



# Kogi Iron

Feb 25<sup>th</sup> 2014

## Kogi Iron aiming to become a major West African iron ore producer

Recommendation: Speculative Buy

Sector: Materials

Target Price: \$0.28

ASX Code: KFE

52 Week -:

Current: \$0.095

High: \$0.22

Low: \$0.08

Issued Shares: 320.2M

Options: NIL

Cash: \$1.2M

Market Cap: \$30.4M

Enterprise Value: \$29.2M

- Kogi Iron (ASX: KFE) has established first mover status for the development of Nigerian iron ore assets at the Agbaja Plateau Iron Ore Project.

- JORC Indicated and Inferred Resources of 586 million tonnes at 41.3% Fe established over 20% of Exploration License 12124.

- The remaining 80% of EL12124 host identified targets with a conceptual range of 1.3 - 2.0 billion tonnes at a grade of 32-48% Fe. The remaining 14 tenements are untouched by modern exploration methods.

- Kogi Iron has completed a Preliminary Feasibility Study for production of 5 million tonnes per annum of magnetite concentrate at a grade of 56% Fe, and reported CAPEX and OPEX costs that are amongst the lowest in the world for new iron ore mine development.

- CAPEX of US\$497 million expected to be paid out from the first 48 months of production from annualised EBITDA of US\$136 million.

- Kogi Iron has potential to become a major developer of West African iron ore assets, and help crack the current iron oligopoly between Australia and Brazil.

- Kogi Iron has commenced a Definitive Financial Study that will look to reach first iron concentrate production by late 2016 or early 2017.

- The Company has managerial talent and is led by Ian Burston who was also instrumental in the development of the Western Australian iron ore industry. He served as Managing Director of Hamersley Iron and Portman Mining, Non-Executive Director of Fortescue Metals Group, Chairman of Aztec and Executive Chairman of Cape Lambert Resources.

- Kogi Iron estimate annualised production of 5 million tonnes of iron concentrate will produce an EBITDA of ~A\$154 million (A\$0.88) for the first stage of the Agbaja Project.

- Proactive investors forecasts that Agbaja will be worth A\$90.8 million, or \$0.28 per Kogi Iron share (undiluted) on completion of Definitive Financial Study at the end of 2014 (see peer group analysis).

**Price:** A\$0.1

**Market Cap:** A\$17.53M

### 1 Year Share Price Graph



### Share Information

**Code:** KFE

**Listing:** ASX

**Sector:** General Mining

**Website:** [www.kogiiron.com](http://www.kogiiron.com)

### Company Synopsis:

*Kogi Iron Limited (ASX:KFE) is focused on being 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).*

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- Our peer group analysis and valuation sees additional and significant valuation increases as Agbaja is funded and developed.

- It has not factored in a potential investment from an Asian steel company, which would boost this valuation.

## SPECULATIVE BUY

Kogi Iron Ltd (ASX:KFE) is an ASX listed explorer and developer of the Agbaja Plateau Iron Ore Project (Agbaja Project) that is located in Kogi State, Republic of Nigeria.

## AGBAJA IRON PROJECT IN NIGERIA

The Agbaja Project is 100% owned by Kogi Iron and includes 17 exploration licenses that cover 400 square kilometres. Drilling and development efforts are focussed within Exploration Licence EL12124 where a current JORC 2012 compliant Indicated Resource of 466 million tonnes at 41.4% Fe (iron) and an Inferred Resource of 120 million tonnes at 41.1% Fe (cut-of grade of 20% Fe) has been defined, and constitutes one of the highest grade beneficiable iron ore deposits in West Africa.

Magnetite iron mineralisation is contained within very shallow and flat lying channel iron deposits that are ideal for low cost surface mining. Kogi Iron has completed drilling and resource estimates over 20% of the Agbaja Project area and has identified additional conceptual exploration targets of 1.3 2.0 billion tonnes at 32 48% iron within EL12124 and adjacent licenses.

