

January 2018

# KOGI IRON LTD. (ASX: KFE) NIGERIA'S FIRST INTEGRATED STEEL PRODUCER



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# EXECUTIVE SUMMARY

- **Nigeria has an annual steel demand of 6.8 Mt**
  - the majority from electric arc furnaces using imported scrap metal (scrap metal imports up >50% since 2013) ;
  - Continued urbanization to increase the underlying steel demand which is low in regional terms.
- **Kogi Iron is proposing an integrated Direct Reduction Iron plant.**
- **Definitive Feasibility Study** is targeting production of steel billet to supply the Nigerian domestic market and substitute its reliance for imported scrap steel/billets.
- **Import Parity Pricing** for the sale of billet steel results in potential for high margins.
- **Strong Export Credit Agency interest and support as sales will be invoiced in USD and the proceeds held offshore.** This will significantly reduce political and project risk.



# ACHIEVEMENTS IN 2017

**Significant traction gained to advance and reposition project as steel plant with captive raw material supply**

- 1) Mining Licenses granted including Community Development Agreement signed
- 2) Bulk sample mined and sent to Tenova/Mintek, testing underway
- 3) Financing progress: SD Capital/ GKB Ventures (London) appointed for debt sourcing
- 4) New London based director appointed



# PLANNED IN 2018

## 2018 target to finalize DFS and Project Financing

- 1) Equity fund raising
- 2) Completion of MET testing end April followed by analysis and reporting
- 3) Completion of DFS 4<sup>th</sup> quarter 2018
- 4) Appointment of CEO completed - Martin Wood ★
- 5) Broker appointed for project major equity raise - RFC Ambrian ★
- 6) Completion of Export Credit Agency (ECA) debt funding package



# NIGERIA AND AFRICA: STRONG DEMAND FOR STEEL

- Nigerian steel demand of 6.8 Mtpa. There are **no primary steel production facilities in Nigeria**
  - 1/3 is domestically produced from scrap metal and billet
  - The balance is imported, up >50% since 2013
  - Kogi's Agbaja Integrated Iron Ore and Steel Project will reduce Nigeria's dependence on imported steel
- Most steel operations are focussed on using imported scrap metal to produce hot/cold rolled steel and wire coils.
- Nigeria imports an estimated US\$4.3 Bn of processed steel and associated derivatives, representing 80% of the US\$5.2 Bn total metal products imported per year (29 Mt/annum).
- There are 30 steel rolling mills in the country with a combined capacity of 6.5 Mt/annum;
  - Only 18 are operational, producing about 2.8 Mt/annum using **100% scrap steel/billets**

## Regional Potential to Supply Billet Steel

- The regional export markets represent a strong opportunity and further upside potential for customers
- **All West African countries are net importers of steel products**

True Steel Use (finished steel equiv.) (Kt)			
Africa	2006	2014	
Algeria	3,965	8,354	111%
Angola	1,040	1,773	70%
Cameroon	229	493	115%
Egypt	4,942	11,281	128%
Ethiopia	461	1,686	266%
Ghana	640	1,204	88%
Kenya	720	1,847	157%
Morocco	2,028	3,139	55%
<b>Nigeria</b>	<b>2,090</b>	<b>3,601</b>	<b>72%</b>
RSA	6,280	5,172	-18%
Tanzania	451	1,201	166%
<b>Africa Total</b>	<b>22,846</b>	<b>39,751</b>	<b>74%</b>

