

## POSITIVE PRELIMINARY FEASIBILITY STUDY FOR AGBAJA PROJECT

### Highlights

- PFS establishes robust economic and technical viability of a 5 Mtpa iron ore project at Agbaja
- Project is highly attractive with IRR of 23.7% and estimated pre-tax NPV of US\$420 million (@ 12% discount)
- CAPEX estimate US\$497 million and capital intensity of US\$99.4/t
- Average operating costs US\$42.98/t concentrate FOB
- Four year capital payback
- Project ranks in the bottom quartile for capital intensity and the bottom half of operating cost curve of magnetite projects
- Long term forecast FOB price of US\$73.00/t iron ore concentrate
- Net margin US\$ 30/t and average EBITDA of US\$136M p.a.
- Commencement of a Definitive Feasibility Study (DFS) approved

Australian based iron ore development company, Kogi Iron Limited (ASX: KFE) ("Kogi", "Kogi Iron", or the "Company") and its 100% owned Nigerian operating company, KCM Mining Limited ("KCM") are pleased to advise a positive and robust outcome for the Preliminary Feasibility Study ("PFS") on its 100% owned Agbaja Iron Ore Project, in Kogi State, Federal Republic of Nigeria ("Agbaja Project", "Agbaja" or the "Project").

Kogi's Managing Director Iggy Tan said: that "the PFS has been completed two months ahead of schedule which is testament to the hard work put in by the high quality team involved. The highly positive results of the study determined that the development and operation of a mine and processing plant at Agbaja to produce 5 Mtpa of iron ore concentrate is technically feasible, economically viable and socially and environmentally acceptable".

"Operating costs are estimated at ~\$43/dmt FOB and capital intensity at ~\$99/dmt, this places both the projected operating costs and the projected capital costs for Agbaja in the bottom half and bottom quartile respectively for global magnetite projects and comparable to some DSO hematite iron ore projects. This is due to the softness of the Agbaja material and the resultant moderate grinding intensity and simple processing plant design, the low strip ratio (0.55:1), gas fired power and river barging for concentrate transport".

"These strong results have led to approval from the Board of Kogi Iron to proceed to a Definitive Feasibility Study ("DFS") as a precursor to a decision to mine at Agbaja. The DFS is expected to be completed by end of Q4 2014".



The following is the Executive Summary from the Preliminary Feasibility Study Report.

## PRELIMINARY FEASIBILITY STUDY – EXECUTIVE SUMMARY

Kogi Iron Limited (Kogi, Kogi Iron or the Company) is an Australian company with the objective of becoming an African iron ore producer through the development of its 100% owned Agbaja iron ore project located in Kogi State, Republic of Nigeria, West Africa (Agbaja or Agbaja Project). The Company holds 17 iron ore exploration licences in Kogi State, with the main focus being EL12124, which covers more than half of the Agbaja Plateau and within which is the Agbaja iron ore deposit.

This Preliminary Feasibility Study (PFS) assesses the technical and economic viability for the development of an iron ore mining and processing operation at Agbaja to produce 5.0 million tonnes of upgraded iron ore concentrate per annum.

### 1.1 MINERAL RESOURCES

The Agbaja Plateau hosts an extensive, shallow, flat-lying channel iron deposit and Mineral Resources currently estimated at 586 million tonnes at 41.3% Fe (within EL12124) (Agbaja Mineral Resource). The majority of the Mineral Resources are classified as Indicated (466 million tonnes at 41.4% Fe), the balance are classified as Inferred (120 million tonnes at 41.1% Fe)<sup>1</sup>.

The Agbaja Mineral Resource is one of the highest grade beneficiable iron ore resources in West Africa, yet the current resource covers only 20% of the Agbaja Plateau area within EL12124 that is considered prospective for channel iron mineralisation.

The Agbaja Mineral Resource is the basis for this PFS. There are sufficient Indicated Mineral Resources at Agbaja to support a 5 Mtpa iron ore mining and processing operation for a period of more than 35 years. A mine plan sufficient for 21 years production was used in the PFS.

### 1.2 MAGNETITE IRON ORE DEPOSITS

Magnetite iron ore deposits generally grade around 25-40% Fe, however the Agbaja Mineral Resource is a unique sedimentary hosted magnetite deposit with a resource grade averaging 41.3% Fe, which with selective mining of higher grade material will provide a feed head grade of 45.7%, ranking it in the top quartile of magnetite projects world-wide with respect to resource grade.

Magnetite deposits are typically found in banded ironstone formations (BIFs), however Agbaja is unique in that it is a channel iron deposit (CID), with only two known similar deposits of this kind in the world. Typical BIF magnetite deposits require large amounts of energy intensive grinding to liberate the iron from its associated natural matrix, however the Agbaja CID material is relatively soft and friable and only requires moderate grinding, simple magnetic separation, and only a coarse grind particle size to liberate the iron. Consequently mining and processing costs for the Agbaja project are relative low compared to other magnetite projects. Agbaja's estimated total operating costs rank in the bottom quartile when compared to operating costs of all other magnetite projects.



*Project Location and Niger River Barging Route*

<sup>1</sup> Refer Appendix 1 for a table summarising the Agbaja Mineral Resource



### 1.3 PROJECT LOCATION

The Agbaja Plateau lies 15 km northwest of the city of Lokoja in Kogi State, and 165 km south west (highway) from Nigeria's capital city of Abuja. Lokoja has reticulated electrical power, cellular telephone networks, primary and secondary schools, hospitals and other amenities. Abuja, being the political capital of Nigeria is a well-established and serviced city; it has a large international airport with daily flights to Europe, the middle-east and other African nations and is connected to Abuja by a well maintained dual carriageway tarmac road (driving time ~2 hours).

Importantly, Agbaja is proximal to existing, under-utilised river and port infrastructure suitable for the transport of bulk commodities (such as iron ore concentrate).

A crucial ingredient to the commercial viability of an iron ore mine is access to bulk commodity transport infrastructure, which is one of Agbaja's key competitive advantages. Agbaja is uniquely positioned in terms of its proximity to two potential transport solutions for shipment of its iron ore concentrate; a barge loading point at Banda on the Niger River (within 20 km) and an existing heavy haulage railway line (within 80 km). Both barge and rail connect to the established export port of Warri on the Gulf of Guinea.

### 1.4 NIGERIA AND MINING

With a population of more than 170 million people, Nigeria is the largest and most populous country in Africa. In 2013 Nigeria had a GDP growth rate of 7.2% and is Africa's largest oil producer, with oil accounting for 95% of the country's exports. The country is now recognised as one of the fastest growing in the world and Citigroup has forecast Nigeria will grow to become the world's fifth largest economy by 2050. As one of the four "MINT" countries (Mexico, Indonesia, Nigeria and Turkey), which are set to replace the BRICs (Brazil, Russia, India and China) in terms of the world's fastest growing investment destinations, Nigeria is predicted to continue to rapidly diversify, grow and expand its economy in the coming decades. Standard Bank believes Nigeria has the fastest growing economy of all of the MINT countries and has the strongest fiscal balance, lowest public debt, and is the only country in the MINT group with a Current Account surplus.