## DEVELOPMENT FOCUS AT EXPLORATION LICENCE 12124

Agbaja is ideally located close to the Niger River, and within 60 kilometres of an under-utilised heavy haulage rail line that leads to the Port of Warri, and just north of Lokoja with a population of 90,000 which serves as the capital city of Kogi State. The State is known for production of cash crops and the country's largest steel facility at Ajaokuta, and largest cement factory at Obajana.

## AGBAJA IS A HIGHLY UNIQUE IRON PROJECT

### MAGNETITE WITHIN AGBAJA FORMATION (LATERITE AND OOLITE), WIDTH OF 3-6 KM AND LENGTH OF 20 KM ACROSS TOP OF MESA

Agbaja is a unique sedimentary magnetite Channel Iron Deposit (CID) that is located across the top of a large mesa that has a width of 3-6 kilometres and length of 20 kilometres. The resource carries grades of ~46% Fe, and softer and coarser ore that liberates at ~250 microns.

Most magnetite deposits are classified as Banded Iron Formation (BIF) with grades of 25 40% Fe that liberate at ~45 microns, and are significantly more expensive to process.

## PRELIMINARY FEASIBILITY STUDY CONFIRMS ROBUSTNESS OF AGBAJA PROJECT

Kogi Iron has just completed a Preliminary Feasibility Study "PFS" that was headed by Coffey Mining for resource and mining planning, and Tenova Australia for metallurgy and processing. Seven additional consultants reported on



bioleaching, pipeline, barging, operations, markets, financial modelling, environmental and social issues.

The PFS was based around a magnetite concentrate production rate of 5 million tonnes per annum, over a mine life of 21 years and projected:

- CAPEX of US\$497 million to generate an Internal Rate of Return of 23.7%.
- Pre-tax Net Present Value of US\$420 million, at a 12% discount rate.
- Capital intensity of US\$99.4 per tonne.
- Average OPEX of US\$42.98 per tonne, Free On Board or FOB.
- Four year CAPEX payback.
- Based on a long term FOB price of US\$73.00 per tonne of iron ore concentrate.
- Producing a net margin of US\$30.00 per tonne and EBITDA of US\$136 million per year.

This places Agbaja in the bottom quartile for capital intensity, and bottom half of the operating cost curve of global magnetite projects. A Definitive Feasibility Study has now been approved and is expected to be completed by the fourth quarter of 2014.

Low CAPEX and OPEX driven by:

- Low strip ratio of 0.55:1 for open pit operations.
- Soft and coarse ore requires no drilling or blasting, moderate grinding costs, and use of simple plant design.
- Excellent local infrastructure that includes availability of natural gas to power plant, and river barges to transport concentrate to port.
- Life of Mine of 21 years applied in the PFS, but Indicated Mineral Resources are sufficient to maintain an output of 5 million tonnes per annum for over 35 years.

## LOW STRIP RATIO

Kogi Iron reports a low strip ratio of 0.55:1, whereas typical West Australian iron ore miners report higher strip ratios of ~1:1 and up to 4:1. Low strip ratios reduce both capital and operating expenses that are incurred at the commencement of open pit mining, and opening up of new areas of production.

## SOFT AND COARSE ORE EASY TO MINE

Agbaja is unique in that it is only one of three globally known sedimentary hosted magnetite deposits. Typical magnetite deposits are found in banded ironstone formations or "BIF" that require large amounts of energy and intensive grinding to liberate the iron from associated natural matrix.

Agbaja ore is soft and friable that requires a coarse grind and simple magnetic separation, providing lower capital and operating costs. BIF magnetite deposits typically grade 25-40% Fe, whereas Agbaja averages 41.3% Fe, and with selective mining of higher grades will provide a head grade of 45.7% Fe to the process plant.

