

12 December 2011

## Zanaga Iron Ore Company

Year End	Revenue (US\$m)	PBT* (US\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/09	0.0	(1.6)	(1.2)	0.0	N/A	N/A
12/10	0.0	(13.9)	(5.4)	0.0	N/A	N/A
12/11e	0.0	(3.5)	(1.3)	0.0	N/A	N/A
12/12e	0.0	(3.3)	(1.2)	0.0	N/A	N/A

Note: \*PBT and EPS are normalised, excluding intangible amortisation and exceptional items.

### Investment summary: High-quality iron ore play

Zanaga Iron Ore Company (ZIOC) owns a 50% less one share interest in the Zanaga iron ore project (ZIOP) located in Congo (Brazzaville). ZIOP boasts 4.3bn tonnes of JORC resource and FS being undertaken by Xstrata, which gained full management control in Q111. ZIOP is expected to deliver its first ore in 2017 with the subsequent ramp-up to capacity by 2018. While execution risk is low, we see a clear exit strategy as ZIOC's interest in the project will either be bought out by Xstrata or a strategic partner, or in the worst case diluted to c 18% in a fully funded project.

### Large-scale resource, sound project economics

ZIOP's resource has been recently upgraded to 4.3bn tonnes at 33% iron (Fe), placing it among the largest iron ore projects in the region. While the feasibility study (FS) is underway, two development options – a 45mt railway and a 30mt slurry pipeline – were identified, with capex estimates ranging from US\$6.1bn to US\$7.5bn. The project has capital intensity in line with its peers though and is expected to deliver a premium product similar to Brazilian fines, with an Fe grade of at least 65% by 2017. With an estimated FOB cash cost below the US\$22/t level (including contingency), ZIOP will be positioned in the first quartile of the global cash curve.

### Beneficial joint venture agreement

ZIOC's relationship with Xstrata is regulated by the JV agreement, which we believe is beneficial for the company and its minority shareholders as it substantially limits valuation downside and provides a clear exit strategy. Based on our estimates, in the worst case scenario of ZIOC's full dilution at an NPV, its interest in the project is unlikely to drop below c 18% in a fully funded project.

### Valuation: 243% upside to NPV, downside protection

We value the project based on an NPV indicating 243% upside for our base case mine-railway-port scenario. We also provide ZIOC's valuation based on the pipeline route and JVA terms, both yielding a similar value. We like the stock as we believe that the established JV agreement substantially limits valuation downside, while Xstrata's involvement and the project's compelling economics underpin the company's appeal.

Price 110p  
Market Cap £308m

#### Share price graph



#### Share details

Code ZIOC  
Listing AIM  
Sector Metals and Mining  
Shares in issue 280.4m

#### Price

52 week High Low  
222.2p 72.0p

#### Balance Sheet as at 30 June 2011

Debt/Equity (%) N/A  
NAV per share (c) 88.8  
Net cash (US\$m) 48.5

#### Business

Zanaga Iron Ore Company (ZIOC) manages its 50% less one share in the Zanaga iron ore project located in Congo Brazzaville. ZIOP, which has JORC resources of 4.3bn tonnes at 33% Fe and is expected to deliver first production in 2017, is managed by Xstrata, which has recently brought it to the FS stage.

#### Valuation

	2010	2011e	2012e
P/E relative	N/A	N/A	N/A
P/CF	N/A	N/A	N/A
EV/Sales	N/A	N/A	N/A
ROE	N/A	N/A	N/A

#### Revenues by geography

UK	Europe	US	Other
N/A	N/A	N/A	N/A

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## Investment summary: High-quality iron ore play

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### Company description: A large-scale iron ore project in Congo

ZIOC owns a 50% less one share stake in the Zanaga Iron Ore Project (ZIOP) managed by Xstrata, which holds the remaining 50% plus one share interest. Located in the Republic of Congo Brazzaville, ZIOP has a JORC resource of 4.3bn tonnes at 33% Fe and has recently been brought to the FS stage with the completion due in Q114. The project is expected to deliver its first production in 2017 with the subsequent ramp-up to full capacity of 30mt or 45mt (depending on the transport route) of saleable product by 2018. Accordingly, overall capex is estimated at US\$6.1bn or US\$7.5bn, suggesting capital intensity of US\$202/t and US\$168/t respectively, which is broadly in line with its West African peers. Based on the current pre-feasibility cash cost estimates, the project will be positioned in the first quartile of the global FOB cash cost curve.

### Xstrata JV: A win-win deal for minorities

We believe that the Joint Venture Agreement (JVA), regulating the relationships between Xstrata and ZIOC, is highly beneficial for both ZIOC and its minority shareholders as it substantially limits valuation downside. Assuming that the project goes ahead, we see three most likely scenarios: 1) Xstrata buys out ZIOC at an NPV post the FS (best case); 2) ZIOC's interest in the project is reduced through the acquisition by a strategic partner in the next two years; or 3) ZIOC is diluted at an NPV (worst case). While we believe that Xstrata may be interested in eliminating the significant minority interest and splitting the capex, our worst case scenario (ZIOC not investing in the project) suggests that ZIOC's share in the project will only be diluted to c 18%.

### Valuation: A 243% upside to NPV, downside protection

We value ZIOP based on an NPV applying a 25% discount to ZIOC's attributable value to account for the lack of control. Our base case valuation of US\$1.7bn (railway route) is 243% above the current market. We also provide ZIOC's valuation based on the pipeline scenario and JVA terms subsequently testing our NPV to changes in the benchmark iron ore price, capex and cash costs. In general, given the relatively low execution risk, the project's compelling economics and the highly protective JV agreement, we consider Zanaga as an attractive investment in the African iron ore space. Based on our NPV estimate, we believe that the JV agreement substantially limits the downside risk, effectively providing a floor to the company's valuation, while the potential sale to the strategic partner or Xstrata's buyout represents additional upside.