Experts believe that the Nigerian Government's ability to implement market-oriented reforms such as modernisation of the banking systems and the recent elimination of subsidies (as urged by the International Monetary Fund) have played vital roles in positioning the country for a "take off". Recent reports put Nigeria's foreign direct investment (FDI) at US\$8.9 billion, which is estimated to account for 16% of Africa's total FDI.

As a result of its reliance on oil, the Nigerian Government has sought to diversify its economy and is working hard to encourage new forms of investment and the mining sector is one of the highest priority industries. In 2007 the country adopted a new mining act (the Nigerian Minerals and Mining Act, 2007), which was followed in 2011 by the Nigerian Minerals and Mining Regulations. Both the mining act and the mining regulations are highly transparent and internationally competitive; the government has positioned itself as a regulator of the mining industry (and not legislated mandatory government participation), and it allows 100% foreign ownership of Nigerian company's seeking to develop mining projects. Fiscal terms are competitive with a 30% company tax rate, 3% ad valorem royalty on iron ore and there are numerous incentives for mining operators such as import and customs duty exemption and a three year tax free holiday.

Nigeria is richly endowed with natural resources and Kogi Iron has secured a first mover advantage in the iron ore sector at Agbaja, which has the potential to become a significant resource project for the country.



## 1.5 MINE DEVELOPMENT, PROCESSING AND CONCENTRATE PRODUCTION

### 1.5.1 Mine Layout and Mining Plan

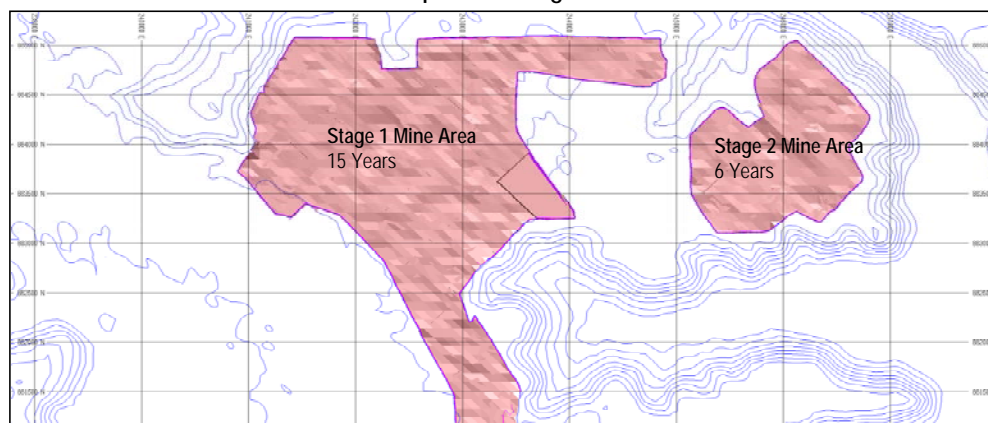
Two mining areas (Stage 1 and Stage 2) have been identified, pits have been designed, and material movement schedules completed. A proposed processing plant site location has also been identified; it is in the north east portion of the area covered by the Agbaja Mineral Resource and was selected based on its central location between the two areas identified for mining operations.

The Stage 1 mining area is approximately 7.2 km<sup>2</sup> and is west of the plant site and contains approximately 158 Mt of Indicated Mineral Resources. Targeting the magnetic fraction of the Indicated Mineral Resource, the average grade of material identified for mining is estimated at 46.1% Fe, with a corresponding strip ratio of approximately 0.55 to 1. As currently designed this area will provide processing plant feed for an initial 15 years at the planned concentrate production rate of 5 Mtpa.

The Stage 2 mining area is approximately 2.2 km<sup>2</sup> and is to the east of the plant site. This area is estimated to contain approximately 66 Mt of the Indicated Mineral Resources. The average grade of material is estimated at 44.8% Fe, with a strip ratio of approximately 0.56 to 1. This area will provide processing plant feed for an additional 6 years, bringing the combined plant feed from the two areas to 21 years (at concentrate production rate of 5 Mtpa).

With a life-of-mine average strip ration of 0.55 to 1 (on Indicated Mineral Resources), mining costs for the 21 years of operations will be low, a distinct advantage of the project.

Figure 1  
Proposed Mining Areas



### 1.5.2 Mining Operations

Kogi has opted for a mining contractor to conduct all site development, overburden and waste removal, open-pit mining including site rehabilitation, haulage and ore feed to a primary crusher. Mining operations will be conducted on a 24/7, 365 days per year basis and it is envisaged that production drilling and blasting will not be required, as all material is regarded as soft and friable, and amenable to "free-dig".

In response to requests for proposals to various mining contractors (based on initial mine design and materials movement schedules), the Company has received detailed proposals from three mining contractors, two of which have West African contract mining experience. The three proposals were relatively similar in terms of approach and total overall cost. A typical mining fleet recommended by the contractors include: 1 x R9250 Excavator; 1 x R984C Excavator; 9 x 777D/F Dump Trucks; 3 x D9R Dozers; 1 x 330E Excavator / Rockbreaker; 2 x 16M Graders; 2 x 773D WT Water Trucks; and 1 x RC GC Drill Rig.



Mining contractor staff numbers are in the region of 224 people, consisting of 30 staff, 149 operators and 45 maintenance personnel.

Mining costs, inclusive of all contract mining costs (overburden and mineralised material) and owner's costs used in the PFS financial model are US\$3.69/t of material feed to the processing plant, equating to US\$8.12/t of iron ore concentrate produced.

The low cost per tonne of plant feed is a reflection of the low 0.55:1 strip ratio, the softness of the Agbaja material, the short haul distances from pit to plant and pit to waste disposal points, African labor rates and the competitive pricing received from the mining contractors. These factors have always been a distinct advantage of the Agbaja Project; they have now been quantified and recognised in the PFS.

### 1.5.3 Metallurgy and Processing

The processing plant design has been finalised based on a variety of test work programs carried out by Tenova Mining and Minerals (part of the global Tenova Iron & Steel and Mining Industries group) ("Tenova") and considers results from earlier metallurgical test work programs conducted by both Tenova and Trical Mining and Metallurgical Services ("Trical").

Tenova's PFS test work focused on subjecting the mineralised Agbaja material to proven simple physical separation techniques to produce an iron ore concentrate with the best possible finished product specifications. Test work found that the iron contained in the mineralised material begins to liberate at a size below about 1mm, so a primary grind size of 600 micron has been selected for the processing plant, with a final grind size at a relatively coarse 250 micron.

Grinding will be followed by Low Intensity Magnetic Separation (LIMS) which is a robust, high capacity and well established mineral processing technology. For the Agbaja material, laboratory testing of LIMS has demonstrated sound primary separation of iron bearing material for a reasonable final product grade and yield after regrinding of the material. Yield is expected to be ~45%, for a final iron ore concentrate grade of ~56% Fe.