## EXCELLENT INFRASTRUCTURE

Agbaja is 15 kilometres northwest of Lokoja which is serviced with electric power, cell phones, schools, and hospitals. The city is located on the Niger River which has a nearby barge loading facility at Banda that is underutilized, and suitable for shipment of iron ore concentrate to the Gulf of Guinea.

The immediate area is served by a dual lane road that links to the capital of Abuja which is 165 kilometres to the southwest, and has an international airport.

## MINE LAYOUT AND MINE PLAN



The Company has identified two mining areas for Stage One and Stage Two of operations. Sites have been selected and designs completed for the process plant and open pit mining operations.

Stage One contains ~158 million tonnes of Indicated Resources with an average grade of 46.1% Fe, and strip ratio of 0.55:1. This will provide an initial mine life of 15 years at 5 million tonnes per annum.

Stage Two contains ~66 million tonnes of Indicated Resources with an average grade of 44.8% Fe with a strip ratio of 0.56:1. This area will provide plant feed for an additional 6 years at a rate of 5 million tonnes per annum.

## MINING OPERATIONS

The Company has opted to utilise contractors to complete site development and conduct mining operations. Detailed proposals have been received from three contractors, two of which are based in West Africa, and all are similar in approach and price.

Mining costs (as stated in the PFS) are currently at US\$3.69 per tonne for ore delivered to the process plant, and are US\$8.12 per tonne for processed magnetite concentrate ready for shipment.

## METALLURGY AND PROCESSING

Tenova Mining and Minerals and Trical Mining and Metallurgical Services completed metallurgical test programs that confirmed a primary grind size of 600 microns to liberate the iron, and a final grind size at a relatively coarse 250 microns. This will be followed by Low Intensity Magnetic Separation, which is a well proven technology for processing high volumes of iron concentrates that will take an iron feed of ~45%Fe to a concentrate of ~56% Fe.

## SCHEMATIC LAYOUT OF MINING OPERATION, PROCESS PLANT AND BARGE LOADING FACILITY

The milling circuit will process a nominal 3,900 tonnes per hour of solids based on a circulating load of 100% of new feed of 1,590 tonnes per hour. Mill discharge slurry density will be maintained at 70% and fed to the Rougher Magnetic Separation "RMS" circuit.

Each RMS unit is expected to recover 67% of the feed to the circuit and produce concentrate slurry at 60% solids density which will feed to a Cleaner Magnetic Separator "CMS". The CMS circuit will upgrade the slurry to 56% Fe, with non-magnetic material reporting to tailings, and 5 million tonnes per annum of magnetite concentrate reporting to bioleach ponds.

Microbial treatment in the ponds will reduce the phosphorous content to 0.25%. Once the phosphorous level falls within the target range the slurry will be thickened and pumped along a pipeline to the Banda barge loading facility. The slurry will then be vacuum filtered, washed with water and sent to the product load out station with a maximum moisture content of less than 10%.

Recovered process water will be piped back to the process plant and river barges will transport the concentrate to a barge transfer station at Escravos from where it will be transferred to ocean going barges for delivery to a transshipment facility moored in the Gulf of Guinea.

## POWER

Power for plant operations will be provided by a dedicated natural gas fired electric power station. The gas will be supplied from the prolific oil and gas province in the Niger Delta and supplied via an underutilized natural gas pipeline that runs close to the proposed plant site.

Dedicated diesel gensets will power the Banda barging facility and the Escravos transfer station.



## TRANSPORTATION OF CONCENTRATES

Studies indicate that barge shipments of concentrates along the Niger River will be 2-2.5 times less expensive than rail transportation to the port of Warri. The concentrate will be loaded into Mississippi type barges (carrying a total of 19,200-32,000 tonnes) that will be propelled in groups of four barges by push boats operating at 10 knots per hour. Travel time from Banda to the Escravos Transfer Station in the Niger Delta will take around 33 hours and cover 602 kilometres.

