Executive Summary

The feasibility study report highlighted that the construction industry heavily relies on aggregates which are becoming scarce and expensive. Hence, it assesses the viability of the commercialization of the jaw crusher, stone crusher and stone screening machine too produce Recycled Concrete Aggregates (RCA) from used concrete. The proposal project objectives are targeted at leveraging the growing rate of urbanization and infrastructural development particular under the present administration both in the rural area and the cities across Ogun state and the nation at large. Nigeria generates thousand of tons of concrete waste annually from demolition, renovation and infrastructural upgrades. The economic viability of recycling and recovery of used concrete have not been harnessed in the construction industry in Ogun state and Nigeria. Recycled Concrete Aggregates (RCA) offer a versatile, eco-friendly and sustainable alternative to virgin materials with a cost-effective advantage in the building construction industry.

The project will be engaged in processing and recycling of used concrete into Recycled Concrete Aggregates (RCA) of high-quality that can be used in the construction industry for economic growth, cost-effectiveness, materials and environmental sustainability.

The key highlights of the feasibility study include:

The key highlights of the feasibility study include:

i. Technical Report:

The processing machine produces fine sizes of aggregates of concrete from used concrete. It is a has powered-equipment for effective crushing of concrete to required sizes. It is efficient in screening stone and can handle varied used concrete.

ii. Market Potential: There is a great demand for concrete aggregates in Ogun State and the neighbouring states in the construction industry.

iii. Environmental Impact: Recycling of used concrete consumes as less as 50% energy than extracting virgin granite, which align with Nigeria's and global SDGs.

iv. Financial Viability: The process turnout has a strong Return On Investment (ROI) prospect due to the low input cost and high cost of Recycled Concrete Aggregates (RCA) in the market.

The feasibility study report concludes that the commercialization of the project is technically viable, economically promising, environmentally impacting with strong potential for profitability in the region of the chosen site. It however, recommend that the project can be executed with the detail planning, site selection, financial and stakeholders' engagement.

1. Business Description

i. Purpose of the venture

The purpose of the business is recycling used concrete and materials into Recycled Concrete Aggregates (RCA) for the construction industries that use them as raw materials for building construction. The RCA are used by individuals and the construction industry.

ii. Description of the aluminium furnace

The processing machines are efficient equipment that has been in existence for decades with proven and high efficiency in breaking, crushing and screening of stones. It is rugged and effective in the processing operations.

iii. Recycling process and value proportion

The used concrete will be recycled through a process pre-treatment, breaking, crushing and separating of stones into different sizes for meeting customers' demand. The value proportion of the recycled concrete is 65%.

2. Market Analysis

i. Targeted Customers

The targeted customers for the products are individuals, builders and construction industry

ii. Location Advantage: The site has proximity to the sources of used concrete which are builders and construction industry.

iii. Competitive Landscape: The existing competitor are granite sellers in the community and Ogun state

This short coming will be treated with price reduction in the RCA to get more sales.

3. Technical Feasibility

i. Stone processing machine: A jaw crusher, stone crusher and stone screening machine are very appropriate for the site region due to their ability to process used concrete of any size mixed. They are very efficient due to mode of operation.

ii. Energy source and efficiency: The fuel to be used for powering the generator is Liquified Petroleum Gas (LPG). Electricity will also be used if it is available. The equipment will be properly maintained to ensure high efficiency and achieve up to 70% mechanical efficiency.

iii. Input materials and processing capacity

The input materials are used concrete.

Pre-treatment will be carried out through basic sorting. The production capacity is 1-2 ton per day which is suitable for pilot operations.

iv. Site requirement:

Land size: The land size is 800 m^2 - 1000 m^2 for small-scale operation.

Utilities: There is water supply, electricity supply and access roads.

Safety System: Fire suppression, fire bucket, ventilation and PPE protocols will be provided.

v. Quality Control and Output

Product: Recycled Concrete Aggregates (RCA) of high-quality will be produced depending on the used concrete integrity.