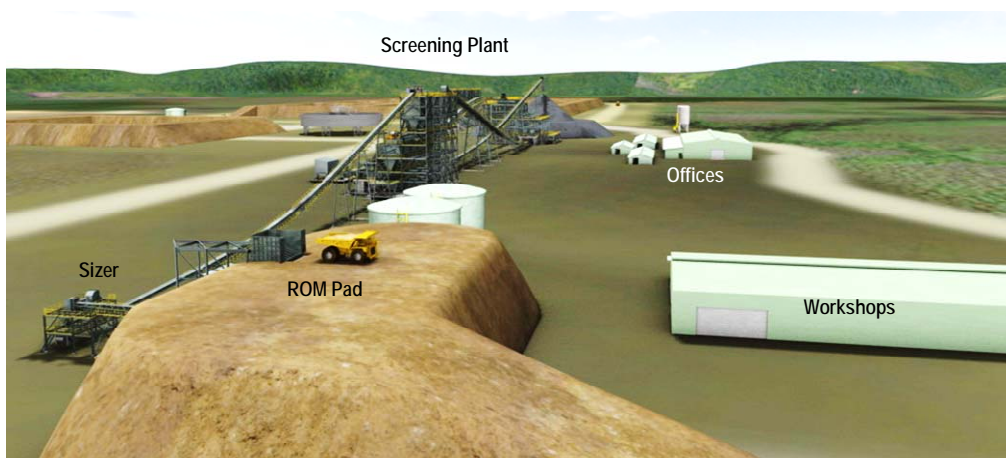
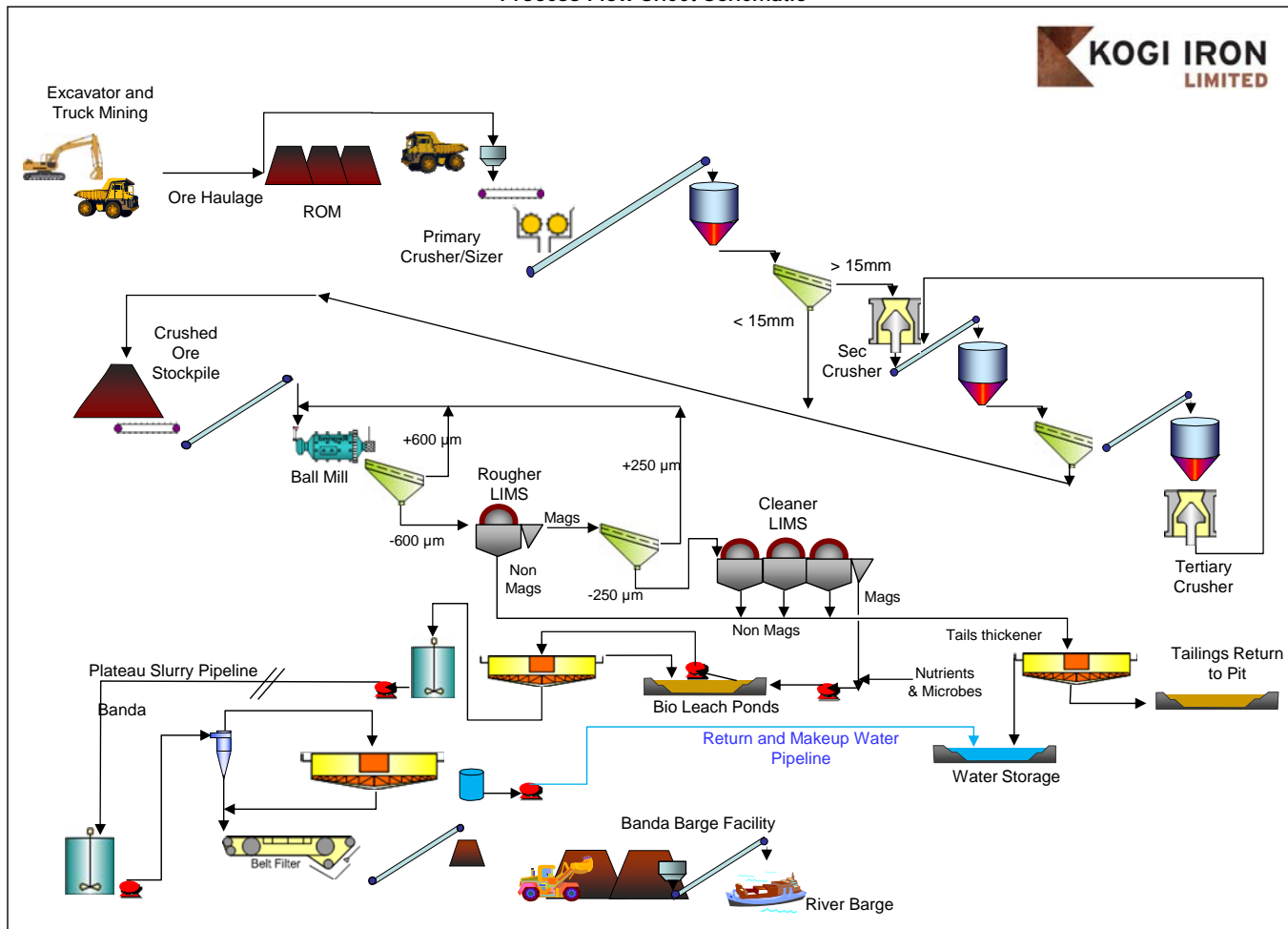
#### Processing Flow Sheet Description

A three stage crushing circuit has been designed, comprising of two double deck banana scaling screens, one primary crusher/sizer, one secondary cone crusher, two tertiary crushers and three single deck final product screens, delivering a <15 mm product ( $P_{80}$ ) to a conical mill feed stockpile (See Figure 1). The nominal throughput of the plant is 1,894 t/hr to achieve 11.1 Mtpa of feed. It is envisaged that crusher feed will be received in a primary crusher directly from the mine via dump trucks for the first stage of size reduction. From the primary crusher, material will report to an apron feeder sizer with >15 mm material proceeding to secondary crushing and <15mm material feeding a ball mill via a 38,000t live stockpile.

The >15 mm crushed material will be screened by a 3.0 m wide by 7.3 m long double deck banana screen with the oversize and middlings (>15 mm) from both decks conveyed to a secondary cone crusher. The secondary crushed product will be screened by three 3.0 m by 7.3 m single deck banana screens and oversize material sent to third stage crushing consisting of two HP800 cone crushers. Discharge from the tertiary crusher will be combined with the secondary crusher feed.