### Sensitivities: Iron ore price is a key risk

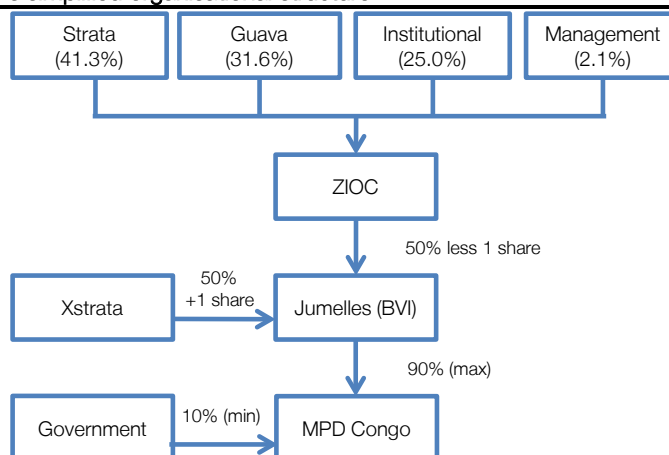
Given the high NPV sensitivity to commodity pricing, iron ore market conditions represent the major risk (both upside and downside) to our valuation. Our analysis suggests that the iron ore market is likely to move into oversupply in the medium term as we see at least 0.7bn tonnes of low-cost iron ore potentially coming from Australia, Brazil and Africa. We therefore expect structurally lower prices in the long run as high-cost balancing iron ore supply from China will be eventually removed from the market. On the upside, we believe that Xstrata's involvement in the project substantially reduces its execution risk, with Congo's abundant energy supply and the project's strong management team and compelling economics being additional positives.

## Company description: JV with Xstrata

Zanaga Iron Ore Company (ZIOC) was initially formed to manage the development of a large-scale Zanaga iron ore project, which is located in the Republic of Congo (Brazzaville) and has potential to deliver up to 45Mt of iron ore by 2017. Following the exercise of a 50%+1 share option in Q111, Xstrata has gained operational control over the project with the respective commitment to fully fund the completion of a feasibility study by Q114. ZIOC remains focused on managing its minority stake in the Zanaga project and monitoring the execution of the FS.

ZIOC holds a 50% less one share effective interest in ZIOP, which comprises two exploration licences in the Republic of Congo being held by ZIOC's subsidiary Mining Project Development Congo (see Exhibit 1) domiciled in Congo Brazzaville. The Zanaga licence area (500 square km) is approximately 250km north-west of the capital Brazzaville and some 300km north-east of Pointe Noire (the proposed location of the deep water port). Both licences will have to be extended for another two years in May 2012, which we believe is likely to happen, given the project's timely execution and significant capital commitments to the country. The remaining 50% plus one share in ZIOP is controlled by Xstrata, which manages the project and has the right to acquire ZIOC's interest in the project at the end of the FS. Once the project is advanced to the exploitation stage (which is not expected before 2014 though), the Congolese government will be entitled to not less than a 10% interest in the project subject to direct negotiations with the company.

**Exhibit 1: Group's simplified organisational structure**



Source: Zanaga Iron Ore Company, Edison Investment Research

## Xstrata deal: 50%+1 share option exercised

In October 2009, ZIOC and Xstrata entered into a call option agreement for the acquisition of a 50% plus one share interest in the Zanaga Iron Ore Project. In February 2011, Xstrata exercised this option, effectively gaining full operational and management control over the project in return to funding a FS in accordance with international best practice. Following the option exercise, Xstrata's and ZIOC's working relationships have been governed by the Joint Venture Agreement (JVA), which among other things granted Xstrata the right to exercise another option (Second call option) acquiring the remaining 50% less one share interest in the project. The two options and JV agreement are discussed in more detail below.

**First call option.** The first call option was granted in 2009 and exercised in February 2011 with Xstrata getting a 50% plus one share stake in ZIOP. By exercising the option Xstrata opted to fully finance the FS, which is expected to be completed no later than Q114. The PFS cost, which was partly funded by ZIOC using the proceeds from the call option premium, amounted to US\$106m. The FS should require an additional US\$250m in financing to be spent by Xstrata. The exercise of the call option by Xstrata triggered the implementation of the JVA governing the working relationships between Xstrata and ZIOC.

**Second call option.** According to the JVA, within 90 business days after the completion of the FS, Xstrata has the right to exercise the second option acquiring all the remaining 50% less one share in the Zanaga project from ZIOC. If an offer price is rejected by ZIOC, an independent valuation based on the project's NPV will be determined. The JVA stipulates that an independent NPV is calculated based on the assumptions taken from the FS, using the average FOB iron ore price forecasts from AME and CRU, discounting the real cash flow at a 10% real rate and making no discount to the NPV.

If Xstrata decides not to exercise the second option, ZIOC will have to either co-finance the construction of the project (which we consider a highly unlikely scenario, given the scale of the project), or be diluted at an NPV. We note though that even if ZIOC is fully diluted, ie the company is not spending a dollar on the project following the completion of the FS, according to the specified formula and based on our own NPV calculation, the company's interest in the project (therefore fully funded by Xstrata) will only be reduced to c 18% from the current 50%.

## Search for a strategic partner

Both Xstrata and ZIOC have recently initiated a search process for a strategic partner, which is expected to enhance the project's value through a commercial off-take agreement and access to the construction expertise and financing. While Xstrata plans to retain its current interest in the project, we understand that ZIOC's stake may be reduced (potentially to zero) once the strategic partner has been found. From the Xstrata standpoint, ZIOC's replacement is positive as it will allow it to split the multibillion dollar capex, thereby reducing the project's risks as well as avoiding the execution of the JVA, which, as we mentioned above, is beneficial for ZIOC. While there is a clear risk that the strategic sale may take place below our NPV estimate, we believe that ZIOC is unlikely to compromise on the valuation of its stake in the project, especially given the terms of the outstanding JV agreement. Moreover, any potential sale of ZIOC's stake to the strategic partner would mean an earlier exit point for the company's shareholders.

## Resource and geology: Scope for a large-scale iron ore project

The company published its maiden JORC compliant resource of 3.3bn (increased to 4.0bn in April 2011) and recently upgraded to 4.3bn tonnes with an average Fe grade of 33.0% based on 126,000m drilled. Drilling is ongoing, with approximately 190,000m expected to be completed by the end of 2012 in order to fulfil FS requirements. The resource has been classified into measured, indicated and inferred categories, with 60% of the resource in the measured or indicated categories. Notably, the announced mineral resource has been derived from only 25km of the 47km strike length of known mineralisation. On top of this, the average depth of the mineralisation used to calculate the resource is only 300km, and there is a strong indication that the main limbs

are open at depth suggesting that there is potential to increase resource over the currently targeted 25km strike.