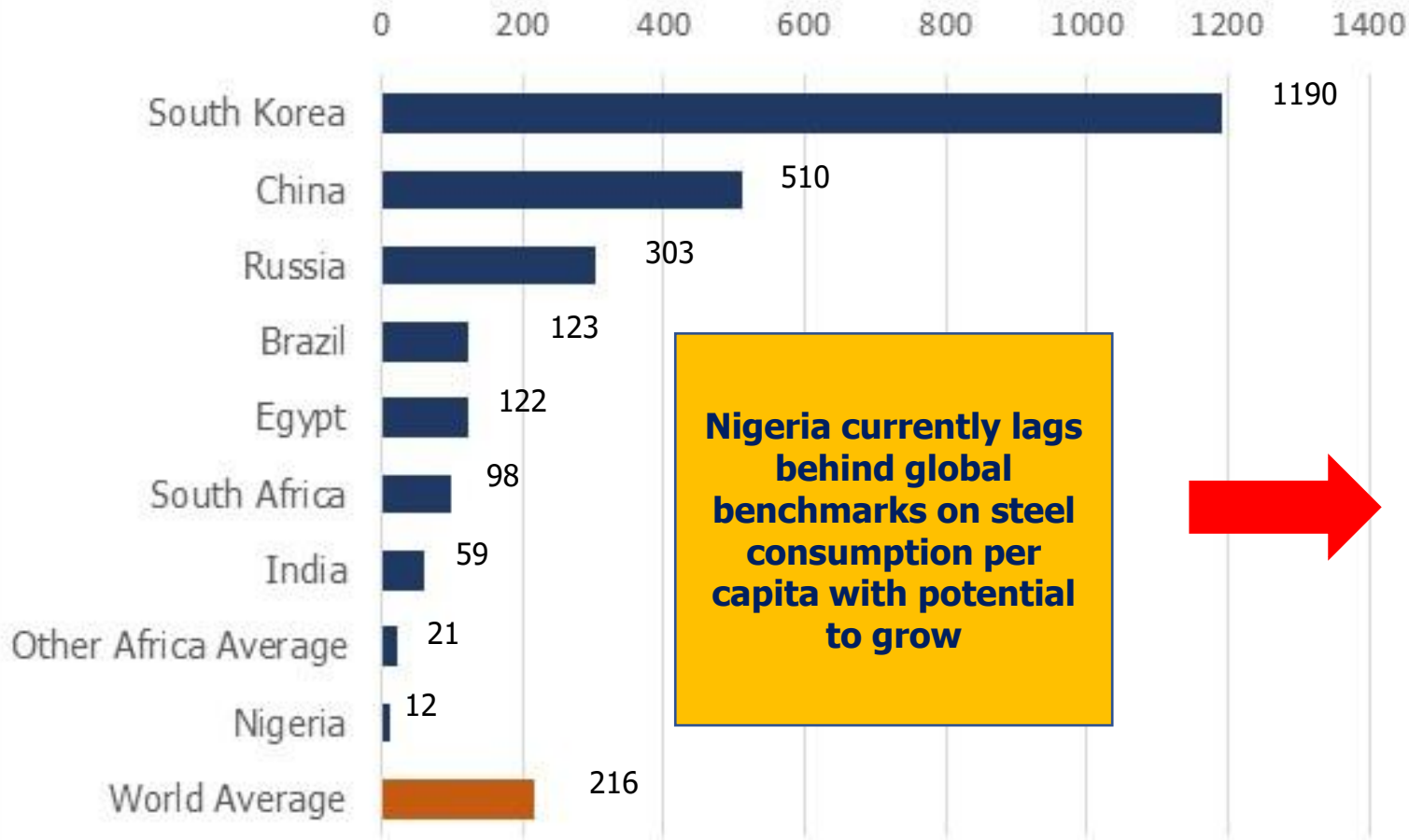
Source: World Steel Association

**According to the Nigerian Ministry of Solid Minerals Development, an estimated US\$3.3 Bn is spent on steel imports annually!**

Source: Ministry of Solid Minerals Development

# STEEL CONSUMPTION: PEER GROUP

Consumption of steel per capita p.a. (kg/yr)



**Nigeria can expect an increase in demand for steel in the coming decade driven by industrialization**

- Increased steel demand owing to increased industrialization
- Building construction; power
- Automotive construction; Agriculture
- Road and bridge building, Military
- Refinery investments
- Machinery for rubber and plastics, textiles, etc.