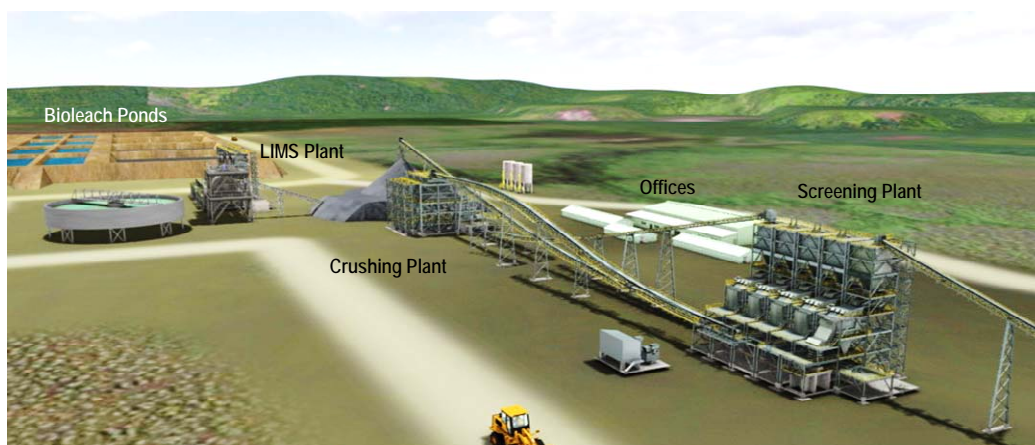
Figure 1  
Process Flow Sheet Schematic



Discover  
a World Class  
iron ore  
opportunity  
in Nigeria



The milling circuit will consist of one 6.7m diameter by 9.2m long ball mill with dual 4,500kW drives, operating in closed circuit with 30 multi-deck screens for classification of the solids. New feed to the grinding circuit will be reclaimed from the material stockpile by vibratory stockpile dischargers and conveyed to the mill hopper where it will be blended with screened mill oversize and Rougher Magnetic Separators (RMS) concentrate oversize. The mill will be sized to process a nominal, 3,900 t/hr of solids based on a circulating load of 100% of new feed of 1,590 t/hr. Mill discharge slurry density will be maintained at 70% solids by the controlled addition of water to the mill feed chute, and water addition to the mill discharge hopper will be controlled to ensure 50% solids density in the feed to one of the six sets of five multi deck screens. The objective of the multi-deck screen is to produce feed to the downstream Rougher Magnetic Separators (RMS) circuit from the undersize at a  $P_{80}$  of 250  $\mu\text{m}$ . The oversize material (>250  $\mu\text{m}$ ) from the multi-deck screens will be returned to the ball mill. The underflow from the multi-deck screens will be collected, maintained at 35% density and fed to the RMS circuit.



*Proposed overall plant layout at Agbaja*

Each RMS unit will be a single drum, low intensity magnetic separator (LIMS), counter current and operating under approximately 2000 Gauss magnetic strength at a distance of 50mm from the drum surface. The resulting concentrate (magnetic stream) is expected to recover 67% of the feed to the circuit and produce concentrate slurry at 60% solids density. The RMS product will be fed to a cleaner magnetic separation circuit (CMS) consisting of three four-way gravity distributors feeding a total of 12 triple drum magnetic separators. Each CMS unit will be a triple drum, LIMS, counter current and operating at approximately 2000 Gauss magnetic strength at a distance of 50mm from the drum surface.

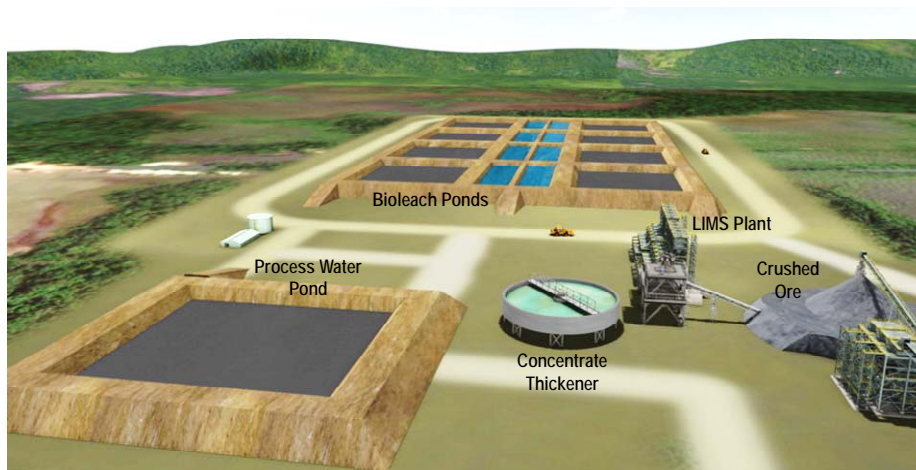


*Typical LIMS units used in iron ore industry*



The RMS concentrate will be upgraded by the CMS to a final Fe grade of 56%, with the non-magnetics reporting to tailings. The CMS is expected produce 5.0 Mtpa of concentrate to undergo microbial treatment to reduce the phosphorous content to 0.25% in open swimming pool style vats. Once the phosphorus levels have reached the targeted level, the slurry will be pumped out of the vats and thickened for pumping and transport to the Banda barge loading facility.

The slurry concentrate received at the Banda barge loading facility will be vacuum filtered and washed with water before being conveyed to the concentrate product load-out station at a maximum moisture content of less than 10% before being loaded onto river barges for transport. Recovered water will be returned back to the processing plant by pipeline with additional process water sourced from the Niger River.



*Proposed Bioleach Circuit at Agbaja*

It is envisaged that power for the Agbaja site will be provided by a dedicated natural gas fired power station. Dedicated diesel fired generators will service the Banda barging facility and the Escravos transfer station. Natural gas is the preferred energy solution for power generation for Agbaja, as it is an environmentally friendly solution supported by the Nigerian Government in its drive to increase the utilisation of the country's natural gas, much of which is currently flared as a bi-product of crude oil production. Of potential benefit to the project is an un-utilised natural gas pipeline that runs from the northern part of the prolific oil and gas province in the Niger Delta, close to the proposed processing plant site.

Processing and maintenance costs used in the PFS financial model is US\$6.31 per tonne of plant feed, equating to US\$13.96 per tonne of concentrate produced.

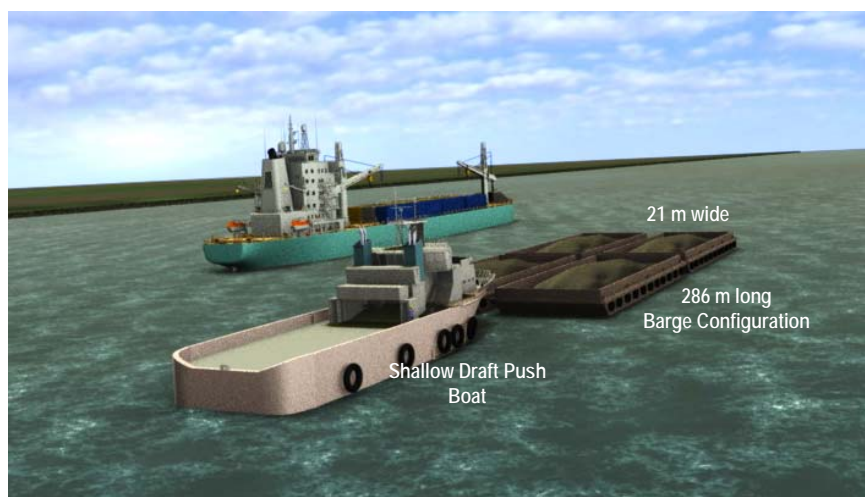
## 1.6 BARGING AND TRANSHIPMENT

It is widely accepted that barging is a lower cost form of bulk commodity transport compared to rail and trucking. Various studies have examined the economics of these three transport modes, and one study identified that rail cost is around 2 to 2.5 times more than that of barging. The study work commissioned by Kogi has demonstrated that the barging and transshipment of iron ore concentrate from Banda via the Niger River to the Gulf of Guinea is not only feasible, but highly economical.