**Exhibit 2: Zanaga's resource statement**

Classification	Mt	Fe, %	SiO <sub>2</sub> , %	P, %	Al <sub>2</sub> O <sub>3</sub> , %	Mn, %	LOI, %
Measured	149	38.7	39.1	0.0	2.4	0.093	1.2
Indicated	2,540	34.1	43.6	0.050	2.8	0.112	1
Inferred	1,650	31.0	46.0	0.050	4.0	0.1	2.0
<b>Total</b>	<b>4,339</b>	<b>33.0</b>	<b>44.3</b>	<b>0.049</b>	<b>3.3</b>	<b>0.114</b>	<b>1.3</b>

Source: Company data, Edison Investment Research

The Zanaga deposit is located within a Precambrian greenstone belt in the eastern part of the Chaillu Massif in South Western Republic of Congo. The belt trends north-south and extends for over 47km in length and is typically 0.3km to 5km in width. The iron bearing lithologies within the deposit consist of itabirites/BIF interbedded with basic lavas. The magnetic itabirite has a sharp north-south trend dipping moderately to the east. The hematite enrichment cap was formed as a result of the weathering and secondary enrichment of the itabirite/BIF, which led to the development of a number of types of iron enriched lithologies within the itabirites. The weathering profile is typically 60-70m thick and comprises six main lithologies varying in Fe content of 30-46%.

## Project overview: Up to 45Mtpa iron ore capacity

Following the completion of the PFS and Value Engineering Exercise (VEE), two main routes to advance the project to production were identified, namely mine-rail-port and mine-pipeline-port. The former option, explored in the scoping study, assumes project capacity of 45mtpa with the saleable product transported by the railway to the port, whereas the latter, identified during the VEE, has a capacity of 30mtpa of pellet feed moved by a slurry pipeline and shipped from the port near the Pointe Noire. Below we discuss the two options in more detail:

**Mine-Rail-Port.** This option assumes the development of an open-pit mining operation with a nearby concentrator producing saleable product (sinter feed/concentrate), which will be transported by a 350km railway link to a deepwater port facility located near Pointe-Noire on the Atlantic Ocean. It is expected that on average 118mtpa of ore will be treated through the two processing plants to produce 30mtpa of magnetite concentrate and 15mtpa of hematite sinter feed. Mining operation assumes the initial production from the higher grade (>40% Fe) hematite ore thereafter replaced by the lower grade (>30% Fe) BIF. The development of the mine-rail-port project is expected to cost US\$7.5bn over a three-year construction period with the nameplate capacity of 45mt of saleable product achieved over a further three years. Following the completion of the VEE, the FOB operating cost for the project is estimated at US\$20/t, excluding a US\$2/t contingency.

**Mine-Pipeline-Port.** In addition to the original railway scenario, during the VEE phase the pipeline option was revisited to allow for the higher flexibility in project execution. It assumes that initially 30mtpa of pellet feed will be produced from an average 75mtpa of combined hematite/magnetite ore, which will be treated through a single integrated processing plant. The pellet feed product will be transported via a slurry pipeline to the port site to the north of Pointe Noire. The mine life is expected to be in excess of 30 years, with significant potential to expand the production profile and

to enhance the project's value. ZIOC estimates overall capital cost under this scenario at US\$6.1bn (assuming US\$1.2bn in cost savings), while FOB opex is seen at US\$16/t level excluding a US\$5/t contingency.

**Exhibit 3: Preliminary capex estimates by Xstrata and ZIOC (US\$m)**

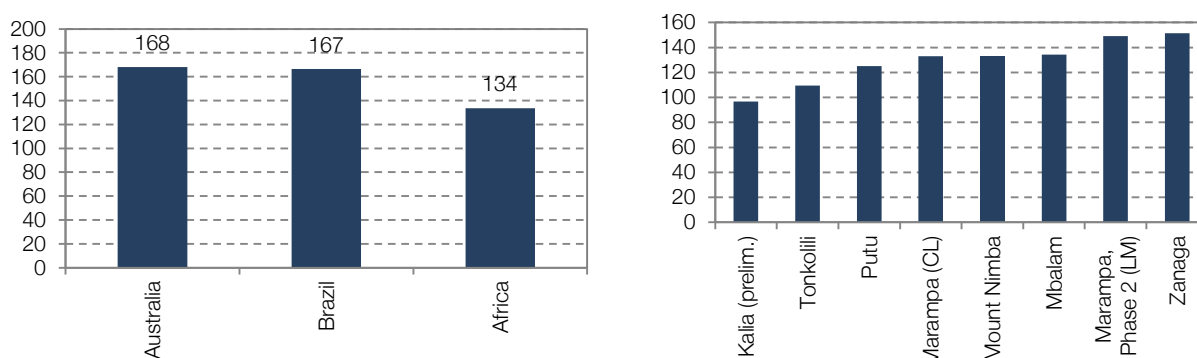
	Railway	Pipeline
Mine site and plant	2,764	2,274
Transport Corridor	2,010	1,096
Port	573	484
Power	550	564
<b>Total direct cost</b>	<b>5,897</b>	<b>4,418</b>
Indirect cost (incl. head office, EPCM)	915	1,216
Contingency	734	1,627
<b>Total cost</b>	<b>7,546</b>	<b>7,261</b>
ZIOC identified cost savings (indirect and contingency)	0	1,200
<b>Total cost post ZIOC adjustment</b>	<b>7,546</b>	<b>6,061</b>
Capital intensity (total cost post ZIOC adjustment)	168	202
Capital intensity (total cost excluding contingency)	151	188

Source: Zanaga Iron Ore Company, Edison Investment Research

While we consider the mine-pipeline-port capex of US\$7.3bn as overly conservative, especially given the US\$1.6bn (22% of total cost) in contingency, even the lower capital cost of US\$6.1bn, which takes into consideration substantial savings identified by the ZIOC project team, suggests its higher capital intensity compared to the railway scenario. However, this should be offset by the lower operating cost, shorter lead time and ramp-up period, which means that the project's return on capital is unlikely to suffer.

On a relative scale, Zanaga's mine-rail-port capital intensity is broadly in line with the similar African operations, one of them being the Marampa project (London Mining), with capex per tonne of US\$149/t for the 16mtpa sinter/pellet feed operation based on a 42km pipeline. While we believe that overall capital budgets in the region will be on the rise, African iron ore projects on average should have capital intensity on par with the large-scale greenfield projects in Australia and Brazil. To this end, we note CITIC's 28mtpa Sino Iron project (US\$186/t), API's 30mtpa West Pilbara (US\$190/t) as well as 15mtpa Ridley project by Atlas (US\$195/t), all of which require substantial investment in infrastructure. In turn, Zanaga's mine-pipeline-port capital intensity is comparable to the similar scale international projects, such as AngloAmerican Minas-Rio Phase 1 (US\$190/t), which will pump pellet feed through a 500km slurry pipeline.

