traffic jams?**

The collection will be done by CIC-WTF crew at a frequency and time table to be agreed between the CIC and the client. Waste collection convenience, is to collect waste at night. It is not uncommon given traffic congestion in the city for collection vehicles to spend several hours travelling to and from the dump each day. This has a significant negative impact on LGAs operating budgets and reduces vehicle collection time. The result is inconsistent collection schedules with uncollected waste and litter on the streets. Thus, CIC will prefer to collect and transport the waste at evening to night hours or early in the morning, and perform treatment during the day.

### **3.7 Assured Hazardous Waste Transportation Norms**

Transportation of waste will be done by using special trucks, while adhering to the hazardous waste transportation regulations and rules.

- a) Waste will be packaged in plastic bags before loading into the trucks
- b) There will be additional hazardous waste collection containers and extra bags in the truck to take care of accidental rupture of bags during transportation
- c) The waste collection crew will have proper uniforms and PPE.

### **3.8 Why not send the medical and industrial waste to Pugu dumpsite?**

This is environmentally unacceptable. Since waste prevention is inevitable in our daily activities and has been proven scientifically, then it is recommended from environmental management guideline to recycle and treat waste prior to disposal. The Pugu dumpsite is the only authorized site in DSM for the receipt of solid non-hazardous and decomposable wastes. It was originally intended to be designed and operated as a sanitary landfill meeting international norms. However, due to budget limitations it has operated since opening as an open dump. At this point, solid waste covers a large percentage of the approved 65 hectares. Medical and industrial wastes are not acceptable in an open dumpsite. Hence, CIC has offered solution for the problem, that is, to treat the waste using high temperature incineration.

### **3.9 Waste storage facilities at CIC-WTF**

The WTF has extensive waste storage facilities including warehouses, two 20-ft containers and ash collection points. This allows WTF to receive large consignments of waste at one time, especially industrial and mining wastes. Currently, the waste storage capacity is about 100 tons. Our future plan is to store up to 500,000 tons at one time, when the construction of the second ware house is completed.

### **3.10 How does the WTF make sure that the waste does not reach the community for safety against expired or substandard products?**

The CIC-WTF takes care on behalf of the client to make sure that the waste does not reach the community, a problem which can lead to health hazards in case expired products are used. This is done during transportation and also during storage and treatment. The premises are within closed premises not accessible by unauthorized people.

### 3.11 Facility Location

This facility is located in an industrial area approved by Pwani Local Government Authorities.

### 3.12 Certificate of Destruction (CoD)

The WTF issues a certificate of destruction to the client after completing an assignment or on monthly basis for continuously received waste cargo.

## 4. FREQUENTLY ASKED QUESTIONS

<b>Q1</b>	<b>What will the facility do in case of failure of the plant after receiving the waste?</b>	<ol style="list-style-type: none"> <li>1) The facility has two incineration units (500-700 kg/h and 100-1500 kg/h loading capacities). The two units can work simultaneously in parallel or one at a time. If one plant fails, the other one will continue working.</li> <li>2) The WTF keeps spares for critical components to make the operations continuous without interruptions.</li> <li>3) The WTF has technical staff for regular maintenance of facility to prevent any kind delay. Technology itself is owned by CIC.</li> <li>4) Moreover, the plant has three storage facilities (two warehouses and two 20-ft containers) capable of storing up to 500,0000 tons of waste at one time.</li> </ol>
<b>Q2</b>	<b>What is the source of process water for the WTF?</b>	<ol style="list-style-type: none"> <li>1) The WTF collects rain water for process plant operations and other uses. Currently, the WTF storage capacity is up to 60,000 liters at a time.</li> <li>2) The WTF plans to install a borehole pump for the same purposes of increasing water supply capacity to render the wet scrubbers operational, cleaning and sanitation operations continuous throughout a year.</li> </ol>
<b>Q3</b>	<b>How is sanitation Carried out at the WTF</b>	<ol style="list-style-type: none"> <li>1) The facility incineration plants generate hot water from the cooling systems, which is used for sanitation and cleaning of containers, uniforms, etc.</li> <li>2) The floors and surfaces are also mopped using hot water to eliminate germs and fungi.</li> <li>3) CIC staffs wear clean PPE that includes boots, overall, apron, helmet and mask during operation activities</li> <li>4) CIC construct a garden and assembly point outside the plant and offices</li> </ol>
<b>Q4</b>	<b>Is the location of the WTF accessible by vehicles?</b>	<ol style="list-style-type: none"> <li>1) Yes, the WTF is located in an industrial area, where extra heavy trucks enter and leave with raw materials or products from the industries.</li> <li>2) The road is under closer surveillance by the LGA which has pledged to support the fast industrialization of the area.</li> <li>3) WTF is located along the road from Kongowe Madafu via Zegereni industrial area to Zogowale village.</li> </ol>
<b>Q5</b>	<b>How can clients understand waste management practices to allow a smooth operation of the WTF?</b>	<ol style="list-style-type: none"> <li>1) CIC-WTF offers training for waste management staff working in the clients' premises in the areas of waste collection, segregation, packaging and labelling before transportation.</li> <li>2) In case the client offers transportation of the waste to our facility, the transporters will be part of the team to be trained.</li> </ol>
<b>Q6</b>	<b>Can clients visit the WTF?</b>	<ol style="list-style-type: none"> <li>1) Our esteemed clients are also allowed to visit the premises upon request.</li> <li>2) Other visitor types include students from different institutions</li> </ol>
<b>Q7</b>	<b>Does the facility provide learning opportunities to engineering students?</b>	<p>Yes.</p> <p>The WTF offers practical training opportunities for 2<sup>nd</sup> and 3<sup>rd</sup> year students in Chemical and Process Engineering and Environmental Engineering.</p>

**Call +255652378076/ to engage the WTF crew 24 hours a day.**