



RFP260/2021 City of Joburg Biomethane Project



TENDER BRIEFING
29 October 2021



a world class African city

PROJECT INTRODUCTION

- A **circular economy** initiative funded by **The Global Environmental Facility** and the **City of Johannesburg**.
- Relief needed from rapidly filling landfill space at **Robinson Deep landfill**.
- Utilisation of **old municipal infrastructure**.
- Utilisation of **waste and wasted resources**.
- Service and product delivery between **Municipal Owned Entities** to improve municipal efficiency of service delivery.
- The project will serve as a pilot or demonstration plant with a close cooperation with the **University of Johannesburg**, to ensure information dissemination and training opportunities.



PROJECT HISTORY

- The **CoJ 50 tpd Biodigester** pilot plant project is funded by **GEF (since 2017)** with the proviso that the **DBSA** act as the **Implementing Agent**.
- The first phases of this project (**feasibility / design**) was performed under a PROCSA contract between **Energidrop** and **UJ** in partnership with **CoJ**.
- **Energidrop** has completed the **concept designs, technical specifications, cost estimating** of the 50tpd biodigester plant under UJ by 2019.
- To conclude the **procurement** and **tender** documentation phase, the **UJ/CoJ contract was ceded to DBSA in 2020**, as per the detailed scope in the **Cession Agreement**.
- This current phase requires **Energidrop** to act as the **Owner's Engineering** company for the **Procurement of the EPC contractor to Build, Operate and Transfer** the facility back to CoJ after 5 years.
- **DBSA** (through the **Infrastructure Delivery Division**) has **approved the final RFP** and will advertise the bid within this week to select a winning bidder for **the Construction and O&M phases** of this Pilot Plant Project. A successful pilot outcome may lead to upgrading of the plant to 100tpd or larger, possibly through a PPP procurement.



Planned Duration

Activities

Deliverables

Form of Contract

Performance Tests

Phase 1: Design & Construction of Bio-digester Plant

18 Months

Phase 1: Scope

- Entering into predefined interface agreements
- Detailed Design and Permitting
- Demolition and decommissioning of old infrastructure
- Revamp and renovation of buildings
- Construction of new buildings
- Road works, fencing, paving
- Construction of waste receiving area and processing plant
- Construction of biogas and biomethane plant
- Connection of utilities
- Installation of electrical connection to Energy Systems and Solar PV roof mounted system
- Setting up composting yard
- Seeding of digesters
- Commissioning the plant
- Construction Health, Quality, Environmental and Safety compliance

Phase 1: Deliverables

- Interface contracts signed
- Detail design reviewed, HAZOPed, and approved
- Decommissioned incinerator and diesel tanks
- Revamped management office and main process building
- Constructed pump rooms, weighbridge office, control room etc.
- Roads and fences complete
- Waste receiving and processing plant implemented
- Digesters built
- Biogas plant equipment installed
- Upgrading plant installed
- BioCNG compressor and bus filling station installed
- Piping to Joburg Landfill Gas plant installed for heating
- Electrical connection complete
- Biogas vent and flare lines installed
- Digesters seeded
- Cold commissioning certificate
- Hot commissioning certificate
- Tests after completion & Handover

NEC 3 Engineering and Construction Contract Option A

Phase 2: Operations & Manitenance

36 Months

Phase 2: Scope

- Initiate engagement; support follow-up & correspondence with NERSA, DAFF and City power for permits.
- Manage the plant monitoring, operations and maintenance, accounting, invoicing, and reporting requirements for the facility.
- Operate and maintain the facility.
- Collect waste on a daily basis
- Dispose of excess or unused waste.
- Process waste adequately to produce biogas
- Produce biogas and biomethane for busses.
- Provide security 24/7
- Order and manage spares, consumables and chemicals stock
- Spread digestate liquid fraction on the landfill for dust suppression. Facilitate the use of it as fertiliser by JCPZ and others.
- Produce compost and facilitate collection of product.
- Spares and chemicals inventory monitoring
- Provide real-time access to operational process and performance data
- Operational health, quality, environmental, and safety assurance
- Training of CoJ staff to operate the plant before the end of the 3 years
- Accommodating of visitors and delegates
- Staffing of plant and management of HR
- Daily access and delivery/collections/filling monitoring and recording