**Exhibit 4: Regional capital intensity of new iron ore projects and comparative capital intensity of African projects (US\$/t)**



Source: ABARE, Company data, Edison Investment Research

## Infrastructure: Pipeline versus rail

The overall infrastructure capex (transport, port, power) is estimated at US\$3.1bn under the railway option and US\$2.1bn under the pipeline scenario, with the latter benefiting from the lower cost of pipeline construction (although having a lower throughput). On top of this, for the pellet feed the project will only need to utilise one processing plant, while the mine-rail-port scenario assumes construction of two separate concentrators to produce sinter feed and concentrate.

**Railway versus slurry pipeline.** The initial plan of building the railway has recently been reviewed, bringing in the slurry pipeline as a new viable option, potentially reducing both capex (in absolute terms) and opex for the project. Compared to the railway, which is expected to move the saleable product c 350km to the sea port, the slurry pipeline will likely to extend for c 300km connecting the mine site with the same deepwater sea port. Given the relative complexity of the railway construction (some 49 bridges for a total length of 7,900m will have to be built), the pipeline may not only lead to lower capital cost, but substantially reduce the project's lead time. We therefore believe that the pipeline route is likely to be finally executed. That said, we understand that Xstrata intends to undertake a more detailed study refining this option and its costing before finally deciding which infrastructure solution to take through the FS.

The **deep water port** is the final leg in the Zanaga project supply chain. It is expected to be built approximately 9km from the current port facility of Pointe Noire and will be capable of berthing cape size vessels. The port location has a number of advantages, such as natural headland protection, which removes the need to build the breakwater, minimal dredging and only a 1.6km trestle to access water with a depth in excess of 20m. Post the completion of phase 1 the port will be capable of loading 180,000 DWT ships, while phase 2 will upgrade the port facilities to accommodate 250,000 DWT vessels.

Following the release of the VEE, Xstrata is committed to complete the FS by Q114, potentially bringing the project to the construction decision. The construction stage is expected to take two to three years depending on which infrastructure Xstrata decides to proceed with.

### Exhibit 5: Zanaga's project execution timeline

May 07 - Dec 08	Exploration licence granted, airborne magnetic survey, mapping and limited drilling undertaken
Feb 09 - Sep 09	Conceptual study completed, Order of magnitude study completed, PFS funding raised
Oct 2009	Option agreement with Xstrata concluded to fund the Phase 1 of the PFS (US\$50m)
Feb 2010	Xstrata agreed to fund Phase 2 of the PFS
Nov 2010	ZIOC's IPO on AIM raised US\$50m
Feb 2011	PFS is completed, Xstrata exercised first option taking over control and management
April 2011	Maiden JORC resource of 3.3bn upgraded to 4.0bn
Oct 2011	PFS and Value engineering exercise (Phase 1 of the FS) results released
Mid-2012	Pipeline study
Q114e	Completion of the FS, construction to commence (three year construction period)
Q1/Q214e	Xstrata potentially exercises the second option, moving to full control
2016/17e	Project commissioning, first ore production and shipment

Source: Zanaga Iron Ore Company, Edison Investment Research

## Product quality

ZIOP is believed to have a saleable product quality similar to that of the Brazilian Itabira fines with Fe grade of about 65% and above, a substantial premium to the Australian reference fines. While

there is no up-to-date information on the Fe content and deleterious elements for the project's pipeline scenario (pellet feed), the PFS Stage 1 suggests that the project's saleable product under the railway scenario (sinter feed/concentrate) would have Fe content close to 65% and both silica and alumina below the Australian Hamersley fines. We believe that the pellet feed will likely have either similar or even better qualities, suggesting a premium pricing. In general, low chemical impurities and high Fe grade lead to better steelmaking efficiency. Thus, a 1.5% decrease in silica content reduces slag volume by 65kg/t of pig iron, while an additional 100kg of slag increases fuel consumption by 40kg of coke per tonne of pig iron. For the grade, an increase of one Fe wt% results in a 2% productivity gain and a 3% reduction in coke usage.

**Exhibit 6: Zanaga's preliminary iron ore product specifications compared to benchmark ores (%)**

	Zanaga	Hamersley fines	Itabira fines	Indian spot materials
Iron	66.0+	62.5	65.8	63.5
Silica	2.0-4.5	7.0	3.8	3.5
Alumina	<1.5	2.5	0.8	3.0
Phosphorous	<0.05	0.07	0.04	0.10
Sulphur	N/A	0.05	0.03	0.05

Source: Zanaga Iron Ore Company (after CRU), Edison Investment Research

## Experienced management team led by Xstrata

The company managed to build a highly-experienced project team with a proven track record of developing large-scale, exploration-stage mining projects. While Xstrata is the operator, we understand that it works closely with ZIOC's team on advancing the Zanaga project.

### Key ZIOC technical personnel:

**Colin Harris, former Project director.** Mr Harris has more than 40 years of experience in geological exploration working for major international mining companies including Anglo American, Cominco and most recently Rio Tinto. At Rio Mr Harris managed multi-million dollar world class projects including the Simandou iron ore project in Guinea, which was taken from grass roots to PFS and then handed over to Rio Tinto iron ore group. Mr Harris heads the ZIOC technical team.

**Gary Vallerius, CFO.** Prior to joining the group, Mr Vallerius spent 19 years managing all aspects of the financial control and reporting for all of Rio Tinto's African and European exploration projects.

## Risks to our valuation

The iron ore market supply/demand balance, pricing and execution are the main risks attached to the project in general and the company in particular. We would not completely ignore the country risk, although Congo seems to be fairly stable from a political and economic standpoint. On a positive note, we cannot overestimate the benefits of Xstrata's participation in the project, with the global mining major bringing the required expertise and financial backing. We note that among other things Xstrata's involvement will help to keep the project's execution within the specified timeframe as we see the equipment lead times in the industry increasing substantially.



## Iron ore market and pricing

In the long term the iron ore market environment is the main risk (both upside and downside) for the company, as the Zanaga project has relatively long lead time and its NPV is very sensitive to the commodity price assumptions and any variations in production volumes.

## Execution and funding

We consider both execution and funding risks as relatively minor, given Xstrata's involvement in the project and no financing commitment from ZIOC. Nevertheless, if the iron ore market conditions significantly worsen, the Zanaga project may be put on hold. However, based on our conservative estimates, Zanaga has enough valuation headroom to get the green light even if the iron ore price continues to fall adjusting to new supply.