The concentrate slurry will be filtered at Banda to have a moisture content of less than 10%, and conveyed to a covered stockpile. Barge loading will be by a travelling, luffing, telescoping barge loader filling Mississippi type barges, in a configuration of four barges. This configuration will have dimensions of 21 m beam by 286 m long and designed to carry loads of 4800 t to 8000 t depending on river water levels. The river barge configuration will be propelled by shallow draft four engine push boats with a preferred speed of 10 knots. The iron ore concentrate will be transported around 602 km from Banda along the Niger River to the Escravos Transfer Station in the Niger Delta, the travel time will be approximately 33 hours.



*River Barging Configuration*

At the Escravos Transfer Station the concentrate will be transferred into a 20 000 t self-propelled and self-unloading ocean going barge. The ocean barge will transfer the concentrate to a floating transshipment storage facility in the Gulf of Guinea around 33 km away. The floating transshipment facility will have a storage capacity of 200 000 t of concentrate and allow the loading of Panamax and Cape size ships to the markets of the world.



*Proposed Escravos Transfer Station*



*Proposed Floating Transshipment Facility in Gulf of Guinea*

The Free on Board (FOB) barging cost including lease of tugs, river and ocean barges and a transshipment facility and owner's costs is estimated at US\$18.77/dmt of concentrate or a rate of 2.96 c/t/km.

## 1.7 OPERATIONS MANAGEMENT

It is envisaged that the bulk of the workforce required for the project will be sourced from within Nigeria. Recruitment of site management and personnel for specialist roles will be from those industry markets (within Nigeria) where mining industry like skills may be available (such as oil and gas, civil construction and quarrying). The overall employment philosophy is "employ at the gate", which means that all employees will meet their own accommodation requirements, the aim is for the Company not



to provide accommodation for its employees. The majority of the workforce will be hired locally from Kogi State where possible. A full business unit organisational structure is provided for. The total manning is estimated to be 541 personnel consisting of 274 Kogi staff, 224 mining contractor staff and 43 other contractors.

## 1.8 ENVIRONMENTAL AND SOCIAL IMPACT

The Company has completed an Environmental and Social Impact Assessment (ESIA) which is a key component of this PFS. The ESIA work was conducted by Greenwater Environmental Services Limited (Greenwater) and commenced in January 2013. The ESIA concluded that there are no environmental or social impediments for the development of the Agbaja Project. In terms of environmental impact, the ESIA reported that the areas directly affected by Kogi Iron's proposed mining and processing activities are predominantly low value scrub land and savannah woodland intercepted by grasslands, all of which have limited agricultural use or environmental significance. There were no rare or endangered species of flora or fauna identified in the proposed mine and operational areas, and furthermore the ESIA stated that anticipated environmental impacts from planned mining, processing and associated activities can be mitigated and managed via the requisite Environmental Management Plan, submitted as part of the ESIA.

The overall assessment of the potential and associated social impacts of the Agbaja Project was positive. The ESIA gauged that the project would positively impact the local stakeholder economy and the Local Government area and communities of the Agbaja Plateau generally, with similar positive impacts on Kogi State and Nigeria. The proposed mine development will contribute to socio-economic development within the host communities and result in economic empowerment for the indigenes and residents of the Agbaja Plateau, predominantly by way of direct and indirect employment opportunities (including contract opportunities during the construction and operational phases of the proposed mine).

## 1.9 GOVERNMENT AND COMMUNITY PARTNERSHIP

The Company works closely with the Ministry of Mines and Steel Development and all the departments of the Ministry that are concerned with monitoring the progress of the Project, specifically the Minister's office, the Mining Cadastre office, and the Mines Inspectorates Office. Kogi Iron is encouraged by the strong support shown for the development plans of the Agbaja Project and believes that Kogi has been identified as a leader of Nigeria's burgeoning mining industry.

Kogi, through its Nigerian team has established very strong local relationships with all of the Agbaja communities, building on the initial land consent agreements that were entered into. One of the key principals incorporated in the consent agreements was the engagement of local employees, and consistent with this principal currently 75% of Kogi's Nigerian employees are indigenous to the Agbaja Plateau and the remaining 25% are indigenous to Kogi State. Kogi Iron also ensures high levels of local content in its operations where possible, with procurement from local suppliers and service providers. Supporting the social development initiatives of local communities is integral to the way Kogi Iron operates in Nigeria. Ongoing support is provided to locally appointed committees and traditional rulers in their social development endeavours, this has assisted in improving local infrastructure and services, and consequently the well-being of the respective communities.

## 1.10 CAPITAL COSTS

The major capital cost component for the project is the processing facility and associated infrastructure. The engineering design and cost estimates for this facility has been carried out by Tenova Australia Limited (Tenova). Tenova is an independent process engineering consultant, which has extensive experience in this type and scale of plant. Tenova assesses its capital estimate for the plant to be accurate to  $\pm 30\%$ .

Major equipment costs were based on budget quotations from single source suppliers (18% of total estimate). The balance of the remaining equipment was derived from Tenova knowledge of similar projects and historical databases (17% of total estimate). Platework items and buildings have been quantified from the mechanical equipment list and general arrangement



drawings, with supply rates and installation durations using similar locality historical data (37% of total estimate). Concrete, steelwork, pipework and electrical/instrumentation allowances have been applied as a factored percentage per the cost of mechanical equipment on a facility by facility basis (22% of total estimate). The Concentrate Pipelines, Banda Barge Facility Infrastructure, Escravos Transfer Facility Infrastructure and general process plant and off-site infrastructure costs were provided by other consultants.

**Table 1**  
**Capital Costs Estimates**

| Item                                | US\$ M              |
|-------------------------------------|---------------------|
| Mine Development                    | 11.9                |
| Processing Plant                    | 132.7               |
| Pipeline, Banda & Escravos          | 120.2               |
| Utilities and Infrastructure        | 108.2               |
| Insurance , IT, First Fills, Spares | 32.5                |
| EPCM                                | 46.5                |
| Contingency                         | 45.1                |
| <b>Total Capital Costs</b>          | <b>497.1</b>        |
| <b>Capital Cost Intensity /t</b>    | <b>US\$ 99.4 /t</b> |

## 1.11 OPERATING COSTS

The following operating costs assumptions were used in the PFS financial model:

- Mining operating costs were based on three budget submission proposals by three leading mining contractors, with Africa experience.
- Power costs are based on equipment and plant power loads and the operating units of the power supplier. Natural gas is assumed to be used as the fuel source for the Agbaja Plateau power plant under a proposal from a potential natural gas supplier.
- Plant operating costs are based on a study by Tenova.
- Pipeline pumping cost was from a study by Patterson and Cooke.
- Barging and transshipping costs were based on study by PRDW.