# PRODUCTION FACILITY

- **Kogi's DRI Plant planned to produce high quality steel billets for the Nigerian domestic market**
- The Direct Reduced Iron (DRI) facility will be constructed in close proximity to Kogi's 100% owned captive raw material source at Agbaja
- Facility will **use simple, low-cost, proven technology** with "off the shelf equipment"
- Processing and beneficiation testwork will be completed by ALS, Mintek and Tenova has defined a well understood process pathway: beneficiation, melting and converting.
- **An initial equipment sourcing analysis has established that the required thresholds for potential ECA funding are met for six manufacturing countries.**
- **The three key components are:**
  - **Rotary Kilns producing sponge iron (typical size of 200,000 tpa capacity per module)**
  - **Steam Turbines generating 34 MW power**
  - **Converters and Melter Vessels**
- **Abundant supply of locally available coal and limestone**

**Rotary Kiln**



**Power Station Steam Turbine (34 MW)**



**Converters and Melter Vessel**





# AGBAJA: CAPTIVE RAW MATERIAL – IRON ORE

**Significant supply of good quality iron ore to feed the plant with coal and limestone available within 70 kms**

- Total JORC Resource of 586 Mt @ 41.3% Fe (See slide 22 for JORC statement)
- Agbaja is a continuous, flat lying, sedimentary channel iron deposit covering Kogi's 233 km<sup>2</sup> licence area
- Largely free digging (relatively soft ground) compared to traditional iron deposits (e.g. Banded Iron Formations (BIFs))