## Dilution

Under the current JV agreement, value dilution is not a major issue, as our calculations suggest that even if the company (ZIOC) does not invest in the project, its stake will only be diluted to c 18%. We nevertheless believe that this extreme scenario is unlikely to materialise as Xstrata will most likely execute the second option, buying out the remaining 50% less one share in the project at an NPV post the FS, or ZIOC's stake will be acquired by the strategic partner.

## Country risk

Having emerged from the civil war, Congo has since been showing relatively stable economic growth (real GDP grew 10% in 2010 and is expected to grow 8% in 2011). The country is a functioning democracy with the rule of law based on the French Civil Code. Congo's economy is strongly dependent on the oil industry with major international firms, including Total and ENI, carrying out exploration and commercial production in the country. That said, despite the relatively friendly investment climate, the country may not be fully immune to the mounting resource nationalism pressures, which are becoming increasingly visible in some African countries. As such, there is some risk that both Zanaga and ZIOC will end up losing more than 10% in the project in favour of the Congolese government.

## Energy sufficiency and cost control

One of the upside risks for Zanaga is the ability to control energy costs due to the Republic of Congo's abundant energy supply. The country, with an economy dominated by off-shore oil, has an excessive electricity capacity that is likely to grow further. Italian ENI built a 150MW power plant at Pointe Noire with some 100MW of spare capacity. This may potentially be brought to 700MW, which bodes well for Zanaga, helping it to keep cash production costs under control.

## Valuation and key model assumptions

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We employ an NPV methodology to value the Zanaga project and ZIOC's 50% respective stake in it. Our major assumptions regarding the project's production profile, costs, product qualities, etc, were sourced from the Phase 1 of the PFS (provided at IPO) and updated in accordance with the recently released full PFS and VEE data. In addition to our base case valuation (which rests on the mine-railway-port scenario), we looked at the project's valuation assuming the implementation of a

pipeline scenario as well as the valuation implied by the XTA shareholder agreement. We also provide a detailed sensitivity analysis to test our model and NPV with the respective changes in benchmark iron ore pricing and capex assumptions, which along with the production volumes appear to be the major sensitivities for ZIOP's valuation.

Our **base-case valuation** of the Zanaga project is US\$4.3bn in current money terms (discounted to FY11 at 10% to account for the opportunity cost of capital). In our valuation we used a 10% nominal discount rate and applied a 25% haircut to ZIOC's attributable value to account for the lack of control, as the project is effectively managed by Xstrata. It implies ZIOC's attributable value of US\$1.7bn or US\$6.0 per share (£3.8/share).

If Xstrata proceeds with the **pipeline option**, we estimate the project's NPV at US\$4.2bn (current money terms). We assigned additional value to the remaining resource (at Zanaga's current US\$0.55 per tonne of contained Fe multiple) to account for the potential longer life of mine under the pipeline scenario. While mine-pipeline-port project has lower annual capacity, it is offset by lower absolute capex and opex. In addition, we note that the pipeline option has a shorter lead time, which has a positive impact on the project's present value.

Finally, we looked at the project's valuation **implied by the JV agreement**. In line with the JVA, we used the FS assumptions, a 10% real discount rate (12.5% nominal), an average CRU/AME price deck (which appears to be broadly in line with our base case netback price for the project). Based on these assumptions, we derived the project's NPV of US\$3.1bn, which translates into a US\$1.6bn value for ZIOC's 50% stake. We did not apply any discount for the lack of control, nor did we assign any additional value to the remaining resource.

**Exhibit 7: Summary of Zanaga's NPV valuation (US\$m)**

	Railway route (base case)	Pipeline route	Based on JVA
PV of discounted FCF (FY16 railway, FY15 pipeline/JVA)	6,975	5,526	4,571
<b>Discounted to FY11 (@10%)</b>	<b>4,331</b>	<b>3,774</b>	<b>3,122</b>
Add value of the remaining resource (@ current US\$0.61/t mult.)	0.0	428	0.0
<b>Zanaga NPV</b>	<b>4,331</b>	<b>4,202</b>	<b>3,122</b>
Value attributable to ZIOC (@50%)	2,166	2,101	1,561
Less 25% discount for no control	541	525	0
Add cash	48.5	48.5	48.5
<b>ZIOC's implied value</b>	<b>1,673</b>	<b>1,624</b>	<b>1,609</b>
Shares in issue (m)	28.0	28.0	28.0
Value per share (US\$)	5.97	5.79	5.74
<b>Value per share (£)</b>	<b>3.78</b>	<b>3.67</b>	<b>3.63</b>
Current share price (£)	1.10	1.10	1.10
Upside / (Downside)	243%	233%	230%

Source: Company data, Edison Investment Research

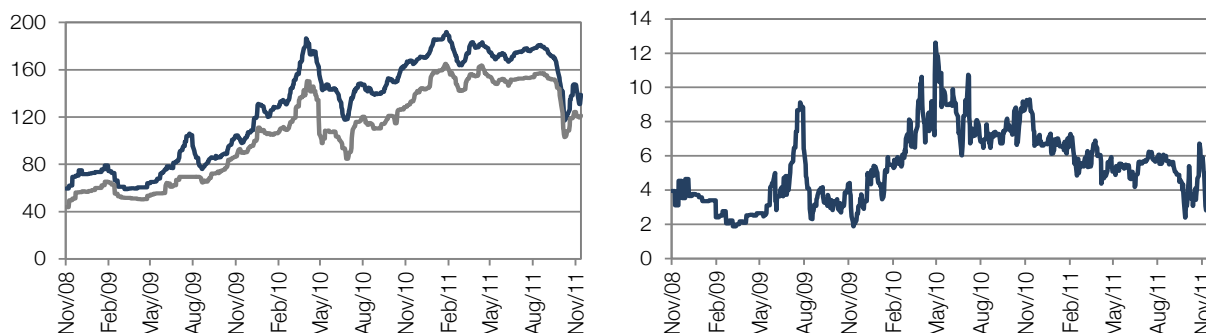
**Our NPV valuation is based on the following assumptions:**

**Iron ore price and netback.** We use a nominal long-term iron ore benchmark price of US\$70/t (equivalent to US\$1.29dmtu for 62% Fe Hamersley fines), which is based on the third quartile FOB cash production cost increased by a 20% margin to account for the required rate of return needed to incentivise producers to invest into new capacity. To arrive at ZIOP's netback price of US\$86/t we make an indicative US\$16/t value-in-use adjustment (based on the current market premium for one Fe unit), which reflects ZIOP's higher grade, but does not take into account its lower silica and

alumina impurities compared to the reference price. We also note that VIU for the pipeline scenario will likely to be higher as pellet feed could have higher Fe grade and lower impurities (Exhibit 6).

