## Zanaga Iron Ore

**Investor Presentation** 

28 March 2019



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- A world class iron ore asset
  - 6,900Mt Mineral Resource
  - 2,070Mt Ore Reserve
- Mining Licence and Mining Convention received
- Experienced leadership and shareholders
  - JV between Glencore & Zanaga Iron Ore Company



- Well positioned in current iron ore market due to high quality product specification
- Project advancing on Staged Development scope
  - 1Mtpa Early Production Project (EPP) under assessment
    - Near term, low capex development
  - 30Mtpa Staged Development Project
    - 12Mtpa Stage One (fully permitted)
    - 18Mtpa Stage Two expansion to 30Mtpa
    - Feasibility Study complete
    - Multiple value engineering opportunities under investigation

## **Experienced Board and Management**



#### **Board of Directors**



### Clifford Elphick

- Non-Executive Chairman
- >32 years experience in the mining sector
- Founder and CEO of Gem Diamonds Ltd
- Ex-Anglo American, E Oppenheimer & Son, and De Beers



#### Clinton James Dines Non-Executive Director

- >31 years experience in the mining sector
- Former President of BHP Billiton China
- Non Executive Director of Fonterra

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Management

## Corporate Development and IR Manager >12 years of Natural Resources financing

Andrew Trahar

- >12 years of Natural Resources financing and transaction experience
- Former JPMorgan Corporate Finance
   Investment Banking

#### Colin Harris Lead Technical Expert

- >40 years experience in the mining sector
- Former Project Manager Rio Tinto Simandou
- Former Project Manager Zanaga Iron Ore Project



- >27 years experience in the mining sector
- Former General Manager at Mining Area C, the largest iron ore mine in the BHP portfolio
- Former COO of Gem Diamonds Ltd



#### Gary Vallerius Chief Financial Officer

- >30 years experience in the mining sector
- Former CFO Rio Tinto Simandou Project



Simon Renton Internal Legal Counsel

- >30 years experience
- Former Partner Norton Rose

## Iron Ore Market Update



## Steel demand remains robust, driven by continued demand in the ASEAN region

## Environmental controls encouraging efficiency through higher utilisation rates



### ...driving premium iron ore prices higher



#### Crude steel capacity utilisation (%) 30% 100% Modelled EBITDA, China integreted 95% China, crude steel cap. Utilisation 90% 85% Utilisatio 80% 75% 70% 65% -30% 60% 07Q1 701 801 08Q1 09Q1 ğ 11Q1 <u>4</u>0 ğ <u></u> 20 g Source: WSA, Macquarie, Feb-19

#### ...widening price premiums





Source: Bloomberg, 26 March 2019

Source: Morgan Stanley, Platts, February 2019

## Iron Ore Market Update (cont'd)



#### Limited supply of high grade iron ore product in the market

- Product quality concerns
  - Australian iron ore grades declining and impurity levels rising
  - Brazilian supply disruptions affecting higher quality production base
- · China needs higher quality ores more than ever before
  - Structural shift in demand for high grade iron ore products due to pollution controls in China
  - Natural evolution of Chinese steel industry to higher quality steel products requires high quality ore feed
  - Pellets (and pellet feed) will play an increasingly important role



**Early Production Project** 

## Introduction



- Targeting 1Mtpa production of high grade >65% Fe iron ore pellet feed concentrate / pellets with low impurities
- Low capital cost development
  - Evaluation process progressing well
  - Targeting less than U\$50m capital cost for pellet feed project scope, or U\$110m for full pellet project

#### Substantial plant technical work complete

- Bulk sample utilised for product testing
- · Low capex, low opex milling solution proven viable
- Beneficiation test work confirmed process flow sheet
- Indicative detailed pellet feed plant cost estimate received
- Bolt-on pellet plant cost estimate being refined
- Preferred mining contractor selected contract negotiation under way
- Brownfield logistics solution entering final stages of definition
  - Minor road upgrade cost of U\$1m confirmed for road route to Franceville, Gabon
  - Multiple trucking contractors engaged optimal solution being refined
  - Rail and port costs entering detailed negotiation
- Construction estimated at approximately two years
- On completion of assessment work, outcomes to be presented to the board of Jumelles, the joint venture company