Source: KFE

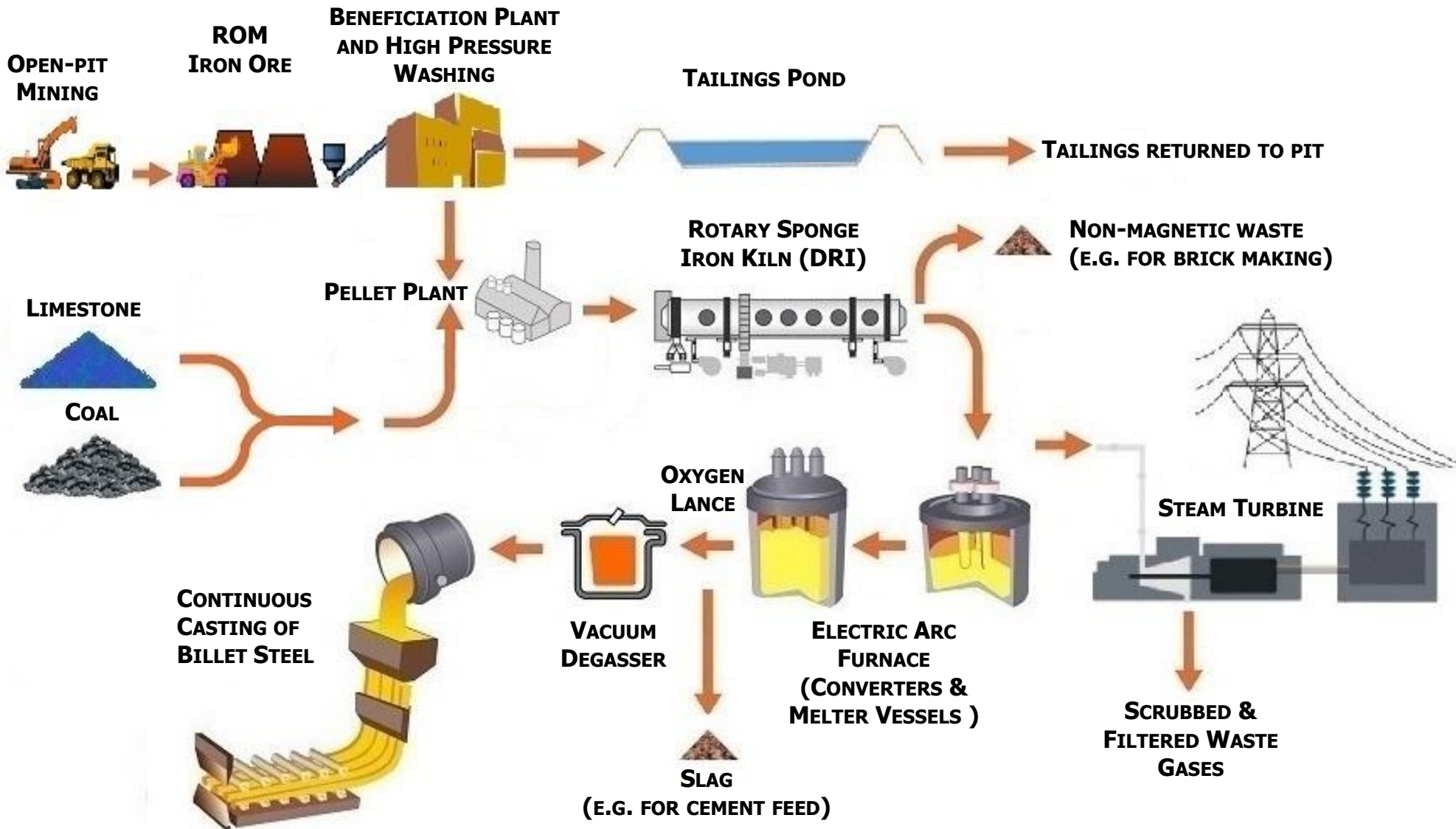


# AGBAJA PROJECT: PLANNED PROCESSING

- The plant feed preparation includes crushing, screening and high pressure washing which removes alumina. The ore is then screened into coarse & fines.
- The coarse ore, coal and limestone goes directly to 4 rotary kilns, the fines are ball-milled and fed to a pellet plant before subsequently going to the rotary kilns.
- Waste heat recovered from rotary kilns is passed through the 35MW steam turbines to power the plant. Any excess power generated will be supplied to the local grid. The waste gases are then scrubbed and filtered before being released.
- Rotary kilns produce sponge iron at 85% to 90% Fe (Iron).
- The sponge iron is magnetically separated with the magnetic component going to a melter for further upgrading and reduction in impurities. The application of an oxygen lance drives off the phosphorous and allows the carbon content to be optimised.
- The liquid pig iron goes to one of two converters to make steel.
- Liquid steel is passed through a continuous caster to produce steel billets.
- Fine tailings and other non-toxic wastes are returned to the mined out area as backfill.



# PROCESS FLOW SHEET



# AGBAJA BILLET STEEL PRODUCT AND POTENTIAL CUSTOMERS

- The billet steel from Agbaja planned to be produced in 150mm x 150mm x 1500mm billets (continuous casting length may vary)
- Billet steel quality targeted Fe >95%, Phosphorous < 0.03%, SiO<sub>2</sub> <2%, Al<sub>2</sub>O<sub>3</sub> <2% and Mn <0.01%.



- Customers are existing electric arc steel melters using scrap and billet and are within trucking distance of the Agbaja Steel Project (See Map)



# LIMITED ENVIRONMENTAL IMPACT

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Non-arable land unsuitable for crops and animal husbandry. Backfill will improve land quality.

Tailings from the initial washing impounded on the plateau. After drying returned to the pit for infilling.

→ No toxic chemicals used in the production process

Minimal dust during transport, as limited haulage of 5km and a limited number of truck movements daily. Dust suppressing measures will be in place.

Slag and waste material containing principally silica and aluminium, to be used in brick making and local road production.

