	Scope of Work	Generation: JET Office
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Title: **Appointment of a consultant to support Eskom in conducting a feasibility study to assess the business case for mushroom and “eco-brick” production from alien vegetation at, or nearby, Komati Power Station**

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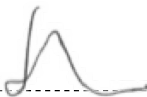

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1. INTRODUCTION

“Green building” development initiatives are utilising waste as components for brick making. One such initiative, noted as a project that could leverage existing Just Energy Initiatives—viz., Alien Invasive Species Removal—could use the alien vegetation waste as a substrate for cultivating mushrooms. Once the mushrooms are harvested and sold, the remaining biomass can be processed into building materials, which are commonly referred to as “eco-bricks”. “Eco-bricks”, in this scope of work, are thus building materials that are produced using the “waste” from mushroom production.

This method, tested by several players globally, offers an alternative to traditional building materials by converting waste into environmentally friendly construction products. It is Eskom’s intention to contract the services of a consultant to conduct a feasibility study to establish and operate a sustainable business that utilises, amongst others, the invasive species around Komati Power Station, in Mpumalanga, South Africa, as a substrate for mushroom production and associated building products.

1.1 Scope

The feasibility study must deliver an assessment of the viability of setting up a mushroom and “eco-brick” production facility in the Komati Power Station area. The feasibility study will cover critical areas such as biomass volume and suitability (looking at what is available and what needs to be planted), product marketability (locally and internationally), regulatory requirements and job creation. The study must include the following:

- **Resource and Feasibility Assessment:** Identify and quantify invasive plant species around Komati Power Station, assess suitability for various types of mushroom cultivation and associated “eco-brick” production, evaluate market demand for mushrooms and “eco-bricks”, and analyse regulatory requirements for certifying “eco-bricks” as a building material in South Africa.
- **Operational and Financial Modelling:** Estimate job creation potential, develop an operating model, and conduct a detailed financial analysis, covering income, expenses, capital expenditure, and financing needs, and propose an ownership structure that appropriately apportions risk/reward for the owner and community alike.
- **Implementation Planning:** Create a roadmap for implementation with cost estimates and perform a risk assessment to guide project execution. List the identified potential clients and the expected volumes for both mushrooms and “eco-bricks”.

1.1.1 Purpose

The purpose of this document is to specify how the services must be rendered and the schedule and resources needed.

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1.1.2 Applicability

This document shall apply to Komati Power Station and the JET Office.

1.1.3 Effective date

The effective date will be when the contract for these services has been approved and supporting systems required for compliance are in place.

1.2 Normative/Informative References

1.2.1 Normative

- [1] ISO 9001 Quality Management Systems – Requirements
- [2] Supplier Quality Management Specification (QM58): 240-105658000
- [3] ISO 19011: Guidelines for Quality and/or Environmental Management Systems Auditing
- [4] Supplier Quality Management List: List of Tender Returnable: 240-12248652

1.2.2 Informative

- [1] ISO 45001:2018 Occupational Health & Safety Management System
- [2] 36-1131 Conducting of QMS Internal Quality Audit
- [3] OHS Act & Regulations
- [4] Terms of reference (KfW approved)

1.3 Abbreviations

Abbreviation	Explanation
JET	Just Energy Transition
OHS	Occupational Health & Safety
QMS	Quality management System

1.4 Related/Supporting Documents

- All divisional and business unit supplier quality requirements, standards and/or specifications.

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2. FULL DESCRIPTION OF THE SERVICE

2.1 Ground Truthing Exercise (Baseline Assessment)

- Conduct a survey of invasive plant species within a 50-kilometer radius of Komati Power Station. This process includes field inspections and mapping to accurately identify the types and quantity of biomass available. Important official reference sources for this work will include the work done by the South African National Biodiversity Institute, the Department of Forestry, Fisheries and the Environment (DFFE), and the Department of Agriculture.
- Compile a detailed inventory report on available invasive plant biomass, indicating whether the biomass is located on public or private land, and provide a realistic assessment on the ease by which such biomass could be secured for use in the production facility.

2.2 Invasive Plant Species Selection and Testing

- Select plant species will need to be tested for their suitability for use as a substrate for mushroom cultivation and “eco-brick” production. The testing of these species will need to be done at an accredited laboratory. The laboratory will need to verify that the alien invasive species is suitable for effective and efficient mushroom growth and that the resulting substrate can be used in “eco-brick” production.
- Interpret the lab results to determine the optimal species for mushroom and “eco-brick” production in the Komati Power Station area.
- Document the optimal growing conditions for the mushrooms and flag any concerns that may relate to the growing context in the Komati Power Station area.

