# Zanaga Project

**Investor Presentation** 

ZNDA 846

IRON ORE

Q4 2016

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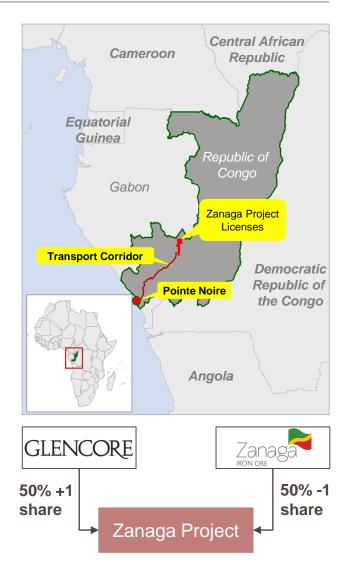
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# Zanaga Project Overview

### World class iron ore project

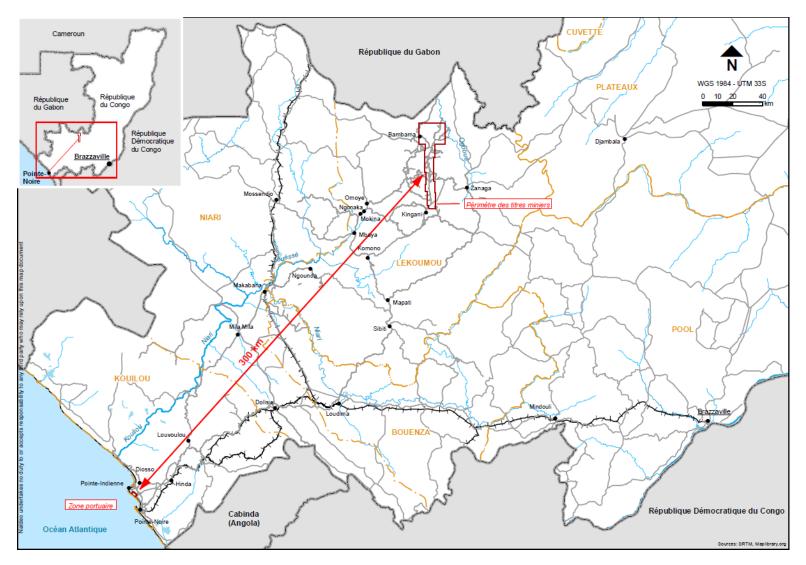
- 6,900Mt Mineral Resource
- 2,070Mt Ore Reserve
- High quality, low impurity iron ore product
- Bottom quartile operating costs
- JV between Glencore & Zanaga Iron Ore Company
  - Glencore manage the Project
- Feasibility Study & SEIA complete
  - Compelling project economics
  - Project optimised through Staged Development
    - Lower capital and execution risk
    - Reduced financing requirements
    - Maximised return on capital
- Mining Licence and Convention received



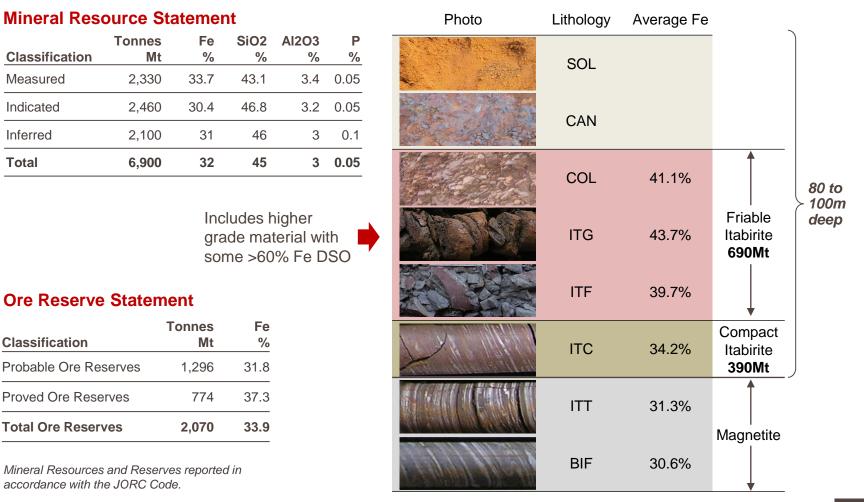


# Location





### >178,000m of exploration drilling has resulted in a large, well defined ore body





### Zanaga is a globally significant iron ore resource supported by a large reserve base



Zanaga is one of the only large, long-life, assets that is not already under the control of existing major iron ore producers

Globally Signif	icant Iron Ore Reserves <sup>2</sup>				
Country	Operator	Project	Status	Total Resources (mt) <sup>1</sup>	Total Reserves (mt)
Brazil	Vale	Carajas - Serra Sul	Construction	n.a	4,240
Brazil	Vale	Mariana	Producing	n.a	3,261
Brazil	Vale	Serra Norte	Producing	n.a	2,637
Australia	Rio Tinto	Hamersley	Producing	10,697	2,272
Congo	Zanaga Iron Ore / Glencore	Zanaga	DFS	6,890	2,070
Australia	BHP Billiton	Mt. Newman	Producing	13,400	1,980
Guinea	Rio Tinto – Chinalco	Simandou (3 & 4)	DFS	2,640	1,844
Australia	FMG	Chichester Hub	Producing	3,222	1,470
Brazil	Anglo American	Minas Rio	Producing	3,937	1,385
Canada	Oceanic Iron Ore	Hopes Advance	DFS	1,432	1,359
Brazil	Vale	Minas Centrais	Producing	n.a	1,130
Australia	Atlas Iron	Ridley Magnetite	PFS	2,010	970
Australia	BHP Billiton	Yandi	Producing	2,380	950
Australia	FMG	Solomon Hub	Producing	2,219	903
Brazil	Vale	Itabira	Producing	n.a	857
Australia	Hancock Prospecting	Roy Hill	Construction	2,420	562
Sierra Leone	London Mining	Marampa	Care & Maint	1,057	532
Australia	BHP Billiton	Mining Area C	Producing	4,520	500
Australia	Rio Tinto	Robe JV	Producing	4,892	456
Cameroon	Sundance Resources	Mbalam	DFS	775	436
Australia	Rio Tinto	Hope Downs	Producing	4,476	363
Mauritania	Glencore	Askaf North	Care & Maint	405	250
Guinea	Bellzone	Kalia (Oxide)	DFS	124	60

Assets already controlled by existing Major Iron Ore Producers

Source: Woodmac, Company Filings & Barclays Research.

1. Under SEC regulation on Resource Disclosure, Vale does not disclose measured, indicated, inferred or possible resources.

2. Only included assets that have reserves.



		Stage One	Stage Two	
Production		12 Mtpa >30 year minelife	30 Mtpa (through 18Mtpa expansion) >30 year minelife	
		(Significant resource remaining to extend life or expand magnetite operation)		
Mining	Ore types	Upper hematite ores (friable and compact itabirite)	Magnetite ores exposed from mining hematite	
	Strip Ratio	0.45 (Waste:ore)	0.37 (Waste:ore)	
Processing		Conventional spiral and flotation processing	Conventional magnetic separator processing	
High Quality P	roduct	66% Fe 3% SiO <sub>2</sub> 0.8% Al <sub>2</sub> O <sub>3</sub>	67.5% Fe 3.2-3.4% SiO <sub>2</sub> 0.4-0.6% Al <sub>2</sub> O <sub>3</sub>	
Infrastructure	Pipeline	366km long (500mm wide)	366km long (600mm wide)	
Port		RoC & China proposed port development		
	Power	100MW available from existing generation	Expansion to ~250MW underpinned by development of new generation capacity	



CAPEX \$m	Stage 1	Stage 2
FEED	22	11
Pre Production	23	-
Mine Area	614	814
Pipeline	399	467
Port Yard Facilities	173	243
Total Direct Costs	1,231	1,535
Construction Indirects & Owners Costs	529	353
EPCM	203	236
Contingency	256	365
Total Costs	2,219	2,489

OPEX \$/dmt	Stage 1 30 yr avg	Stage 2 9-30 yr avg
Mining & Processing	19.1	17.4
Pipeline	2.4	2.1
Port Area	6.5	2.7
G&A	2.0	0.9
Cash Cost	29.9	23.1
Royalty	1.2	1.6
Cost – FOB	31.1	24.7

Royalty, included in operating costs, calculated at \$70/dmt IODEX 62%Fe

#### Basis of estimate:

• Contract mining for first 5 years

• Third party port "marine" construction, and third party power supply

· Road upgrades included in Government programmes

• Notes: Stage One capital costs have been estimated to an FS level of definition. The Stage Two costs are supported by a lower level of engineering (PFS level) but significantly leverages the work completed for the Stage One development. Cost escalation is excluded from the capital cost estimate. The capital cost estimate assumes the use of a third party port facility at Pointe-Indienne

# Pipeline transportation with low risk land access



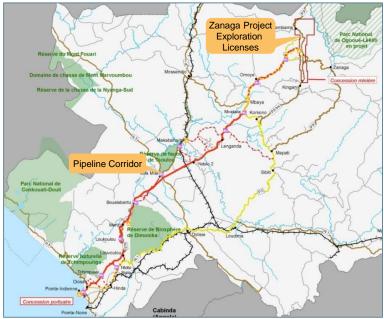
# • 366km pipeline to transport pellet feed from mine site to port at Pointe-Noire

- Stage One 20" Pipeline
  - Optimal for 12mtpa throughput
  - 13.2Mtpa capacity for first 5 years of operation due to inclusion of corrosion allowance
- Stage Two 24" Pipeline
- Very low opex
- Maximum pipeline gradient 12%
- · Well defined process for securing required land
  - Appropriate consultation
  - Single central government approval contrast to Brazil, where negotiations with hundreds of landowners required

#### 1,200 Elevation/Altitude (m) Samarco (BHP/Vale) 1,000 Zanaga 800 600 400 200 0 50 100 200 250 350 0 150 300 400 Kilometres (km)

#### Indicative topographical profile - easier terrain than Brazil

#### Planned pipeline route





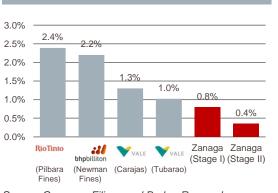
### The Stage One pellet feed product will have an iron grade of 66%, similar to Brazilian supply

#### High Grade Product with High Fe Content and Low Impurities

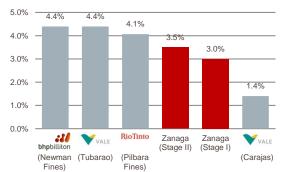
- High quality, low impurity pellet feed product
- High iron content will command price premium relative to 62%FE IODEX
- Stage Two expansion provides option to produce two products or blend
- Product suitable for direct feed to pellet plants (size approx. 80% passing 45 microns)
- Attractive feed for pellet plants or as part of a sinter feed blend

	Zanaga		Iron Ore Indices Specifications
	IRON ORE Stage I	Stage II	RioTinto bhpbilliton IODEX
Fe (%)	66.0%	68.5%	62%
Alumina (%)	0.8%	0.3%-0.4%	2.0%
Silica (%)	3.0%	3.3%-3.7%	4.5%
Phos (%)	0.04%	<0.01%	0.08%

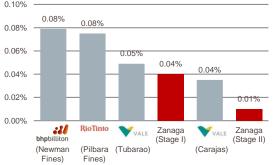




#### Silica



#### Phosphorus



Source: Company Filings and Broker Research.

Alumina



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	2007-2012	2013 2014 2015 2016 2017	4 years
Capital cost	\$350m spe	ent ~\$2m	\$2.2bn
Exploration, Drilling, and Preliminary Studies			
30Mtpa Pipeline Pre-Feasibility Study		*	
Staged Development Studies			
Staged Development scoping study		★	
Feasibility Study & SEIA		★	
Mining Licence received		*	
Permitting Process			
Mining Convention received		*	
Construction Phase			
Mining Commences			
First Shipment			

# **Investment Highlights**



### ✓ Attractive Project Economics

- Large ore body defined to support long life development
- High quality product specifications

## ✓ Feasibility Study complete

- Confirms attractive technical and economic basis for development
- Study work conducted by Xstrata & Glencore

### ✓ Deliverable and financeable project

- Reduced capital intensity and quantum for staged development approach
- Optionality with respect to port and power infrastructure

### Mining Licence granted and Convention received

Supported by best in class Feasibility Study and SEIA