Phase 2: Deliverables

- Monthly production and processing targets met
- Monthly performance reports
- Emergency maintenance and event reports
- Monthly SHEQ compliance report
- Monthly operations and maintenance reports
- NERSA gas trading license for the client and their facility
- Group 2 Compost registration for the digestate
- SSEG registration for the site with City Power

NEC Term Service Contract of April 2013 (including amendments)

TAC

Adjusted
Performance
Criteria

TDO 1

TDO n

TDO 36



PROJECT LOCATION



PROJECT LOCATION

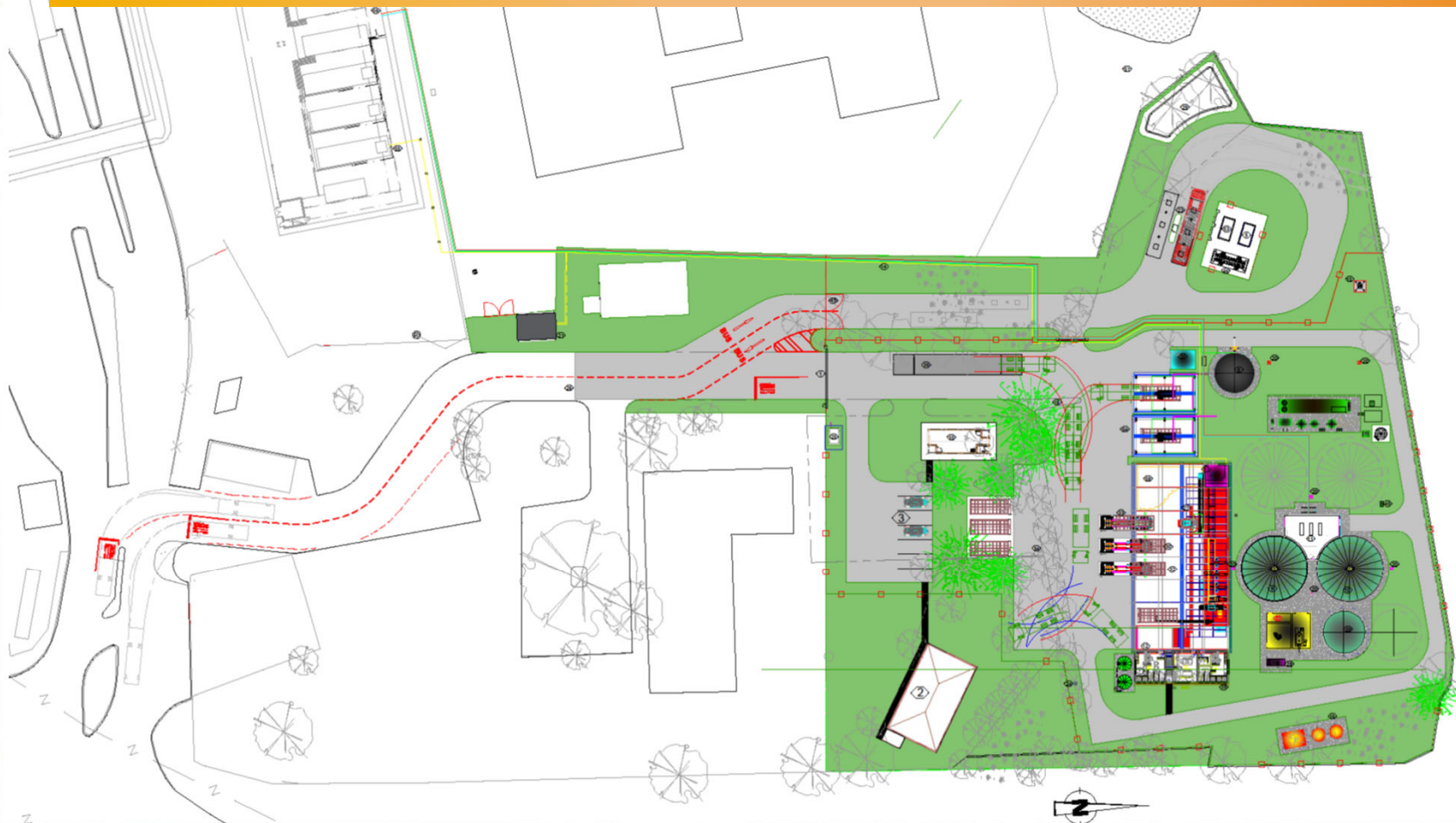


PROCESS FLOW

- JFPM site – source separation and onsite waste management
- Robinson Deep – Main processing and biogas plant site and bus filling point
- JMPD Academy – compost maturing