Testing: Material characterization, physical and mechanical tests and frequent check-up will be carried out to ensure consistency of the products.

Packaging: The RCA will be stored at the site for display to customer.

vi. Pollution Control and Emission Management

Noise and Vibration: Damping materials will be deployed to minimize community impact and noise effect. Safety materials will be deployed to meet the environmental standard of NESREA.

4. Regulatory and Environmental Consideration

Licensing and Permit

The license and permit would be sought from the concerned regulatory body for industrial operations and emission

Environmental Impact

The environmental impact will comply with the local and international standards for air quality and noise effect.

Sustainability Appeal

The recycling of used concrete saves up to 50% of the energy compared to primary production.

5. Financial Feasibility

Capital Expenditure (CAPEX)

S/N	ITEMS	ESTIMATED COST (NAIRA)	NOTES
1	Crushers and equipment	22,365,000.00	It a rotary furnace of 0.3 - 0.5 tons per day
2	Land acquisition	To be provided by the institution	Provided by the institution
3	Site development	14,600,000.00	Foundation, utilities and fencing
4	Pollution control system	1,410,000.00	Dust, noise and vibration handling

5	Testing and quality equipment	680,000/.00	Spectrometers, scales, packaging
6	Licensing and permits	1,050,000.00	NESREA, FMEvn. and Local government fees
	Total Estimated CAPEX	40,105,000.00	

Operating Expenses (OPEX)

S/N	ITEMS	COST (NAIRA)
1	Energy (LPG)	650,000.00
2	Labour (6 – 10 staff)	1,460,000.00
3	Used concrete procurement	300,000.00
4	Maintenance and consumables	2,405,000.00
5	Logistics and packaging	100,000.00
	Monthly Estimated OPEX	4,915,000.00

Revenue Projections

S/N	ITEM	DESCRIPTION	REMARK
1	Output	30 – 50 ton per day	Recycled Concrete Aggregates (RCA)
2	Selling price	300,000.00 – 500,000.00 per day	Depending on the purity
3	Monthly revenue	6,000,000.00 – 10,000,000.00	Assuming 20 working days)

Profitability and Return on Investment (ROI)

i. Gross Margin

40-60% depending on the used concrete cost and energy efficiency.

ii. Break-even Point

Estimated within 18-30 months

Return ON Investment (ROI)

Potential to exceed 65% within 3 years

The funding of the project will come from government grants for recycling and sustainability.

6. Organizational and Operational Plan

i. Staffing and Skill Requirements

The project team will be engaged in the monitoring and operations of the project. However, 6-10 staff will also be employed to work at the Recycled Concrete Aggregates (RCA) Centre (FPI-RCAC).

ii. Supply Chain and Logistics

Procurement of used concrete for production will be operational.

Recycling of used concrete to produce RCA will be carried out. Supply of RCA to targeted customers will be carried out to keep the supply chain and logistics at an optimal operational level.

Production Workflow

The production workflow will be operational with all the stakeholders working to carry out the assigned tasks.

Safety and Training Protocol

The stakeholders and all staff will receive all the necessary safety equipment and training to reduce accident and risk to the barest minimum.

7. Risk Assessment

i. Market Risks

The market risks include price volatility of RCA and competition from other granite sellers. The market price will be targeted at the optimal level.

ii. Operational Risks

The equipment may malfunction during operations which may affect the operations, production output and targeted sales. Used concrete quality may also affect the quality of RCA and reduce income generation. Adequate equipment maintenance will be deployed and used concrete quality will not be compromised.

iii. Regulatory Risks

The necessary regulatory agencies will be contacted to obtain all the needed license and permit document and certifications.

iv. Mitigation Strategies

The necessary mitigation, laws and regulations will be enforced and strictly adhere to.

8. Conclusion and Recommendations

The feasibility study shows that the project is economically viable, technically sound, market demanding with positive commercialization potential with minimal risks if the working plans are strictly used. The product commercialization can go on and the project can be executed. The next step is to receive the government grant and proceed to execute the project and commercialized the product.