## **Contractor focussed development approach**

# Zanaga

### Majority of operational items outsourced to minimise development risk and capex



Owned infrastructure, requiring capital investment by Zanaga Project shareholders and investors

Contracted operation, not expected to require significant funding by Zanaga Project shareholders and investors

# Optionality on logistics routes and potential pellet plant locations





## Mining



Сарех	Nil – contractor solution
Орех	Mining contract in process of final estimation

- Planning for the definition of pre-production resources in progress
- Mine plans prepared to be refined following completion of product test work
- More than 250Mt of free-dig orebody material available to support the project
- Reputable Mining Contractor selected
  - Preliminary scope and equipment list agreed
  - Contract negotiation in progress





Capex*	U\$38m (installed on site)
Opex*	U\$3.75/t Run of Mine (excl. power)
Power consumption	5.9MW
Construction schedule	22 months

- Positive results from pilot test work programme
  - Positive milling results received confirming capability of low capex, low opex and low power milling solution
  - Beneficiation test work complete to confirm process flow
  - Conventional, low risk solution
- Highly regarded engineering procurement and construction (EPC) company selected
- Detailed indicative cost estimate for pellet feed concentrate plant received

Milling of Zanaga material in test facility



Magnetic separation testing



<sup>\*</sup> Capital and operating costs are indicative detailed estimates

## Process Plant (cont'd) Pellet Plant Option – Conventional Technology



Capex*	U\$50-60m indicative estimate (installed on site)
Opex*	Undergoing confirmation process
Power consumption	4.0 to 4.5MW
Construction schedule	24 – 28 months

- 162m2 Pellet Plant proposed
- Production: 1-1.2 Mt/y
- Linear model to reduce transfer equipment
- Savings on building structure quantity
- Can operate with 2 installed pelletising discs (3rd is optional)
- Standardised equipment
- Gas cleaning design to meet local regulations



Courtesy of Outotec

<sup>\*</sup> Capital and operating costs are indicative estimates and are not yet estimated to a detailed level of definition but are preliminary estimates following a first review of the potential project parameters

## Power solution Diesel / Grid base case



Сарех	Nil (leased solution)
Opex estimate	U\$20c/kwh
Delivery schedule	3-4 month delivery time

- Leased diesel generator solution proposed for mine site activities
  - Standard solution for remote power generation in the industry
  - Multiple providers under consideration
  - Low risk technical solution
  - Capable of supplying power for full 10.4MW required if pellet plant installed on site
- Grid power solution considered if pellet plant located at port or rail siding
- Options under investigation:
  - Bolt on battery solution to optimise generator efficiency and lower fuel consumption
  - Potential hydro solution under investigation will require capital investment, but has potential to dramatically lower energy cost

Example of Diesel Genset mine solution



## **Road logistics**



- Trucking 173km from Zanaga mine site to Transgabonais rail siding in Franceville, Gabon
- Road route in good condition, only minor improvement required
- Preferred route for commencement of operations

- Trucking of 160km from Zanaga mine site to rail siding in Mossendjo, Rep. of Congo
- Road route requires upgrades in order to cater for long term trucking operation

Capex*	U\$1m	Capex*	U\$10m
Орех	Multiple trucking contractor estimates received – refining optimal solution	Орех	Multiple trucking contractor estimates received – refining optimal solution

Road between mine site and Franceville



Road between mine site and Mossendjo



## Gabon option – Rail & Port



- Discussions in progress to finalise rail and port operating cost with service provider
- Transgabonais railway
  - Contract solution no capex required
  - Well established 648km railway, already transporting 3Mtpa manganese
  - Expandable up to 22Mtpa
  - Phased expansion 2018-2025 underway Iron Ore capacity increasing from 300ktpa to 5Mtpa
  - IFC funded €82m track rehabilitation, replacing 600km of rail & sleepers
- Multi User Mineral Terminal Owendo
  - GSEZ (OLAM and Gabon State) joint development
  - 45ha of land reclaimed from sea
  - Connected to railway with integrated storage and reclaim facility
  - Planned jetty approximately 2.5km, providing 12.5m draft enabling up to 45,000t OGV or transhippers
  - Load-out of initially 5Mtpa (already operational), ramping up to 10Mtpa