The river barges will transfer the concentrate into a 20,000 tonne self-propelled and self-unloading ocean going barge. The ocean going barge will then travel 33 kilometres into the Gulf of Guinea and transfer the concentrate to a floating transshipment storage facility with a capacity of 200,000 tonnes. This facility will load Panamax and Cape size ships for export of iron concentrates to world markets.

The Free On Board transport cost including all vessel and transshipment storage facility costs are estimated at US\$18.77 per metric tonne, or a rate of US\$0.0296 per metric tonne for each kilometre travelled.

## OPERATIONS MANAGEMENT WORKFORCE

Construction of mine and process plant at Agbaja will require a temporary work force of 800 1,000 personnel.

The Company projects manning levels for Kogi at 274 directly employed staff, 224 mining contractor staff, and 43 other contractors. Recruitment will focus on employment of skilled local residents that will meet their own accommodation needs.

## ENVIRONMENTAL AND SOCIAL ISSUES

Greenwater Environment Services has completed an Environmental and Social Impact Assessment or ESIA that concluded there are no environmental or social impediments for the development of the Agbaja Project. The project area covers low value scrub land, savannah woodland and grasslands that have limited agricultural use or environmental significance.

The statement also notes that the project will generate long term employment and service opportunities that will enrich and develop local communities.

An Environmental Management Plan has also been prepared that mitigates the environmental impact of proposed mining and processing activities.

## CAPITAL EXPENDITURE (CAPEX)

Estimates include mine development US\$11.9 million, process plant US\$132.7 million, pipeline to Banda and Escravos facility US\$120.2 million, utilities and infrastructure US\$108.2 million, insurance, fills and spares US\$32.5 million, EPCM contract US\$46.5 million, contingencies US\$45.1 million for a total of US\$497.1 million or US\$99.4 per tonne.

## OPERATING EXPENDITURE (OPEX)

Estimates include mining US\$8.12 per tonne, processing and pipeline costs US\$13.96 per tonne, Barging and FOB US\$18.77 per tonne, general and administration US\$2.13 per tonne for a total of US\$42.98 per tonne.

## CATALYSTS 2014 TO FIRST QUARTER OF 2017

- Completion of Definitive Financial Study by end of 2014.
- Approval of Environmental and Social Impact Assessment by Nigerian authorities.
- Grant of mining lease and completion of project funding by the end of 2014.



- Engineering, Procurement and Construction Management Contract executed.
- Construction phase of 76 weeks commencing early to mid-2015.
- Commissioning Q4 of 2016, or Q1 2017.

## NIGERIA A RESOURCE DRIVEN ECONOMY

Nigeria is a former British colony that gained independence in 1960. The country has a population of 163 million people that elects its President and parliament by popular vote.

Oil production is currently at 2.5 million barrels per day and makes up 95% of all exports. Higher oil prices have allowed the nation to run a budget surplus in 2012, and provided for a GDP growth rate of 7.2% in 2013.

Standard Bank forecasts that Nigeria will be the fastest growing of the MINT economies (Mexico, Indonesia, Nigeria and Turkey) and will be driven by the strongest fiscal balance, lowest public debt and market reforms. The country currently attracts \$8.9 billion in foreign investment, which is 16% of Africa's total.

Citigroup studies project that GDP growth for Nigeria has potential to place it within the top ten world economies by 2050.

The Agbaja project is governed by the contemporary Nigerian Minerals and Mining Act 2007 that provides a quick and easy approvals process, and does not impose any free carried participation by government or local entities. The corporate tax rate is set at 30%, iron ore royalties at 3%, and provides a transparent and consistent tax structure.

## IRON ORE MARKET AND KOGI PRODUCT

China is expected to import more iron ore as domestic production grades continue to fall. Asian countries such as India, Indonesia and Vietnam are expected to increase iron ore imports to fuel greater industrialisation.

West African iron ore resources such as Agbaja have the potential to break the current iron ore supply oligopoly that exists in Australia and Brazil, and supply global markets with an additional source of good quality iron ore.