It appears that the market applies a higher premium for Fe units contained in the ore than it would otherwise imply by using the traditional pricing mechanism. Among other things, this discrepancy reflects the prevailing iron ore supply demand situation. We calculate that over the last three years 62% Fe fines (CIF China) have been trading at an average premium of US\$5.4 per Fe unit compared to the 58% Fe grade product.

**Exhibit 8: Spot iron ore price CIF China (58% versus 62% Fe), US\$/t; Historical premium for Fe unit (US\$ per Fe unit)**



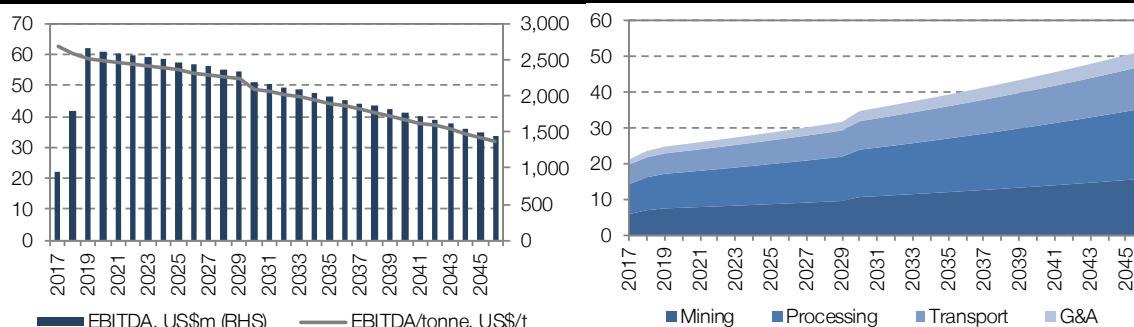
Source: Bloomberg, Edison Investment Research

**Production and capacity roll-out.** By and large, we used similar assumptions on production capacity and flow as were previously produced either by the PFS (for the railway route) or the VEE (the pipeline option). Given the FS timing (not later than Q114e) and a three-year construction period, we have conservatively chosen to shift the production start for the mine-railway-port option by one year to 2017e, leaving the capacity roll-out profile the same. The pipeline option will likely to have shorter lead time though, with production realistically commencing in 2016e. While the project's capacity has a significant impact on its valuation, the pipeline route has potential to extend the life of mine beyond the initial 30 years further enhancing the project's value. We account for this by assigning additional value to the project's remaining resource.

**Cash cost and margins.** The PFS estimates Zanaga's life of mine unit cash production cost under the railway scenario at US\$23/t (excluding US\$2/t in contingency), while the VEE indicates US\$3/t in additional savings, which translates into US\$20/t cash cost. With an estimated unit FOB cash cost of US\$16/t (excluding US\$5/t in contingency), the railway option benefits from the lower mining cost (thanks to the significantly lower strip ratio), transportation expense and port handling. Both cost estimates would put the project in the first quartile of the global FOB cash cost curve. Given the mining industry cost pressures, we have chosen a rather conservative approach of inflating Zanaga's unit cash cost on the back of the flat commodity price. We believe this brings the project's abnormally high EBITDA margin at the inception (we estimate US\$63/t or 75%) to more realistic mid-cycle levels of c US\$45/t (55%) through its life cycle. But even in this extreme case the project has enough headroom to remain profitable, which in our view underscores Zanaga's compelling economics. As such, we see the total unit cash cost under the railway scenario rising from US\$24/t (based on VEE inflated at 3%pa) to US\$52/t (2046e). In a similar fashion, the pipeline scenario unit cash cost increases from US\$19/t to US\$37/t. While we believe that Zanaga will not

be immune to the industry-wide cost escalation, we note that Congo enjoys relatively moderate inflationary pressures with an annual CPI below the 5% level.

**Exhibit 9: Zanaga estimated base case EBITDA and EBITDA/t (Left) versus unit cash cost (US\$/t) performance**



Source: Edison Investment Research

**Capital cost.** In line with the post-VEE estimate, we assume an overall capex for the mine-railway-port project of US\$7.5bn. For the pipeline route we used a “clean” capital cost of US\$6.1bn as it seems that Xstrata’s contingency estimate might be overinflated. We assume that c 75% of the overall capex is spent upfront, with the remainder being invested over the ramp-up period.

**Exchange rates, taxation.** We take no account of potential currency moves as we model all costs in the US dollar, therefore assuming flat US\$/XAF exchange rate for the project. While this is not our preferred approach (normally, almost all cash costs in mining are denominated in local currency, while prices are dollar denominated), it might be justified by the fact that we use flat commodity price. On the tax side, we stick to 30% statutory tax rate and use a 3% royalty.

## Sensitivity and value realisation scenarios

We see three most likely scenarios of value realisation for ZIOC shareholders: 1) ZIOCs’ 50% stake is brought-out by Xstrata at an agreed NPV; 2) ZIOC’s stake is reduced through a sale to a strategic partner; or) full dilution at an NPV. In general, we believe that the project’s execution risk is low as its NPV has enough headroom to get the green light even if iron ore prices continue to fall and cost pressures persist. We also note that the Zanaga project is, by far, Xstrata’s main option to enter the iron ore market (Sphere’s JV is too small to compete), which significantly increases the chance of the project being executed. As such, we view the scenario where Xstrata (or another strategic partner) buys out ZIOC’s remaining 50% stake in ZIOP as the most probable, as we believe that the company will eventually be looking to split the project’s cost and/or to eliminate the significant non-investing minority. While the potential sale to the strategic partner may come in below an NPV, we note that ZIOC is unlikely to compromise on the valuation as it has an advantageous JVA in place. Finally, our analysis suggests that even if Xstrata decides not to exercise the second option and ZIOC does not finance its share of capex, ZIOC’s 50% stake will only be diluted to c 18% in a fully funded project. We believe this provides floor to ZIOC’s valuation.