2.3 Market Assessment

- Conduct an in-depth analysis of the mushroom market (domestic and export):
 - Interview industry stakeholders, including local distributors, retailers, and wholesalers, to gain insights into preferred mushroom varieties, temperature conditions, etc.; quality and care requirements; packaging formats; and price points.
 - Provide a demand forecast, considering trends in geographic demand and consumer preferences.
 - Provide a demand analysis for the adoption of green-building products, such as “eco-bricks,” in the South African building sector. Specifically, identifying what segment of the building sector would most likely make use of alternative brick

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products and the circumstances under which they would do so. It is expected that the consultant will engage with the Green Building Council South Africa, among other relevant industry players.

2.4 Building Material Certification Assessment

- Produce a detailed analysis of the required steps to certify a new building material in South Africa, specifically in relation to eco-bricks.
- Engage with relevant competent bodies, including, but not limited to, the South African Bureau of Standards (SABS) and Agrément South Africa (ASA) to understand the process, fees, and risk factors that may impact the approval of mycelium-based "eco-bricks" as a certified building material in South Africa.
- Quantify the likely cost of product testing and third-party certification to demonstrate the “eco-brick” conformance with South African safety, fire resistance, and load-bearing standards, and provide a realistic timeframe for achieving local certification.

2.5 Job Creation Potential

- Estimate the number of direct jobs that would be created at various stages of the operation including biomass clearing, mushroom cultivation, “eco-brick” manufacturing, logistics and sales.
- Categorize the job estimate by job roles and provide an estimated market-related salary per job role.
- Highlight essential skills that will be required to staff the operation.

2.6 Operating Model Development

- Recommend an operating model whose scale is optimised for business sustainability and accounts for the key components of the envisioned value chain, specifically: biomass clearing, mushroom growing, “eco-brick” production, packaging, sales, end-product logistics, etc.

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- Determine the extent to which the operating model should be vertically integrated (or not) and identify suppliers and off-takers that are essential to the successful functioning of the operation. Given the extended timeline associated with building material certification, the priority is to identify mushroom off-takers with genuine intention and ability to purchase and the terms and conditions that such off-takers would expect.
- Explain how to maximise the use of “eco-bricks” that could be produced alongside mushroom production.
- The operating model should account for the finite volume of invasive plants within the 50-kilometer radius of Komati Power Station and by when the biomass will be exhausted. A strategy for sourcing alternative feedstocks there-after should also be included, together with a cost-containment and sustainable sourcing plan.

2.7 Financial Analysis

- Conduct a comprehensive financial analysis, projecting a five-year revenue forecast, based on mushroom sales, “eco-brick” production, and any secondary revenue streams.
- Five-year forecast of operating expenses, including costs for raw materials, labour, utilities, transportation and compliance.
- Provide the cost of invasive plant removal and sterilisation/ post-removal treatment.
- Provide the costs associated with certifying “eco-bricks” for the South African market and the cost of making productive use of “eco-bricks” in the interleading period.
- Provide the cost of essential training to secure an appropriately skilled staff complement.
- Estimate capital expenditure needs for equipment, facilities, and infrastructure, along with depreciation rates and maintenance costs.
- Assess the financing options, likely to be a concessionary term loan, and assess the impact on project cash flow and return on investment (ROI) and the extent to which a modest grant component is necessary.

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2.8 Ownership and Intellectual Property

- Propose an ownership structure that appropriately apportions risk/reward for parties. Consideration should be given to the practicality and implications of incorporating a community ownership portion.
- Confirm the real intention of interested parties to make contributions in terms of intellectual property, equity finance, sweat equity and grant funding.

2.9 Document Lessons Learned

- Include a “Lessons Learned” report from the research done with an emphasis on mushrooms and “eco-brick” development that can be undertaken at other sites in Mpumalanga and what to prioritise should Eskom’s Just Energy Transition team pursue a similar project at other sites.

2.10 Implementation Roadmap

- Develop an actionable roadmap outlining the steps needed to launch the project, including key activities such as permitting, equipment acquisition, facility setup, and staff training.
- Estimate costs for each stage of the roadmap including contingency funds for potential delays or unexpected expenses.
- Conduct a risk analysis to identify potential challenges including environmental, operational, and financial risks, and create mitigation plans.
- Set realistic timelines for each phase, ensuring the roadmap is adaptable to accommodate market changes, regulatory updates, or new technology.

3. DELIVERABLES

The deliverables of this feasibility study are summarised as follows:

3.1 Biomass Inventory and Viability Assessment

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- Comprehensive inventory of invasive plant species around Komati Power Station in Mpumalanga, including biomass quantities, public/private land location, and assessment of the ease by which such biomass could be secured.
- Assessment of selected species for viability in mushroom cultivation and “eco-brick” production, with lab test results and a final list of recommended species.
- Elucidation of the optimal growing conditions for the mushrooms and suitability of the Komati context.
- Market analysis report for mushrooms, with demand forecasts and export opportunities.
- Demand analysis for the adoption of “eco-bricks” in the South African building sector.