**Table 2**  
**Operating Costs Estimates**

| Operating Costs                    | Concentrate US\$/t |
|------------------------------------|--------------------|
| Mining                             | 8.12               |
| Processing incl. pipeline          | 13.96              |
| Barging (FOB)                      | 18.77              |
| General and Administration         | 2.13               |
| <b>Total Operating Costs (FOB)</b> | <b>42.98</b>       |



## 1.12 PROJECT IMPLEMENTATION

The next phase of the project development is the completion of a Definitive Feasibility Study (DFS) and approval of the Environmental and Social Impact Assessment by Nigerian authorities. The DFS is expected to be completed by end of Q4 2014.

On completion of a positive DFS, the Company will appoint an EPCM (engineering, procurement and construction management) contractor to undertake the design, procurement, construction supervision and basic project administrative tasks for the process plant and selected infrastructure. The construction schedule duration is 76 weeks from the time of appointment of the EPCM contractor, until the commencement of commissioning. Assuming a favourable DFS, mining lease grant and project finance being finalised by the end of 2014, long lead orders could be placed in Q1 2015 and construction commenced thereafter with first product being available between the end of Q4 2016 and early Q1 2017.

## 1.13 IRON ORE MARKET OUTLOOK

AME expects that going forward China will have a greater reliance on seaborne iron ore imports, particularly as domestic grades continue to fall. China's seaborne iron ore demand growth is expected to be the strongest over the short term as an accelerated decline in domestic iron ore concentrate production forces steel production capacity to source a greater portion of feed from the seaborne market. In the long term, global iron ore demand is expected to grow, driven primarily by increasing demand from the developing world (excluding China), and in particular other Asian countries such as India, Indonesia and Vietnam as industrialisation in these countries leads to greater infrastructure development and higher incomes, promoting underlying steel demand growth. AME believes that the scope for steel consumption growth in these countries is substantial, particularly in India.

## 1.14 WEST AFRICA – THE NEXT IRON ORE HUB

Kogi supports the view of Investec Bank who have proposed that West Africa has the potential to become the next global iron ore hub, underpinned by ongoing Chinese demand for seaborne iron ore. The reasons supporting this belief include the following:

- West African presents an opportunity to break the current iron ore supply oligopoly, as many quality iron ore deposits in the region are held by others.
- China is over-dependent on iron ore imports from Australia and Brazil, the development of West Africa would assist in alleviating this dependence.
- China is likely to continue to see downward pressure on domestic iron ore grades, resulting in increased demand for imports.
- There is more "low hanging fruit" in West Africa in terms of large scale, low cost, long life deposits.
- Many West Africa deposits have low strip ratios and consequently competitive mining and processing costs.
- Additional production is required to offset a decline in the India seaborne output.
- Many undeveloped West African projects are proximal to port/rail infrastructure.
- It has lower capital intensity and operating costs opportunities compared to Australia and Brazil.
- China is uniquely positioned to partner in infrastructure development (rail especially), in parallel with mine development.



## 1.15 KOGI PRODUCT AND PRICE FORECAST

Based on metallurgical test-work and processing plant design incorporating bioleaching the typical indicative analysis of the proposed Agbaja Fines product is detailed below.

Table 3  
Agbaja Fines – Indicative Analysis

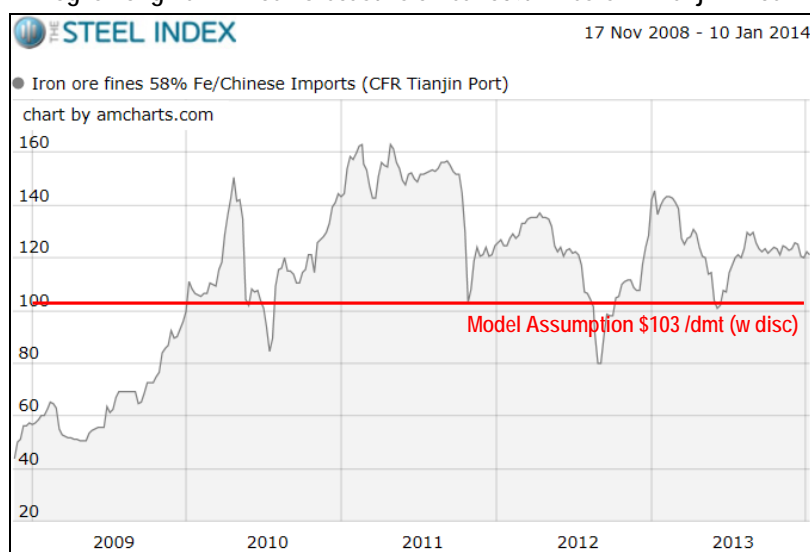
| Component                      | %      |
|--------------------------------|--------|
| Fe                             | 56.0   |
| SiO <sub>2</sub>               | 3.8    |
| Al <sub>2</sub> O <sub>3</sub> | 6.6    |
| P                              | 0.25   |
| LOI (1000)                     | 7.28   |
| Sizing P <sub>80</sub>         | 193 μm |

Agbaja Fines will have the advantage of low silica content, which will strongly appeal to Asian customers. The product will also have the advantage of low impurities such as alkalis (K<sub>2</sub>O+Na<sub>2</sub>O) which can cause significant blast furnace operational problems and compares favourably to the South African ores which have high alkali levels. The titanium level of the Agbaja Fines is also low, which contributes to the production of a more fluid slag. For a magnetite concentrate Agbaja Fines will be quite coarse, which makes the product more attractive for sintering and is in the size range of concentrates commonly sintered in China. The LOI (Loss on Ignition) of 7.28% results in a calcined Fe value of 60.4%.

Agbaja Fines is an ideal blend with high silica, low phosphorous product from the Pilbara (Australia) and Brazil bringing the overall silica, alumina and phosphorus levels down of the blended product. Based on market feedback, the product is saleable and Kogi expects some price discount for phosphorous and alumina.

Kogi's long term price forecast for its Agbaja Fines (56% Fe) product is US\$73/dmt FOB, Nigeria. This equates to an iron ore fines 58% Fe - CFR Tianjin Port (China) price of US\$103/dmt (including discounts).

Figure 2  
Kogi's Long Term Price Forecast vs 5 Year 58% Fines CFR Tianjin Price



**Table 4**  
**FOB Price Nigeria for Agbaja Fines (56%)**

| Item                                 | US\$/dmt  |
|--------------------------------------|-----------|
| 58% Fe CFR Price (LT Forecast)       | 110       |
| Shipping Nigeria to China            | (25)      |
| <b>FOB Nigeria for 58% w/o disc</b>  | <b>85</b> |
| Discount                             | (7)       |
| <b>FOB Nigeria for 58% w disc</b>    | <b>78</b> |
| Price adjustment @ \$2.5 per Fe Unit | (5)       |
| <b>FOB Nigeria for 56% (w disc)</b>  | <b>73</b> |
| Equal 58% Fe CFR China (\$1.77 dmtu) | 103       |

A more detailed marketing analysis and strategy will be carried out in the DFS and will include sintering testing, individual bulk samples for prospective customers and a full Value in Use analysis for a more complete evaluation of the product.