Below, we show a sensitivity analysis of our base case NPV valuation to changes in the discount rate and capex. Based on our estimates, a 14% increase in the benchmark iron ore price (from US\$70/t to US\$80/t) would lead to a 37% increase in the project’s NPV, while a 13% growth in capex (from US\$7.6bn to US\$8.6bn) would reduce the NPV by 13% (discount rate and iron ore price deck being the same). As with all mining projects, Zanaga’s valuation is sensitive to changes

in cash costs with an estimated 10% increase in the overall unit cash cost across the curve resulting in a 12% decline in our base case NPV and vice versa. Finally, given its relatively low cost of capital, we believe that Xstrata may value the project using a discount rate below our base case nominal 10% rate (and hence 10% real rate stipulated by the JVA). We estimate that a 2.5pp reduction in the discount rate to 7.5% (nominal) would increase project's value by c US\$2.0bn.

**Exhibit 10: NPV sensitivity to changes in discount rate and benchmark iron ore price (US\$m)**

		Benchmark iron ore price, US\$/t					
		50	60	70	80	90	100
Discount rate	5.0%	4,029	6,766	9,504	12,241	14,978	17,716
	7.5%	2,300	4,367	6,435	8,502	10,569	12,637
	10.0%	1,090	2,711	4,331	5,952	7,572	9,193
	12.5%	215	1,526	2,836	4,147	5,457	6,768
	15.0%	-437	651	1,738	2,826	3,913	5,001

Source: Edison Investment Research

**Exhibit 11: NPV sensitivity to changes in capex and benchmark iron ore price (US\$m)**

		Benchmark iron ore price, US\$/t					
		50	60	70	80	90	100
Capex, US\$m	5,550	2,213	3,834	5,454	7,075	8,696	10,316
	6,550	1,652	3,272	4,893	6,513	8,134	9,754
	7,550	1,090	2,711	4,331	5,952	7,572	9,193
	8,550	528	2,149	3,770	5,390	7,011	8,631
	9,550	-33	1,587	3,208	4,828	6,449	8,070

Source: Edison Investment Research

## Peer valuation

While we do not employ this approach for Zanaga, we nevertheless believe it is worth taking a closer look at comparable pre-production iron ore companies' EV/Resource valuation. Zanaga trades at a discount to London Mining and Sundance, which both have more advanced projects, but broadly in line with African Minerals. The latter is developing a large-scale near-term project in Sierra Leone and has China Railway Materials as an anchor investor owning 12.3%. We believe ZIOC's strong differentiating point is an established relationship with Xstrata, which is expected to provide the necessary financing and expertise, substantially reducing the project's execution risk and improves its visibility. This, as well as the clearly outlined JVA, which provides valuation floor, makes Zanaga an attractive play on the West African iron ore story.

**Exhibit 12: African iron ore universe valuation**

Note: Priced at 08 December 2011.

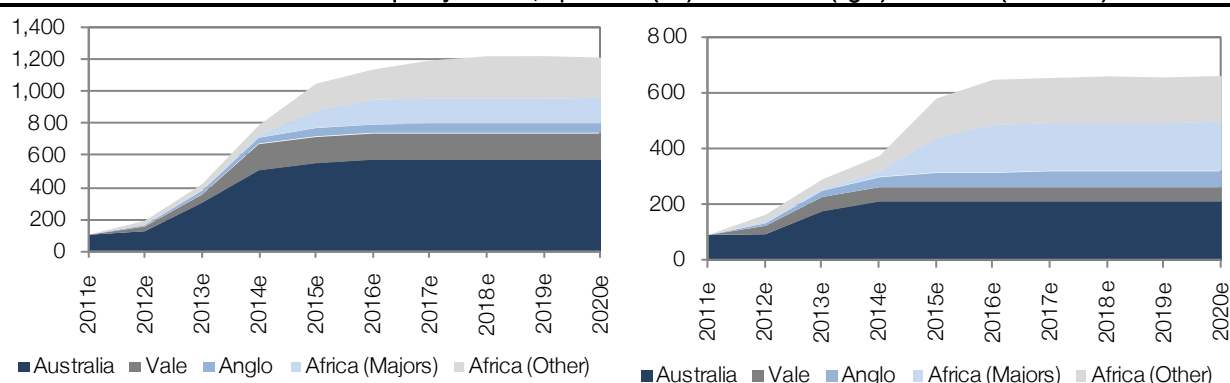
	Price, US\$	Mcap, US\$m	EV, US\$m	Attributable Resource (Mt)	Fe, %	Contained Fe (Mt)	EV/Resource
African Minerals	7.0	2,288	1,870	12,851	31.2%	4,010	0.47
Sundance	0.4	1,103	1,031	2,306	42.2%	973	1.06
London Mining	5.0	566	590	2,106	33.1%	697	0.85
Sphere	2.6	442	442	3,521	33.4%	1,175	0.38
Zanaga	1.7	482	434	2,170	33.0%	716	0.61
Bellzone	0.4	279	49	4,026	24.0%	966	0.05
Afferro	0.7	68	41	2,666	33.9%	904	0.05
<b>Weighted average</b>							<b>0.61</b>

Source: Company data, Bloomberg, Edison Investment Research

## Iron ore market: Prices to fall in the long run

Looking at the iron ore supply-demand balance in the long run, we believe that the risks to iron ore pricing remain on the downside. We estimate that if all the approved and announced greenfield and expansion projects in the industry are executed, some 1.2bn tonnes of incremental iron ore capacity might hit the seaborne market by 2020. More conservative analysis (taking into consideration projects that have already been approved or under construction) suggests that potential supply-side response may reach 0.7bn tonnes. Out of this amount, some 51% may come from Africa with the global majors accounting for c 27% of new capacity. Australia will continue to dominate the seaborne market with almost a 32% contribution to new supply based on the conservative scenario and 47% under the optimistic scenario.

**Exhibit 13: Global seaborne iron ore capacity roll-out, optimistic (left) and realistic (right) scenarios (m tonnes)**



Source: ABARE, Company data, Edison Investment Research

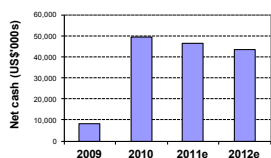
On the demand side, China will continue to drive iron ore consumption higher. If the trend established in 2001-10 remains intact, by 2020 China's apparent steel demand will likely to exceed c 1.0bn tonnes (6% 2020/10 CAGR compared to 16% for 2010/01) implying some 0.7bn of the incremental iron ore consumption. In 2011, China's apparent steel consumption is expected to reach 605mt or c 450kg per capita. We believe there is a fair chance for China's steel demand to settle in the 600-700t per capita range in the medium to long term.