3.2 Certification and Risk Analysis

- Detailed overview of South African certification requirements, procedures, costs, and timeframe for “eco-bricks” as a building material.
- Assessment of the risks associated with “eco-bricks” achieving local certification as an approved building material.

3.3 Operational and Financial Model

- Design of a scalable and sustainable operating model covering biomass sourcing, mushroom and “eco-brick” production, logistics, and distribution.
- Job creation estimates and identification of essential suppliers and off-takers.
- Financial projections, including revenue forecasts, operating costs, capital expenditure and funding options.
- Proposed ownership structure and intellectual property provisions.

3.4 Implementation Roadmap

- Step-by-step roadmap for project implementation including permitting, equipment acquisition, facility setup, and training.

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- Estimated costs, timelines, and contingency planning for each stage.
- Recommendations from similar mushroom and/or "eco-brick" projects and the scalability thereof in South Africa.

4. DELIVERY SCHEDULE

- The feasibility study is expected to be completed within 4 months from the signing of the contract.
- The consultant must provide a Gantt chart that shows the activities, milestones, and deliverables over the term of the project.

5. PRICING AND PAYMENT

The consultant needs to provide a lump sum bid for all fixed and variable costs for conducting the service as part of the financial proposal covering all staff costs, research activities, site visits, data collection, plant species preparation and shipping, and report preparation.

The cost of lab testing is excluded from the budget.

6. CONSULTANT REQUIREMENTS

The consultant is expected to field experts that are qualified to complete the scope of work as detailed in Section 3. The consultant must warrant that the proposed experts are available to work on the feasibility study and that they have the requisite expertise to do so.

The key expert roles, whose CVs and experience will be evaluated, should include the following:

Position	Minimum Experience	Experience Requirements	Weight
Project manager	7+ years in managing feasibility	<ul style="list-style-type: none">• Proven track record delivering successful, bankable feasibility	30%

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Position	Minimum Experience	Experience Requirements	Weight
	studies, preferably with experience new product/ frontier market development.	<ul style="list-style-type: none"> projects and business strategy projects. Experience in overseeing detailed, multi-phase business feasibility studies, including market assessment, regulatory analysis, and project/ business financial analysis. 	
Environmental scientist/ plant biologist	5+ years in environmental assessments	<ul style="list-style-type: none"> Strong background in plant biology and knowledge of invasive plant species in South Africa. Knowledge of fungal biology and mycology. Fieldwork experience, including plant sampling, surveying, and reporting. 	20%
Building materials expert	5+ years in the building materials industry	<ul style="list-style-type: none"> In-depth understanding of South African building materials industry and the associated regulatory requirements. Familiarity with eco-friendly and non-traditional building materials. Familiarity with sustainability certification processes, and green building standards (e.g., LEED or Green Star). 	20%
Market and Business Analyst	5+ years in market and business analysis, financial modelling	<ul style="list-style-type: none"> Strong expertise in conducting market assessments. Proven skills in demand forecasting, pricing analysis, and assessing potential offtake agreements in local and export markets. Financial modelling experience, including capital expenditure, 	20%

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Position	Minimum Experience	Experience Requirements	Weight
		operating expenses, and revenue forecasting. <ul style="list-style-type: none">• Ability to synthesise financial and market insights into recommendations for operational models and business strategy.	
Research Specialist	5 + years in food research and analysis and by-product usage	<ul style="list-style-type: none">• 3 years + experience in researching agri-based and food commodities in South Africa• Ability to assess new technology applications given insights into successes and failures in the Southern African agri-based arena	10%

NB: A 75% threshold is the minimum requirement for the above technical component to be considered for financial evaluation.

7. EVALUATION OF PROPOSALS

A 75% threshold will be used as a minimum requirement in the technical evaluation. Those that meet this threshold will be considered for financial evaluation.

8. CONFIDENTIALITY

- All data and information received from Eskom for the purpose of this assignment must be treated confidentially and is only to be used in connection with the execution of this Terms of Reference.
- All intellectual property rights arising from the execution of these Terms of Reference are assigned to Eskom.
- The contents of written materials obtained and used in this assignment may not be disclosed to any third parties using any media without the expressed advance written authorization of Eskom.

9. ACCEPTANCE

This document has been seen and accepted by:

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Name	Designation
Dana Gampel	Corporate Specialist - JET
Vikesh Rajpaul	General Manager - JET

10. REVISIONS

Date	Rev.	Compiler	Remarks
16/04/2025	1	Tebogo Lekalakala	Final Draft
09/09/2025	2	Sam Moswane	Final DOC

11. DEVELOPMENT TEAM

- Tebogo N Lekalakala
- Sam Moswane
- Anari Van Greuning

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