Kogi Iron PROJECTED AT US\$103 PER TONNE BASED ON 5 YEAR CHINESE IMPORT PRICING AT TIANJIN PORT

Agbaja fines are projected to contain 56% Fe, 3.8% S102, 6.6% Al<sub>2</sub>O<sub>3</sub>, P 0.25%. Low silica, phosphorus and impurity levels will appeal to Asian buyers because they reduce blast furnace operational issues, low titanium levels will produce more fluid slag, and their coarse nature is ideal for sintering.

Agbaja fines are ideal as a blend with high silica, low phosphorus product from the Pilbara (Australia) or Brazil, and will attract a slight discount for phosphorus and alumina content.

Kogi's long term forecast for these 56% Fe fines are US\$73 per tonne FOB Nigeria, and equates to iron ore fines of 58% Fe landed at Tiajin Port of China at US\$103 per tonne. This forecast pricing is at 85% of current pricing into Tiajin, and serves as a proxy for Asian pricing of imported iron fines of the same quality.

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.





## PEER GROUP ANALYSIS AND VALUATION

Agbaja capital intensity is estimated at US\$99 per tonne, and falls into the lowest quartile for global magnetite projects.

This is significantly more competitive than magnetite projects that have been proposed in Western Australia, and include Jack Hills with a capital intensity of A\$140 per tonne, Extension Hill of A\$145 per tonne, and Mount Ida of A\$185 per tonne. Funding will obviously flow to projects like Agbaja that report a faster repayment of debt on a smaller CAPEX.

Major Australian iron ore miners that mine hematite from massive iron resources in the Pilbara are not immune from higher CAPEX. Rio Tinto produces 290 million tonnes per annum of iron ore from its international operations, and reports a drop in capital intensity from A\$150 to A\$120-\$130 per for new annualised production from the Pilbara.

A similar situation applies to OPEX. Fortescue Metals Group projects shipment of 155 million tonnes of 62% Fe from its Western Australian operations in 2014, and forecasts a total production cost of US\$51 per tonne.

These high CAPEX and OPEX numbers are impacting Chinese investment into development of alternative and lower cost sources of iron ore. African Minerals Ltd (AIM: AMI) is fast tracking the development of the Tonkolili iron ore resource in Sierra Leone with the support of major Chinese investors that include Shandong Iron & Steel, China Railways Material Company and an upcoming investment of US\$990 million by Tewoo for a 10% stake that values Tonkolili at US\$6 billion.

Tonkolili is currently producing and targeting a run rate of 20 million tonnes per annum in 2014. Projected EBITDA is US\$31 per tonne or US\$620 million, and capital intensity of US\$120 per tonne.

The PFS for Agbaja projects an EBITDA of US\$136 million / A\$154 million, and application of the same EBITDA to market valuation that Tewoo applies to Tonkolili produces a market valuation of US\$1.5 billion / A\$1.71 billion.

The AIM market currently capitalises African Minerals Ltd at A\$994.7 million for a projected 65% interest in Tonkolili, or A\$76.51 per tonne of annualised output. Applying the same valuation to Kogi Iron's proposed output of 5 million tonnes per annum produces a valuation of A\$382.6 million or \$1.19 per Kogi Iron share on an undiluted basis, and applies on commencement of production.

Zanga Iron (AIM: ZIOC) is developing a large scale iron ore resource in the Republic of Congo in a joint venture with Xstrata. The Company owns a 50% interest and has completed studies for a 12 million tonne per annum production rate, with a capital intensity of US\$200 per tonne, and cash costs of US\$40 per tonne. Zanga is valued at A\$108.9 million or A\$18.15 per tonne of proposed annualised output.

Kogi Iron is currently moving into a bankable feasibility stage, and valuations should be roughly comparable with Zanga, which remains unfunded. This equates to a valuation of A\$90.8 million for Kogi Iron, on completion of Definitive Feasibility Studies, or A\$0.28 per share.

## SPECULATIVE BUY

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