### 1.16 FINANCIAL EVALUATION

Cash flow modelling of the proposed operation shows a pre-tax, equity Net Present Value for the project of US\$420 million (at discount rate of 12%) with total EBITDA cash flow generated over the 21 year project life of US\$2.854 billion. The cash flow model utilises real dollars as its basis and thus does not factor any inflationary impact on revenue or expenses, and a discount rate of 12% was used for NPV determination. The pre-tax Internal Rate of Return is 23.7%.

Based on total capital expenditure of US\$497 million and full year production cash flow of US\$136 million (average), the project has a payback period (excluding financing costs) of 4 years. A long term forecast price of US\$73 per tonne FOB Nigeria (56% Fe, with discounts) has been used. The project generates an average of US\$365 million of sales revenue per annum.

**Table 5**  
**Financial Results**

| Financial Results          | Discount   | Result           |
|----------------------------|------------|------------------|
| Pre-tax, without financing |            |                  |
| Net Present Value          | 10%        | US\$574 M        |
|                            | <b>12%</b> | <b>US\$420 M</b> |
|                            | 14%        | US\$302 M        |
| Internal Rate of Return    |            | 23.7%            |
| Pay back                   |            | 4 Years          |
| EBITDA (Ave pa)            |            | US\$136 M pa     |
| Gross Margin (per tonne)   |            | US\$30/t         |



Table 6  
Sensitivity Analysis

| Financial Results<br>Pre-tax, without financing | % Change | Value        | NPV Change | NPV @ 12 % |
|---|----------|--------------|------------|------------|
| Iron Ore Price                                  | +10%     | US\$80/t FOB | + 50%      | US\$630 M  |
|   | 0%       | US\$73/t FOB | 0 %        | US\$420 M  |
|   | -10%     | US\$66/t FOB | - 50%      | US\$211 M  |
| Capital Costs                                   | +10%     | US\$547 M    | -11%       | US\$373 M  |
|   | 0%       | US\$497 M    | 0 %        | US\$420 M  |
|   | -10%     | US\$447 M    | +11%       | US\$469 M  |
| Opex Costs                                      | +10%     | US\$47/t FOB | -31%       | US\$291 M  |
|   | 0%       | US\$43/t FOB | 0 %        | US\$420 M  |
|   | -10%     | US\$38/t FOB | +31%       | US\$548 M  |

As expected, the project is sensitive to iron ore price and operating costs. To a lesser extent the project is sensitive to capital costs.

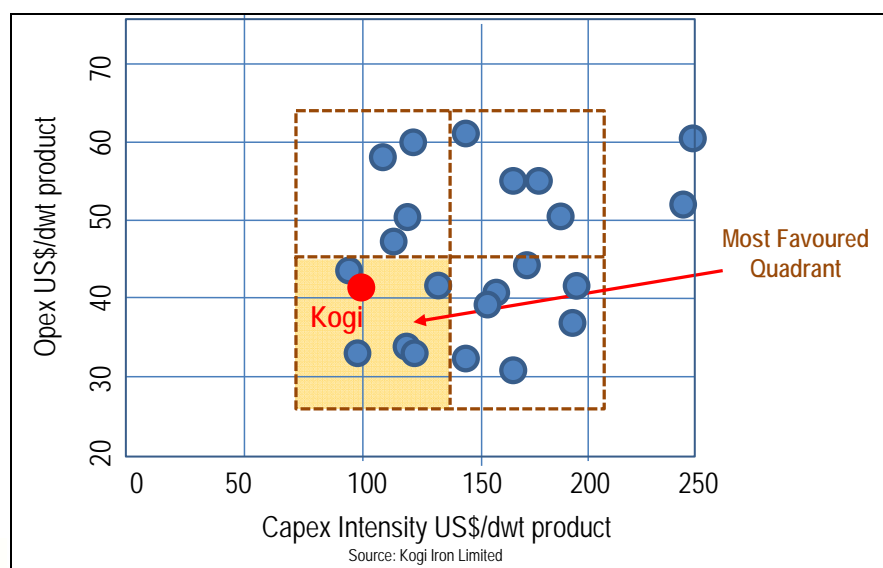
### 1.17 FINANCIAL EVALUATION DISCUSSION

The Agbaja Project is a robust and attractive project. The payback of the project is excellent at 4 years with a net present value of US\$420 million (@ 12% discount) and Internal Rate of Return of 23.7%.

### 1.18 COMPETITIVE ANALYSIS

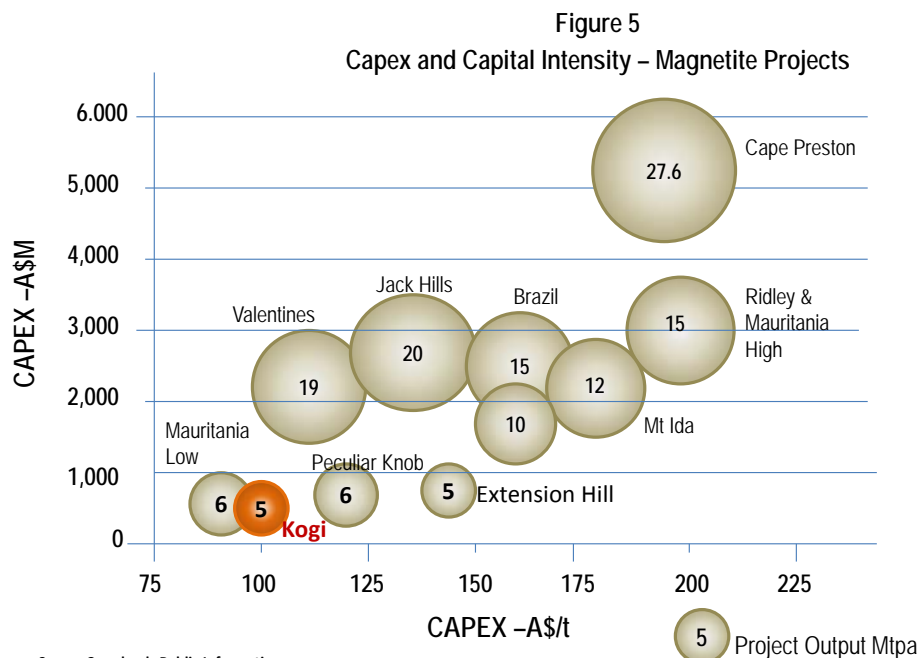
Both the capital intensity and operating costs per tonne for the Agbaja Project compare favourably with other planned or recently developed iron ore projects, as shown in [Figure 3](#).