All in all, the iron ore market is likely to move into oversupply in the medium term, as supply growth may finally outpace demand, leading to structurally lower iron ore prices. Easing supply-side constraints should bring China's domestic iron ore production down as high-cost balancing ore will be replaced by lower-cost Australian, Brazilian and African product. As such, iron ore prices may finally settle below the c US\$130/t level needed to provide an incentive to high-cost Chinese mines to restart production to balance the seaborne market. Having said that, we still envisage a scenario where the supply-side response continues to lag demand due to the project financing issues across the regions as financial markets turbulence persists coupled with high political and execution risks in Africa.

**Exhibit 15: Financials**

	US\$'000s	2009	2010	2011e	2012e
Year end 31 Dec		IFRS	IFRS	IFRS	IFRS
<b>PROFIT &amp; LOSS</b>					
<b>Revenue</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Cost of Sales		0	0	0	0
Gross Profit		0	0	0	0
<b>EBITDA</b>		<b>(1,572)</b>	<b>(13,867)</b>	<b>(3,695)</b>	<b>(3,500)</b>
<b>Operating Profit (before GW and except.)</b>		<b>(1,572)</b>	<b>(13,867)</b>	<b>(3,695)</b>	<b>(3,500)</b>
Intangible Amortisation		0	0	0	0
Exceptionals		0	0	0	0
Other		0	0	0	0
<b>Operating Profit</b>		<b>(1,572)</b>	<b>(13,867)</b>	<b>(3,695)</b>	<b>(3,500)</b>
Net Interest		0	17	174	163
<b>Profit Before Tax (norm)</b>		<b>(1,572)</b>	<b>(13,850)</b>	<b>(3,521)</b>	<b>(3,337)</b>
<b>Profit Before Tax (FRS 3)</b>		<b>(1,572)</b>	<b>(13,850)</b>	<b>(3,521)</b>	<b>(3,337)</b>
Tax		0	0	0	0
<b>Profit After Tax (norm)</b>		<b>(1,572)</b>	<b>(13,850)</b>	<b>(3,521)</b>	<b>(3,337)</b>
<b>Profit After Tax (FRS 3)</b>		<b>(1,572)</b>	<b>(13,850)</b>	<b>(3,521)</b>	<b>(3,337)</b>
Average Number of Shares Outstanding (m)		131.6	257.3	274.8	280.4
EPS - normalised (c)		(1.19)	(5.38)	(1.28)	(1.19)
EPS - normalised & fully diluted (c)		(1.19)	(5.38)	(1.28)	(1.19)
EPS - FRS 3 (c)		(1.19)	(5.38)	(1.28)	(1.19)
Dividend per share (c)		0.0	0.0	0.0	0.0
Gross Margin (%)		-	-	-	-
EBITDA Margin (%)		-	-	-	-
Operating Margin (before GW and except.) (%)		-	-	-	-
<b>BALANCE SHEET</b>					
<b>Fixed Assets</b>		<b>198,439</b>	<b>192,799</b>	<b>195,771</b>	<b>195,771</b>
Investments in associate		198,439	192,799	195,771	195,771
<b>Current Assets</b>		<b>8,117</b>	<b>49,398</b>	<b>46,584</b>	<b>43,247</b>
Debtors		11	80	80	80
Cash		8,106	49,318	46,504	43,167
<b>Current Liabilities</b>		<b>(246)</b>	<b>(1,013)</b>	<b>(1,013)</b>	<b>(1,013)</b>
Creditors		(246)	(1,013)	(1,013)	(1,013)
<b>Long Term Liabilities</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Long term borrowings		0	0	0	0
<b>Net Assets</b>		<b>206,310</b>	<b>241,184</b>	<b>241,342</b>	<b>238,005</b>
<b>CASH FLOW</b>					
<b>Operating Cash Flow</b>		<b>139</b>	<b>(2,275)</b>	<b>(3,407)</b>	<b>(3,337)</b>
Net Interest		0	0	0	0
Tax		0	0	0	0
Capex		0	0	0	0
Acquisitions/disposals		0	0	0	0
Financing		23,967	44,595	0	0
Other		(16,000)	(1,108)	593	0
Net Cash Flow		8,106	41,212	(2,814)	(3,337)
<b>Opening net debt/(cash)</b>		<b>0</b>	<b>(8,106)</b>	<b>(49,318)</b>	<b>(46,504)</b>
HP finance leases initiated		0	0	0	0
Other		0	0	0	0
<b>Closing net debt/(cash)</b>		<b>(8,106)</b>	<b>(49,318)</b>	<b>(46,504)</b>	<b>(43,167)</b>

Source: Company data, Edison Investment Research

Growth	Profitability	Balance sheet strength	Sensitivities evaluation	
N/A	N/A		Litigation/regulatory	○
			Pensions	○
			Currency	◐
			Stock overhang	○
			Interest rates	○
			Oil/commodity prices	●

Growth metrics	%	Profitability metrics	%	Balance sheet metrics		Company details	
EPS CAGR 08-12e	N/A	ROCE 11e	N/A	Gearing 11e	N/A	Address:	
EPS CAGR 10-12e	N/A	Avg ROCE 08-12e	N/A	Interest cover 11e	N/A	3 Grafton Street, London, W1S 4EE, United Kingdom	
EBITDA CAGR 08-12e	N/A	ROE 11e	N/A	CA/CL 11e	N/A		
EBITDA CAGR 10-12e	N/A	Gross margin 11e	N/A	Stock turn 11e	N/A		
Sales CAGR 08-12e	N/A	Operating margin 11e	N/A	Debtor days 11e	N/A	Phone	+44(0)20 7399 1105
Sales CAGR 10-12e	N/A	Gr mgn / Op mgn 11e	N/A	Creditor days 11e	N/A	www.zanagairon.com	

Principal institutional shareholders		%	Management team
BlackRock		8.5	<b>Project director: Colin Harris</b>  Mr Harris has more than 40 years of experience in geological exploration working for major international mining companies including Anglo American, Cominco and most recently Rio Tinto. At Rio Mr Harris managed the Simandou iron ore project in Guinea
F&C		5.4	
T&T International		3.0	
Credit Suisse		1.4	
Henderson		1.4	
			<b>CFO: Gary Vallerius</b>
<b>Forthcoming announcements/catalysts</b>	<b>Date *</b>		Prior to joining the group, Mr Vallerius spent 19 years managing all aspects of the financial control and reporting for all of Rio Tinto's African and European exploration projects.
Pipeline study	mid-2012		
<i>Note: * = estimated</i>			
<b>Companies named in this report</b>			
African Minerals, Sundance, London Mining, Sphere, Bellzone, Afferro			

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