PROJECT LAYOUT



1	Access Control Gate
2	Management building
3	Admin Office parking
4	Back-up Boiler
5	Biogas Compression
6	Biogas Upgrading Plant
7	Control Room, Ablution and Mess
8	Digestate Liquor Storage Tank
9	Digester -Primary
10	Digester -Secondary
11	Pump Room
12	Egoli Gas Connection Point
13	Electrical MCC
14	Pipe & Cable Route
15	Emergency Flare Stack
16	Fire Protection System
17	Future Digester
18	Ground Monitor Borehole
19	Heat Supply
20	Lightning Mast
21	Main Electrical Supply Sub-Station
22	Mascerator
23	Metrobus Fuelling Area
24	Process Water Connection
25	Security Guard Hut
26	Site Access Road
27	Skid-Steer Loader
28	Standby Generator Unit
29	Storm Water Swale
30	Waste Tipping Bays
31	Waste Pre-Processing bays
32	Waste Sorting Plant
33	Waste Truck
34	Waste Truck Turning Area
35	Weighbridge Office
36	Weigh Bridge
37	Workshop & Storage Building
38	Sewer Connection
39	Feed Buffer Tank
40	Gas Storage
41	De-Sulphurization
42	Excess Waste Storage
43	Digestate Dewatering
45	Biogas Blower
46	O2 Supply
47	Biogas Dryer
48	Liquids and Leachate Pit
49	Filling Station Gate
50	Gate to Pickup MRF
51	Leachate Pond
52	Rain Water Capture
53	Booster Filling Compressor
54	Storage Building (Waste, Digestates, Spares or Consumables)
55	Energy Systems Waste Heat to Energy Electrical Connection
56	Hot Water Supply Point and Cold Water Return Point
57	Biogas Vent Point to Joburg Landfill Gas
58	Waste Pile

PERFORMANCE CRITERIA

- Minimum **350 ton/week** fresh waste throughput.
- Minimum **450 GJ/week** on specification bus fuel production.
- Suitable digestate solids separation.
- Suitable compost quality for utilisation.
- Suitable digestate liquid quality for municipal uses.
- Priced alternatives for disposal.
- Waste disposal for ALL waste from JFPM (Price schedule for excess).



CONCEPT DEVELOPMENT

- Concept design - Complete
- Geotechnical Report - Complete
- Topographical survey - Complete
- Traffic impact note - Complete
- Major Hazardous Installation study - Complete
- WML for Biomethane Plant - Complete
- WML for decommissioning of HCRW incinerator - Complete
- Partial township establishment for green infrastructure - ongoing
- Site clearance of waste and informal activities – ongoing
- Letters of intent obtained from all interface entities - Complete



SUPPLIERS AND OFFTAKERS

1. Waste Feedstock from **Johannesburg Fresh Produce Market**
2. Biomethane offtake by **Metrobus**.
3. Digestate offtake by **CoJ Social Development, Johannesburg City Parks and Zoo** and **Pikitup**.
4. Heat supply in the form of circulated hot water from **Energy Systems**.
5. Electricity from **Energy Systems**.
6. Residual waste to **Pikitup** landfill.
7. Unutilised biogas to **Joburg Landfill Gas**.
8. Digestate maturing at **JMPD academy**.
9. Backup fuel from **Egoli Gas**.





SCOPE OF WORKS

Implementation

Contract 1

HSF #FR Q WUDFW

The detailed design, operational setup, logistics system implementation, construction and commissioning of the plant

Operations

Contract 2

R) P #FR Q WUDFW

The EPC contractor will follow up on the EPC contract with a 3 year contract for managing, maintaining and operating the plant. Additional licenses to be obtained in this period.

Orqj#hup #
rshudwlrqv

Uhwhqghu#i#
R) P #FR Q WUDFW

Potential sales
of products

Joburg

a world class African city

IMPLEMENTATION

1. Detail Design

- Confirm and/or update existing design and layout.
- HAZOP review for plant based on contractor final design.
- Statutory signoffs required for gas installation, structural works and electrical work.
- Site development plan submission based on final confirmed design.
- Input into supply and offtake agreements, currently in draft, and signing of these.