Figure 3  
Cost Profile and Capital Intensity Matrix – Magnetite Projects



## Capital Intensity

The Agbaja Project capital intensity of a low US\$99/t ranks in the bottom quartile for magnetite projects around the world (see Figure 5). The Capital intensity is comparable to DSO hematite iron ore projects. The main reason for the low capital costs are soft ore, simple processing, and the river transport system.



Source Crosslands Public Information  
Data for third party projects based upon publicly available information and excludes concentrate transport costs and is direct capital spend only.

## Operating Costs

The Agbaja Project operating costs of a low US\$43/t also ranks in the bottom half for magnetite projects around the world. The operating costs are also more in line with those of DSO hematite iron ore projects, primarily due to the low strip ratio, moderate grinding, simple processing, and the low cost barging transport solution.

## Most Favoured Quadrant

The Agbaja Project is positioned in the most favoured cost profile and lowest Capital Intensity Matrix quadrant (bottom left quadrant) which reflects in the overall potential and attractiveness of the project.

## 1.19 PROJECT RISK

An Integrated Risk Assessment has been undertaken on the project. This assessment included both a qualitative and a quantitative analysis of the risks and uncertainties associated with the project. The objective of the risk analysis was to identify and prioritise the risks involved with the project, build a comprehensive list of potential risks and identify mitigation actions to manage the high risk items.

It is relevant that the Agbaja Project may provide Kogi with future expansion upside, in 5 Mtpa expansion modules and with very significant financial upside. The strategy is to establish a robust project producing positive cash flows, which will then enable the Company to leverage itself to take advantage of the modular expansion potential.





## 1.20 CONCLUSION AND RECOMMENDATIONS

This Preliminary Feasibility Study (PFS), which commenced as a Scoping Study in September 2013, is the first time that a comprehensive study has been conducted into the viability of the commercial development of the Agbaja Plateau iron ore deposit in Nigeria.

The Agbaja Mineral Resource is one of the highest grade beneficiable iron ore resources in West Africa with massive scale potential. A crucial ingredient to the commercial viability of an iron ore mine is access to bulk commodity transport infrastructure, which is one of Agbaja's key competitive advantages.

The Agbaja Project is a robust and attractive project. The payback of the project is excellent at 4 years with a net present value of US\$420 million (@ 12% discount) and Internal Rate of Return of 23.7%. The Agbaja Project ranks in the bottom quartile for capital intensity and bottom half of operating cost curve of magnetite projects around the world. The Agbaja Project is positioned in the most favoured cost profile and lowest Capital Intensity Matrix quadrant (bottom left quadrant) which reflects in the overall potential and attractiveness of the project.

Considering the technical and commercial analysis presented in the PFS, it is recommended that the Company proceed towards mine development at Agbaja by completion of a Definitive Feasibility Study (DFS).

-end-

## Appendix 1 - Agbaja Mineral Resources

| Classification                          | Tonnes (Mt) | Fe (%) |
|---|-------------|--------|
| <b>Zone A (Laterite Mineralisation)</b> |             |        |
| Indicated                               | 147.5       | 33.2   |
| Inferred                                | 33.9        | 31.7   |
| Total Indicated + Inferred (Zone A)     | 181.4       | 32.9   |
| <b>Zone B (Oolitic Mineralisation)</b>  |             |        |
| Indicated                               | 318.7       | 45.2   |
| Inferred                                | 86.3        | 44.7   |
| Total Indicated + Inferred (Zone B)     | 405.0       | 45.1   |
| <b>Combined Zone A and Zone B</b>       |             |        |
| Total Indicated                         | 466.2       | 41.4   |
| Total Inferred                          | 120.1       | 41.1   |
| Total Indicated + Inferred              | 586.3       | 41.3   |

20% Fe lower cutoff is applied



For more information, please contact:

**Corporate**

Iggy Tan  
 Managing Director  
 Kogi Iron Limited  
 Tel (office): +61 8 9200 3456  
 Email: [info@kogiiron.com](mailto:info@kogiiron.com)

**Media Contact**

Michael Vaughan  
 Cannings Purple  
 Tel (office): +61 8 6314 6300  
 Email: [mvaughan@canningspurple.com.au](mailto:mvaughan@canningspurple.com.au)

**About Kogi Iron (ASX: KFE)**

Kogi Iron Limited is a Perth-based company with the objective of becoming an African iron ore producer through the development of its 100% owned Agbaja iron ore project located in Kogi State, Republic of Nigeria, West Africa ("Agbaja" or "Agbaja Project"). The Company has completed a Preliminary Feasibility Study which determined that the development and operation of a mine and processing plant at Agbaja to produce 5 Mtpa of iron ore concentrate is technically feasible, economically viable and socially and environmentally acceptable. The Company is proceeding with a Definitive Feasibility Study as a precursor to a decision to mine. Iron ore concentrate from Agbaja will initially be transported via river barge along the Niger River to the Gulf of Guinea and world export markets. The Company will continue to advance access and usage agreements for an existing under-utilised heavy haulage railway that runs from near the Agbaja Project to Port Warri. This existing railway remains an important part of a longer term transport solution for an expanded production profile.



In recent years Nigeria has sought to diversify its economy, which is dominated by hydrocarbons, into minerals and related industries. Nigeria is the largest country by population in Africa with a GDP growth rate of 7.2% in 2013. The country has very transparent and consistent mining regulations and very favourable fiscal terms for foreign investment in mining.

The Company holds a land position of approximately 400km<sup>2</sup> covering 16 tenements, with the main focus being EL12124 which covers a large part of the Agbaja Plateau. The Agbaja Plateau hosts an extensive, shallow, flat-lying channel iron deposit with Indicated and Inferred Mineral Resource of 586 million tonnes with an in-situ iron grade of 41.3% reported in accordance with the JORC Code (2012). This mineral resource covers approximately 20% of the prospective plateau area within EL12124.

**Forward-looking Statements**

This announcement contains forward-looking statements which are identified by words such as 'anticipates', 'forecasts', 'may', 'will', 'could', 'believes', 'estimates', 'targets', 'expects', 'plan' or 'intends' and other similar words that involve risks and uncertainties. Indications of, and guidelines or outlook on, future earnings, distributions or financial position or performance and targets, estimates and assumptions in respect of production, prices, operating costs, results, capital expenditures, reserves and resources are also forward looking statements. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions and estimates regarding future events and actions that, while considered reasonable as at the date of this announcement and are expected to take place, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of our Company, the Directors and management. We cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this announcement will actually occur and readers are cautioned not to place undue reliance on these forward-looking statements. These forward looking statements are subject to various risk factors that could cause actual events or results to differ materially from the events or results estimated, expressed or anticipated in these statements.

**Competent Persons' Statement**

The information in this PFS announcement that relate to Mineral Resources for the Agbaja Project is based on information compiled by David Slater, Principal Resource Geologist of Coffey Mining who is a Chartered Professional Member of The Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists and by Dr Warwick Crowe, of International Geoscience who is a Member of the Australian Institute of Geoscientists. Both David Slater and Dr Warwick Crowe have sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. David Slater and Dr Warwick Crowe each consent to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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