#### Transgabonais railway locamotive



#### Owendo port



## **Conclusion & Next Steps**



#### Early Production Project progressing well

- Entering detailed definition phase moving directly to firm cost estimates
- Product test work indicates attractive 65%+ Fe product capable of production

#### Mining contract negotiation in progress

#### Plant engineering and cost estimate entering advanced stage

- Pellet feed concentrate plant indicative detailed estimate received
- Indicative pellet plant estimate requires further definition

#### Power solution defined and low risk

Alternative options under evaluation

#### Logistics

• Refining cost estimates with preferred logistics service providers across road, rail and port

#### **Approvals process**

 Presentation of outcomes to Jumelles Board and its shareholders (Glencore and ZIOC) for consideration

**30Mtpa Staged Development Project – Situation Update** 



		Stage One	Stage Two	
Production		12 Mtpa	30 Mtpa (post 18M	tpa expansion)
		>30 year minelife	>30 year minelife	
		(Significant resource remaining to extend	life or expand magne	etite operation)
Сарех		U\$2.2Bn	U\$2.5Bn	
Орех		U\$31.1/t FOB	U\$24.7/t FOB	
Mining	Ore types	Upper hematite dominant 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	
		Hematite only	Magnetite only	Blended product
High Quality P	roduct	66% Fe	68.5% Fe	67.5% Fe
		3% SiO <sub>2</sub>	3.3-3.7% SiO <sub>2</sub>	3.2-3.4% SiO <sub>2</sub>
		0.8% Al <sub>2</sub> O <sub>3</sub>	0.3-0.4% Al <sub>2</sub> O <sub>3</sub>	0.5-0.6% Al <sub>2</sub> O <sub>3</sub>
		0.04 P	<0.01 P	0.02 P
Pipeline 366k		366km long (500mm diameter)	366km long (600mm diameter)	
	Port	RoC & China proposed port development		t
	Power100MW available from existing generationExpansion to ~250MW under development of new generation		MW underpinned by w generation capacity	

## **Economic evaluation exercise**

2014 FS assessed for current product and freight pricing only



#### Attractive outcomes of assessment process under current market pricing environment

- Note: Financial model based on 2014 FS, no capex or opex adjustments
- Product pricing updated for illustrative purposes



- Stage One only - Stage One & Two combined --- Average 65% Fe Concentrate price (Jan 2017 to date)

Source: Management estimates based on 2014 Feasibility Study and the assumptions stated therein Note: Capex and opex figures contained in the 2014 Feasibility Study have not been updated Iron ore product pricing updated: Now based on 65% Fe concentrate index and adjusted for expected iron unit premium for higher Zanaga iron content Freight rates: Long term assumed at U\$20/wmt CFR China (current rate U\$17/wmt)

# Zanaga

## • Illustrative assessment process indicates potential for robust annual Net Cash Flow and EBITDA even at low 65% Fe iron ore concentrate prices



- Stage One only - Stage One & Two combined --- Average 65% Fe Concentrate price (Jan 2017 to date)

Source: Management estimates based on 2014 Feasibility Study and the assumptions stated therein Note: Capex and opex figures contained in the 2014 Feasibility Study have not been updated Iron ore product pricing updated: Now based on 65% Fe concentrate index and adjusted for expected iron unit premium for higher Zanaga iron content Freight rates: Long term assumed at U\$20/wmt CFR China (current rate U\$17/wmt)

## **Value Engineering Opportunities**



- Extensive engineering of the 30Mtpa staged development project
  - >U\$350m spent on extensive evaluation work including detailed technical studies and resource drilling
  - Since the 2014 Feasibility Study was produced industry input costs have dropped significantly
- 2017 internationally recognised technical consulting group commissioned to conduct high level review of the costs of the 2014 FS 12Mtpa Stage One Project with no re-engineering
  - Results indicated potential capital cost savings of between 8% and 19% (U\$153m to US\$371m) and potential operating cost savings of between 15% and 20%
  - Outcome driven by potential reductions in costs of steel, oil, labour, contractor rates, freight, and weaker forex rates for key input cost items versus the US Dollar
- Today
  - Additional value engineering opportunities under investigation with the potential to provide significant savings to the Project's capital and operating costs
  - Optimisation of power solution design and availability
  - New milling technologies now available providing lower capital and operating costs
  - Option to include conventional pelletisation plant in the project scope