Modern, cleaner steel production process with electric arc furnace instead of blast furnaces

Negligible social impact due to remote location and no close settlements

Waste heat recovery recycled to run steam turbine with excess power fed into the local grid

**Minimal environmental impact**

# MARKET INFORMATION

Selling Prices – Steel billet prices in Nigeria are currently in excess of US\$660/t Cost, Freight and Insurance ('CIF') delivered to Lagos<sup>1</sup>. Further costs prior to delivery to steel fabricator include import duty, VAT and transportation.

Competition: - In order to be competitive in the long term Kogi's DRI plant must match or exceed the process and smelting costs of competing DRI steel plants around the world, which according to study conducted by US Department of Energy in 2000 and updated in 2012 range from<sup>2</sup> US\$180/t to US\$240/t of steel billet output.



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## Ironmaking Process Alternatives Screening Study

<sup>1</sup> Steel Billet Price Sources: Metal Bulletin Global Billet Wrap, Spot Ocean Freight

<sup>2</sup> Costs exclude construction costs, sustaining capex, royalties, non-site based overheads, taxes, etc

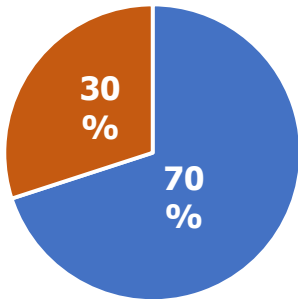
# ROBUST CASE FOR ECA FUNDING...

**Project ideally positioned to take advantage of favourable, low-cost ECA Funding**

Strong cash generation at an early stage of the project providing good credit metrics and debt service ratios. DSR initially at 12 month.

## FINANCE STRUCTURE

High quality EPCM contractors being sought on a turnkey bonded contract



■ Debt ■ Equity

Steel project: Economically viable project along with diversification away from oil against the backdrop of a Nigerian development program **ERGP**

Flexible equipment sourcing with import possible from a variety of sources ensuring local content criteria are met

Robust security package (share/asset pledge etc.) and inter-creditor agreements

Robust off-takers to be contracted

Ring-fencing of hard currency revenue

Equator compliant, Environmental & Social impact assessment completed, fully permitted

# ROBUST CASE FOR EXPORT CREDIT AGENCY (ECA) FUNDING...

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Equator compliant, Environmental & Social impact assessment completed, fully permitted

High quality EPCM contractors being sought on a turnkey bonded contract

Steel: assists diversification away from oil

Reduces foreign currency requirement as it is an import substitution steel products

Flexible equipment sourcing with import possible from a variety of sources ensuring local content criteria are met

In country off-takers to be contracted

**Project ideally positioned to take advantage of favourable, low-cost ECA Funding**



# ...WITH THE ECA'S HAVING SIGNIFICANT EXPOSURE APPETITE

- Various ECAs were approached reflecting potential different country sourcing options
- For good, well-structured projects strong appetite exists
- For Nigeria ECAs have indicated un allocated appetite between USD500 Mn and USD750 Mn
- All stated that they are open for cover to support their exports



- **Key criteria for successful progress on ECA facilities:**

- Meeting the respective content criteria
- Experienced/ credit worthy sponsors
- Strong D/E, High DSRA, PF disciplines, Equator principles etc
- Clarity on off-takers with preference for multinationals with hard currency reserves, and clarity on off-shore hard currency payment mechanics

→ **Our sourcing strategy will be influenced by the quality of the ECA support and the associated "All in Cost of Funding"**