IMPLEMENTATION

2. Decommissioning, demolishing and upgrades

- Remove and de-stump trees (approx. 20) from site located at weighbridge office location and pavements.
- Removal of old weighbridge.
- Removal of waste from site.
- Removal of lean-to structures to buildings and substandard walls.
- Decommissioning and removal of old HCRW incinerator.
- Removal and rehabilitation of old in ground diesel tanks.
- Replace walls and sheeting where required.

IMPLEMENTATION

2. Decommissioning, demolishing and upgrades (continued)

- Height increase of main process building.
- Repaving of road area and walkway where required.
- Suitable industrial coating for all structures.
- Upgrading old driver training centre building for management offices. Rooms as per tender document.
- Upgrade pumphouse.
- Upgrade mini substation (ceiling, electrical panels, new connections to ES and plant, doors, and storm water drainage).

IMPLEMENTATION

3. Construction

- Installation of weighbridge (22m) and a weighbridge office.
- Procure adequate vehicles, bins and tools for operations.
- Establishment of new road for busses.
- Construct new control room and staff building as annex to main process plant.
- Install perimeter fence, gates and CCTV.
- Install 20 kW Solar PV roof mounted system.
- Construct walkways for safe access between gate, weighbridge, management building, process building and equipment.

IMPLEMENTATION

3. Construction (continued)

- Establishment of composting area at JMPD.
- Provide performance guarantees.
- Procure adequate vehicles, bins and tools for operations.
- Install hot water pipe and cold water return with heat exchangers and pumps (running and standby).
- Install backup natural gas boiler and backup genset.
- Install electrical offtake from Energy Systems to upgraded minisub and from there to the Biomethane plant.

IMPLEMENTATION

3. Construction (continued)

- Install a biogas venting pipeline from the facility to the inlet point of the Joburg Landfill Gas facility.
- Install biodigesters and new pumproom in between digesters (allow space for expansion and addition of pasteurisation).
- Install biogas scrubbing and dehydration units.
- Install biogas upgrading plant, THT dosing, emergency flare.
- Install biomethane compression, high pressure storage, filling units and priority filling system.

IMPLEMENTATION

3. Construction (continued)

- Install a liquids receiving pit (location of incinerator).
- Install a feed-hopper, picking conveyor and pulping equipment.
- Construct drainage on the concrete floor for leachate to be captured into liquids receiving pit.
- Install building HVAC and de-odourising and odour control system.
- Install roller shutter doors that close in between truck arrivals with light signalling system for reversing drivers.
- Install partitions and push-walls inside the main processing building.

IMPLEMENTATION

3. Construction (continued)

- Install decanter centrifuge or similar dewatering system at elevation with polymer make-up and feeding system for digestate separation on shed to the west of main building.
- Install digestate solids diversion optionality when digestate solids bin is full and being changed out.
- Install effluent retention pit in sewer connection for monitoring.
- Install digestate liquor tank and top and bottom tanker filling points.
- Install rainwater runoff buffer to leachate pond.

IMPLEMENTATION

4. Commissioning

- Commission digesters (first fill).
- Commission online monitoring and reporting system.
- Commission of biomethane and filling plant.
- Commission compost area.
- Commission waste collection area.
- Tests after completion.
- Handover plant and as built documentation (drawings, manuals, designs and procedures).

OPERATIONS

Highlights

- Sampling, analysis, data capture, process parameter measurement, and reporting.
- Procurement of consumables, spares and services required for operations and maintenance.
- Performance of all regulatory and HSEQ tasks.
- HR management and sourcing.
- Sourcing of waste with onsite presence & activities.
- Digestate management including composting and bagging.

OPERATIONS

Highlights

- Scheduling and schedule management.
- Traffic control.
- Security and access control.
- Odour control
- Waste disposal.
- Sourcing of waste with potential onsite separation activities.
- Digestate maturation next door using mobile composting setup.
- Specific license applications.

PERFORMANCE TESTING

Tests After Completion

- After commissioning
- Performance guarantees

Tests During Operations

- Monthly
- Standard reporting
- Production guarantees

PERMITS and CONTRACTS

The contractor should:

- apply for and obtain a gas trading license in the name of the project owner during the 3 year operations period.
- obtain the building permit and submit suitable plans.
- ensure all submissions to Department of Labour are done.
- enter into suitable supply and offtake contracts with the identified entities.
- conform to all fuel production and dispensing regulations and permits.
- register the site (on behalf of Pikitup) under the City Power SSEG regulations for instances where net electricity production occurs from site.



BUILDING A WORLD CLASS FACILITY FOR A WORLD CLASS AFRICAN CITY