Note: These estimates are not yet costed to a high level of definition and are high level estimates that only indicate potential savings. In order to better define these estimates the Project Team would require further work to be conducted ahead of considering a full re-estimate of the 2014 Feasibility Study to updated feasibility study level. Derisking of a number of logistical matters which are required for the larger project, including export and import solutions

## Stage Two expansion potentially self-financing Example case, using U\$90/t CFR for 65% Fe concentrate price





Conclusion

## **Investment Highlights**



### ✓ Robust project fundamentals

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

#### ✓ 1Mtpa Early Production Project assessment advancing well

- Reduced capital intensity and quantum
- Entering detailed definition phase
- Outcomes to be submitted to board of Jumelles, the joint venture company, for consideration

### ✓ 30Mtpa Stage Development project Feasibility Study completed in 2014

- Economic basis for development has improved in current iron ore market
- Multiple value engineering opportunities identified
- ✓ Mining Licence received in August 2014
- ✓ Mining Convention ratified as a law by the Republic of Congo Parliament in 2016
- ✓ Environmental certificate received in November 2017 for Stage One

## Appendix

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

	Tonnes	Fe	SiO2	AI2O3	Р	
Classification	Mt	%	%	%	%	
Measured	2,330	33.7	43.1	3.4	0.05	
Indicated	2,460	30.4	46.8	3.2	0.05	
Inferred	2,100	31	46	3	0.1	
Total	6,900	32	45	3	0.05	



Mineral Resource Statement

Classification	Tonnes Mt	Fe %
Probable Ore Reserves	1,296	31.8
Proved Ore Reserves	774	37.3
Total Ore Reserves	2,070	33.9



Mineral Resources and Reserves reported in accordance with the JORC Code, and reported in Zanaga Iron Ore Company's 2017 Annual Report

**IRON OR** 



## Zanaga is one of the only large, long-life, assets that is <u>not</u> controlled by the existing major iron ore producers

#### Globally Significant 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
Mauritania	Glencore / SNIM	El Aouj	PFS	4,425	931
Australia	FMG	Solomon Hub	Producing	2,219	903
Brazil	Vale	Itabira	Producing	n.a	857
Australia	Hancock Prospecting	Roy Hill	Construction	2,420	562
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
Guinea	Bellzone	Kalia (Oxide)	DFS	124	60

Assets already controlled by existing Major Iron Ore Producers

Source: Woodmac, Company Filings & Barclays Research 2016.

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

2. Only included assets that have reserves.

## Upside resource potential along strike and at depth



#### **Magnetic signature**



- 25km of 50km magnetic anomaly drilled to date
- Drilling to circa 300 metres with mineralisation open at depth
- Based on expected mass recoveries, only 2.5bn of the existing 6.8bn tonnes of JORC compliant resources will be required to support a 30Mtpa operation for >30 years, suggesting a higher production level and / or a longer mine life is possible

## Well understood geology and low strip ratio ore body



Lar



#### 2014 FS estimate – without value engineering

CAPEX U\$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 U\$/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 U\$70/dmt IODEX 65%Fe

Basis of Feasibility Study 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



### Stage One pellet feed product 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 expected to command significant 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

			Iron Ore Indices Specifications
	Zanaga Iron ore		RioTinto Bhpbilliton
	Stage I	Stage II	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%

#### Very low impurity product when compared to the Major Miners



#### Silica



#### Phosphorus



Source: Company Filings and Broker Research.

## **30Mtpa Project Pipeline transportation with low risk land access**



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

- Stage One 500mm Pipeline
  - 12mtpa throughput for life of mine
  - 13.2Mtpa for first 5 years of operation due to inclusion of corrosion allowance
- Stage Two 600mm Pipeline
- Very low opex (<U\$2.5/t transportation cost)</li>
- 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 50 250 350 100 200 0 150 300 400 Kilometres (km) Source: Company, Samarco and Ferrous company data

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

#### Planned pipeline route





#### • Pipeline planned for primary transport solution

- Lower capital cost versus railway, and in-line with project scale
- Very low operating cost
- Reduced environmental impact buried pipeline
- Majority of ore body most suitable for high grade concentrate which is amenable to pipeline transport
- Significantly reduced construction risk considering terrain
- Favourable topography and attractive land access process in Republic of Congo (contrast to Brazil)

Project	Country	Length (km)	Diameter (inch)	Capacity (Mtpa)	Year
Zanaga Stage One	Rep. Congo	370	20	12	-
Samarco 3 <sup>rd</sup> Pipeline	Brazil	401	22/24	20.0	2014
Minas Rio	Brazil	528	24/26	24.5	2014
Essar 2 <sup>nd</sup> Pipeline	India	253	20	12.0	2013
CP Mining	Australia	30	32	33.6	2013
Da Hong Shan Expansion	China	171	9	3.5	2010
Bao Tou West Mine	China	145	14	5.5	2010
Samarco 2 <sup>nd</sup> Pipeline	Brazil	398	16/14	8.3	2008
Da Hong Shan	China	171	9	2.3	2006
Essar 1 <sup>st</sup> Pipeline	India	266	14/16	6.8	2006
Jian Shan	China	105	9	2.0	1997
Samarco 1 <sup>st</sup> Pipeline	Brazil	398	20/18	16.0	1977

#### Iron Ore pipeline installations

#### Large diameter pipeline installation



## 30Mtpa Project: Port



- Stage One currently costed based on owner-built service harbour and trans-shipping operation
- Optionality:
  - Third party built similar or deep water port
- Stage Two expansion expected through construction of deep water port

#### **Richards Bay Coal Terminal Multi-user with Glencore as shareholder**



#### **Example of Iron Ore transhipping**



#### Porto Nuevo - Glencore owned and operated



## 30Mtpa Project: Port (cont'd)



#### A dedicated mineral port to serve all projects located in the southern part of the country

- Existing port in Pointe Noire is unable to cater for tonnages required for the 12Mtpa Stage one Project so a new port will be required to handle bulk mineral products
- China Road and Bridge Corporation (CRBC) selected by RoC to build the new port north of Pointe Noire
- Total capacity projected at 150 Mtpa
- Discussions underway with the Federation of Mines
  - Third party built similar or deep water port
  - LOI signed with CRBC in 2018 to seek collaboration

#### Planned port capacity (Mt)



## CRBC Proposed Dedicated Mineral Port Project in Pointe Noire



## 30Mtpa Project Power



- Existing grid supplied by low cost power sources
  - Gas generated power using flare gas from oil industry
  - Existing hydro power
- Stage One based on use of national grid, with potential for new hydro power from nearby projects
- Stage Two requires new power generation
  - New gas sources currently being developed
  - Major Hydro projects under consideration by government
- Availability of local gas make pellet plant economics potentially attractive

#### **CEC 300MW Gas Power Station in Pointe-Noire**



#### **Refurbished 220kV transmission lines**



## **EPP Project**

Small hydro plant study indicates multiple sites available





## EPP Project Gabon option – Rail & Port gallery





#### Rail siding at Owendo port site



#### Track upgrades in progress



#### Bridge upgrades



## EPP Project Congo option – Rail & Port



- Challenging solution no large scale bulk operation active on the railway, however investigations continue
- CFCO railway
  - Connects Mossendjo rail siding to Pointe Noire Port
  - Narrow gauge with capex required to expand capacity
  - Ramp up would require significant upgrading and capex of >U\$5m
  - Route currently utilised at low volume by SAPRO who commenced operations in May 2018
  - Significant study work already conducted by Zanaga and neighbours on rail viability
  - Encouraging progress made by SAPRO to deliver operating capability of a small scale
- Pointe Noire Port
  - Government owned
  - One of the largest deep water ports in West Africa
  - Connected to CFCO railway with integrated storage and reclaim facility
  - Limited availability for stockpiling material

#### CFCO railway transporting iron ore



Pointe Noire Port & stockpile options



## EPP Project Technical study work gallery



#### Assembling ore sample for testing



Sampling of high grade surface ore



#### **Gravity separation testing**



Upgraded road between mine site and national highway