**Based on initial ECA response we remain confident that our main funding will be ECA led**

# RISKS AND MITIGANTS

RISK	MITIGANT
<b>Political/Funding</b>	Securing ECA support, of which we are confident given responses so far, significantly reduces political and project funding risk – debt investors are covered through ECA insurances providing in addition a ‘halo effect’ for equity investors. <b>Sovereign backed ECA funding is aligned with equity investors – all parties benefit if the project succeeds.</b>
<b>Market Risk</b>	Historical demand for steel over the past two decades has increased 10x to 3,601kt in 2014, with resilient demand even in challenging geo-political times, implying that demand impairment through geo-political risk is low.
<b>Price/FX</b>	Pricing in USD occurs at import-parity levels and is supported by location and industry policy measures by the government. Sales receipts are held offshore and coupled with a local Naira cost base leads to low exposure to FX and remittance risks.
<b>Process</b>	Process risk is managed by the extensive test work program currently underway. The final plant design uses standard equipment such as kilns, melters, converters and casters which is already in use in similar plants globally.
<b>Volume</b>	Low risk, as project is import substitution, industrialization is supporting a continuous expansion of domestic demand and the steel sector is enjoying government support.
<b>Construction</b>	Low risk owing to modular off-the shelf equipment fabricated off-shore by reputable vendors and installed and commissioned by experienced international EPCM contractors.
<b>Raw Material Supply</b>	Captive iron ore source and advanced discussions with local providers of coal and limestone.

# INTERNATIONAL CONSULTANTS DEPLOYED



Established Canadian full service mechanical consulting engineering firm specializing in sustainable mechanical design.



ALS is a leading, global full-service provider of analytical geochemistry services to the global mining industry.



Autonomous research and development organisation specialising in all aspects of mineral processing, extractive metallurgy and related technology.



Global experts with vast experience in geotechnical engineering, environmental services, testing and project management services.



Award winning leading ECA finance experts.



Corporate Finance advisers with a focus on mining and infrastructure.



Independent engineering consultants specialising in the development, design and construction of new mining projects and the refurbishment of existing gold, base-metal and industrial mineral ore processing plants.



Leading international resource sector finance houses.



Global expert helping mining and metal companies reduce costs, save energy and limit environmental impact. Submerged electric arc and steel making experts.

## Greenwater Environmental Services Ltd

Well respected local Nigerian outfit. Past clients include World Bank funded projects.

## NPV Pty Ltd

Financial Modeling for Mineral Resource Developers

# GOVT SUPPORT FOR UNLOCKING NIGERIA'S ECONOMIC POTENTIAL

## The current state of play...

- The Nigerian GDP was USD405bn in 2016, representing 0.65 percent of the world economy.
- Clear Minerals Act (2007) similar to Western Australia and Canada
- **Oil receipts dominate fiscal revenue and exports**



## ... and the plan to fuel growth and change

- **The Economic Recovery and Growth Plan (ERGP) was adopted, promoting industrialization**



### Key government downstream actions to promote industrial development:

- 1) Support the steel sector through **industry protection** such as **restrictions on the importation of Iron and Steel** until self-sufficiency is attained
- 2) Enforce crude steel and specific finished **steel quality limits** (e.g. dimensional accuracy, brittleness, etc) through regulation
- 3) Ensure continued **free trade agreements within the ECOWAS** region
- 4) Promote **backwards integration capabilities for current processing players** through necessary incentives



# CONCLUDING SUMMARY

- **Nigeria has an annual steel demand of 6.8 Mt**
  - the majority from electric arc furnaces using imported scrap/billet (scrap/billet metal imports up >50% since 2013) ;
  - strong offtake support from potential customer
  - Continued urbanization to increase the underlying steel demand which is low in regional terms.
- **Kogi Iron is proposing an integrated Direct Reduction Iron plant:**
  - Strong offtake support from potential customers;
  - Company owned, low cost iron ore resource and nearby coal and limestone enhances profitability;
- **Import Parity Pricing** for the sale of billet steel results in potential for high margins.
- **Strong Export Credit Agency interest and support as sales will be invoiced in USD and the proceeds held offshore.** This will significantly reduce political and project risk.



# Mineral Resource Statement

Table 1 – Summary Grade Tonnage for Laterite (Zone A) and Oolitic (Zone B) Horizons (20% Fe lower cut off is applied) Refer ASX announcement 10 December 2013.

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

The Company confirms that it is not aware of any information or data that materially affects the information included in the original market announcements and, in the case of estimated Mineral Resources, which all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements.