

## FIREFINCH LTD (FFX AU)

# Morila the Gorilla builds a new West African Producer

RECOMMENDATION: **BUY**

PRICE TARGET: **A\$0.50**

RISK RATING: **HIGH**

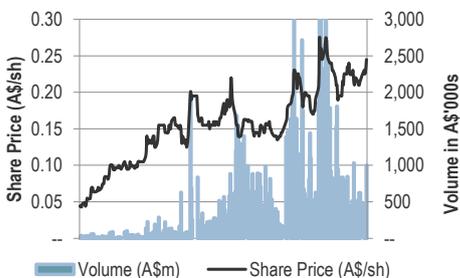
SHARE DATA	A\$0.23/sh
Shares (basic, FD)	782 / 820
52-week high/low	A\$0.28 / A\$0.04
Market cap (US\$m)	US\$137m
Net cash (debt) (US\$m)	8
1.0xNAV5% @ US\$1850/oz (US\$m)	665
1.0xNAV5% FD (A\$/sh)	A\$0.81
P/NAV (x)	0.28x
Average daily value (A\$m, 3M)	1.25

FINANCIALS	2021E	2022E	2023E
Gold produced (000oz)	62	124	177
Revenue (A\$m)	143	294	430
AISC (A\$/oz)	1,939	1,698	1,282
Income (A\$m)	4.0	24.7	41.7
EPS (A\$/sh)	0.00	0.03	0.05
PER (x)	47.1x	8.2x	4.9x
CFPS (A\$/sh)	0.04	0.06	0.06
P/CF (x)	11.1x	3.8x	2.5x

EBITDA (US\$m)	30.0	87.6	138.3
EV/EBITDA (x)	6.3x	2.4x	1.2x

SPOT VALUATION	2021E	2022E	2023E
1xNAV7% FD (A\$/sh)	0.76	0.81	0.94
ROI to 1xNAV (% pa)	298%	106%	70%
1.2xNAV7% FD (A\$/sh)	0.92	0.98	1.13
ROI to 1.2xNAV (% pa)	298%	106%	70%

SOTP 1xNAV5% US\$1850/oz	A\$m	A\$/sh
Morila NPV 1Q21E	532	0.65
Goulamina	132	0.16
Central SG&A & fin costs 1Q21E	(54.6)	(0.07)
Net cash 1Q20	8	0.01
Exploration & other	48	0.06
TOTAL	665	0.81



Source: S&P Capital IQ

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### ASX-listed explorer turned producer with Morila acquisition

Firefinch became a gold producer in November 2020 through its acquisition of the Morila Gold Mine in Mali from Barrick Gold for US\$29.7m. The mine produced 7.4Moz from 2000-2020, averaging 552koz/yr from 2000-2009 during its active mining phase, including a peak of 1,053koz in 2002. The project includes a 4.5Mtpa mill-CIL facility with historical 91% Au recovery, 2.35Moz between the main pit and satellites, and a 685km<sup>2</sup> tenement holding in an area that has yet to see as much drilling as other prolific West African shear zones.

### Potential for a 175koz producer with restart of Morila mining/milling

With a 4.5Mtpa mill and 1.51g/t resource base, Morila has potential to substantially increase production from the current 40kozpa run rate from tailings reprocessing. We expect the intermediate steps to be i) restart of satellite mining and the milling circuit in late Q2 (increases run rate to 70-80kozpa), ii) dewatering, infill drilling and rehabilitation of the Morila main pit in H2, and restart of mine production from the main pit in early 2022, reaching steady state production of SCPe 177kozpa from 2023.

### 2.35Moz resource base and significant potential to grow

Morila's resource base includes 1.86Moz at 1.49g/t at the Morila main pit, 51koz at 0.50g/t from tailings and 113koz at 1.38g/t from satellites. This gives the operation a strong baseload to support an 8-10-year operation producing 150-200kozpa. Moreover, we see significant upside potential from regional exploration potential, noting a relative lack of exploration on the Banafin shear zone, and exploration at depth, as high grade mineralization to the NE of the pit has never been definitely drilled off.

### Significant African gold mining experience on mgmt. and board

Recently appointed MD Michael Anderson joins Firefinch from Taurus Funds, where he helped to lead the fund's investments in West Africa including Teranga (Senegal, Burkina), Toro Gold (Senegal) West African Resources (Burkina) and Asanko (Ghana). Chairman Alistair Cowden is an experienced mining company founder and builder, while newly joined Director Brad Gordon is well known from his successful operational turnaround of Acacia Mining as CEO from 2013-2018. In country, Firefinch inherits an experienced operating team led by GM Drissa Arama, who has been with the Morila operation since 2000.

### We initiate with a BUY rating and A\$0.50/sh price target

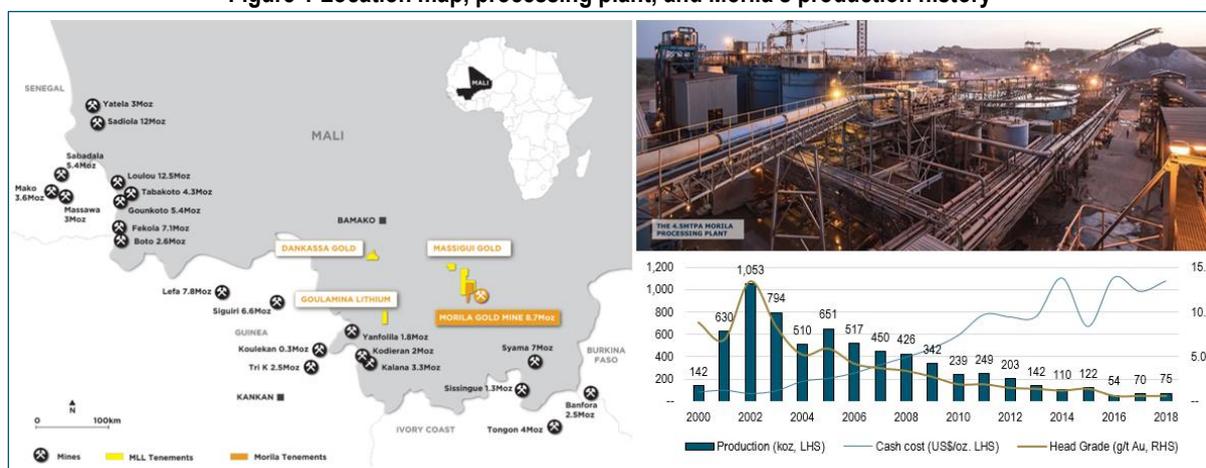
We model Morila based on a mining inventory of 35Mt at 1.50g/t for 1.69Moz which generates a 10-year mine life, ramping up to 124koz in 2022 and 177koz at steady state 2023-2029. This generates an NPV<sub>5%-1850</sub> of US\$405m (A\$533m) and a fully-funded NAVPS of A\$0.74/sh. We initiate with a BUY rating and A\$0.50/sh price target based on 0.75x NAV for the gold assets and balance sheet and 0.5x for the Goulamina lithium asset, which has been flagged for spin-out (0.5x SCPe nominal US\$100m NAV).

## Investment case

### Long standing Mali explorer makes jump to producer with Morila acquisition

Firefinch is an ASX-listed gold producer and operator of the Morila Gold Mine in Mali, with a further 685km<sup>2</sup> of mine and exploration licences in a district scale holding. History: The company was previously named Mali Lithium (2018-2020) and Birimian Gold (pre-2018), and defined a number of satellite gold deposits surrounding Morila, before pivoting to focus on development of the Goulamina Lithium Project in 2016, which it brought to completed feasibility study. In August 2020, Firefinch agreed to buy Morila for US\$29.7m, which is now the company's focus. Morila is currently producing at ~40kozpa run rate, produced 7.4Moz from 2010-2019, and has been producing from stockpiles, waste dumps and tailings since 2010. Including satellites, the asset has a total resource base of 2.35Moz at 1.52g/t with a 4.5Mtpa plant at historical 90% Au recovery. Firefinch's roadmap includes restarting the mill and increasing production to 70-80kozpa in 2H21, dewatering and resuming mining of the Morila main pit to bring production to SCPe 177koz run rate in 2023, and defining a target of a 10-year mine life at 150-200kozpa.

Figure 1 Location map, processing plant, and Morila's production history



Source: Firefinch, Barrick Gold, Randgold, AngloGold

### Experienced mine builders and operators on the management team and board

Firefinch has built a strong team in Mali and corporately. At site, Firefinch inherits an experienced operation run by Randgold and Barrick for 20 years, headlined by Morila GM Drissa Arama, who joined Randgold in 2000 as a metallurgist at Morila, became Plant Manager in 2007 and was made GM of Morila in 2017. Incoming MD Michael Anderson led Exco Resources through development of the White Dam Gold Au-Cu heap leach operation and advancement of the Cloncurry Copper project before its sale to Xstrata for A\$175m. Chairman Alistair Cowden founded Altona mining and financed and built the Kylylahti Cu-Au mine in Finland and advanced the Eva Copper project in QLD before Altona's merger with Copper Mountain. Recently joined Director Brad Gordon was the CEO of Acacia Mining (formerly named African Barrick) from 2013-2018 where he led the turnaround of Acacia into a £2.5bn market cap company with significantly improved operations and cash flow.

Figure 2: Share price chart and history

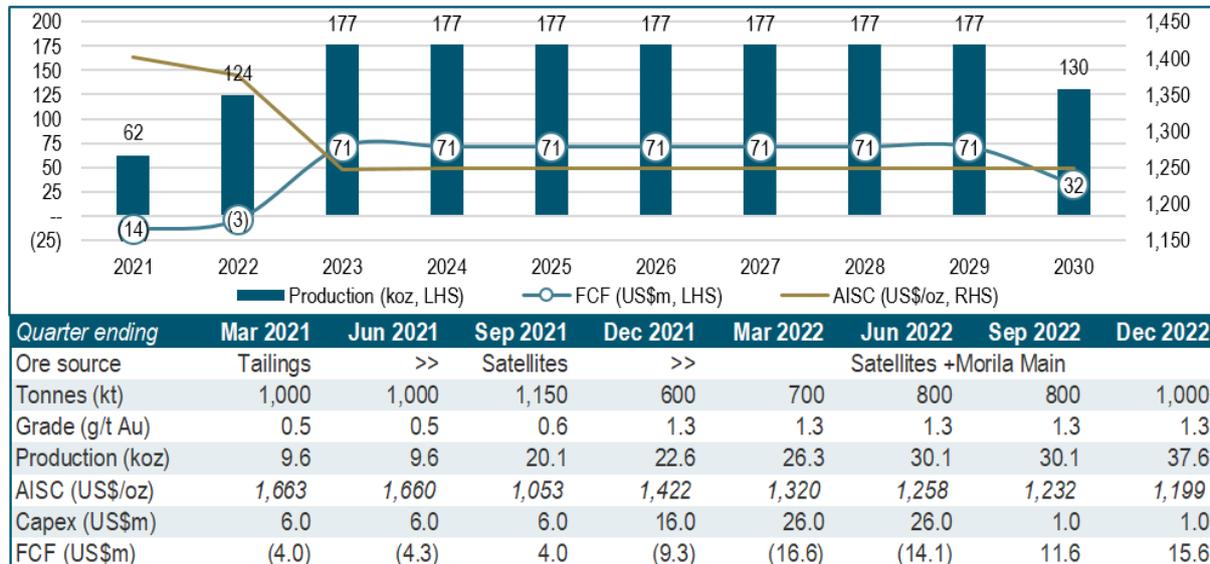


Source: Bloomberg, Firefinch, SCP

## Production ramp up to SCPe 177kozpa at steady state

The benefit of Morila's existing infrastructure is a faster and more capital ramp up from current 40kozpa tailings production to SCPe 177koz/year in SCPe 2023. Morila's 4.0-4.5 Mtpa plant throughput capacity, historical 90% recovery rate, and 1.5g/t resource base are the non-resource inputs to the production target. We estimate plant, dewatering, and pre-strip capex of US\$86m spent over the next five quarters, offset by SCPe US\$35m of operating FCF over that period. At US\$49m per 100kozpa of production capacity, this ranks as one of the most capital efficient projects in the gold mining sector.

Figure 3: SCPe production profile and ramp up schedule



Source: SCPe

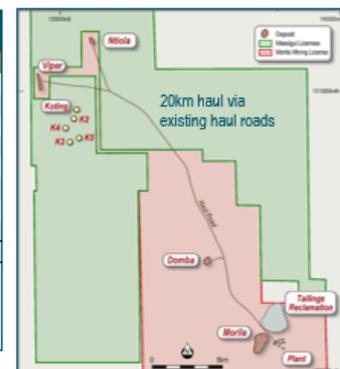
## 2.35Moz Resource base provides baseload for a profitable long-life operation

The mine life is underpinned by 1.9Moz at 1.49g/t from the Morila main pit, which was last mined in 2010. In the intervening ten years of stockpile, waste dump and tailings reprocessing, Randgold developed the Tongon and Kibali mines while AngloGold entered a long period of deleveraging, which prevented the two companies from agreeing to invest in the next cutback of the pit or in further exploration. Firefinch, in its previous iteration as Birimian Gold, drilled the Viper, Domba and N'Tiola targets, which contain a total of 113koz at 1.38g/t, which should provide the main source of ore in 2H21 and early 2022, while the main pit is dewatered, infill drilled and pre-stripped. We expect tailings mining to continue through the end of Q3, with mill start-up and first ore from satellites expected in late Q2.

Table 1. R&R, map of satellites

Property	M&I			Inferred			Total			Cut off g/t Au
	Tonnes (Mt)	Grade (g/t)	Gold (Moz)	Tonnes (Mt)	Grade (g/t)	Gold (Moz)	Tonnes (Mt)	Grade (g/t)	Gold (Moz)	
Morila Pit	21,200	1.60	1,090	17,500	1.37	770	38,700	1.49	1,860	0.40
Morila NE	--	--	--	210	3.11	21	210	3.11	21	1.80
Samacine	--	--	--	3,740	2.56	308	3,740	2.56	308	1.80
Tailings	3,150	0.50	51	--	--	--	3,150	0.50	51	0.30
N'Tiola	750	1.35	33	380	1.06	13	1,130	1.25	46	0.50
Viper	670	1.31	28	290	1.59	15	960	1.39	43	0.50
Domba	200	1.75	11	250	1.61	13	450	1.67	24	0.50
Kotina	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>25,970</b>	<b>1.45</b>	<b>1,213</b>	<b>22,370</b>	<b>1.58</b>	<b>1,140</b>	<b>48,340</b>	<b>1.51</b>	<b>2,353</b>	
Tailings	3,150	0.50	51	--	--	--	3,150	0.50	51	
Total satellites	1,620	1.38	72	920	2.33	41	2,540	1.38	113	
Morila Pit	21,200	1.60	1,090	17,500	1.39	770	38,700	1.50	1,860	
Morila other	--	1.60	--	3,950	1.39	329	3,950	1.50	329	

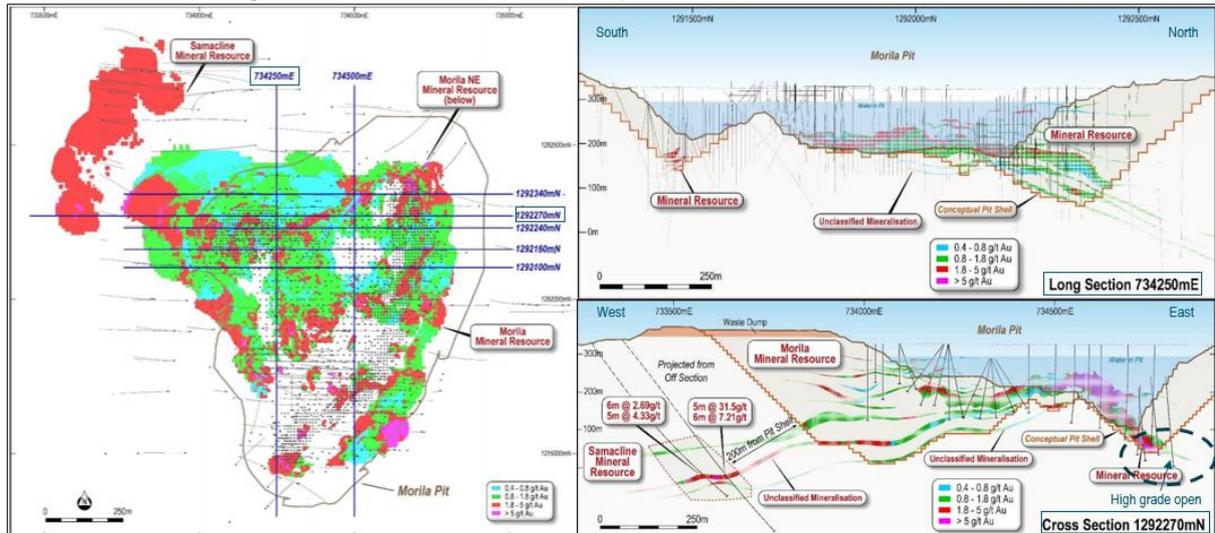
Source: Firefinch



**Opportunities at main pit include high grade extensions at depth, Samacline UG**

The first 5.8Moz at Morila were produced at a head grade >5g/t and drilling to the NE margin of the pit indicates potential for high-grade continuity. The current pit depth extends to ~170m below surface and mineralization has been defined to depths of up to ~300m. Many of the neighbouring Birimian gold mines have had significant life extensions as decline-accessed underground mines, including Barrick’s (formerly Randgold) Loulo-Gounkoto mine in Mali where the Yalea and Gara undergrounds had reached mineralized defined depths of 1,050m and 920m, respectively, by 2018 and the Gounkoto deposit had been defined to a vertical depth of 700m. A conceptual 200ktpa decline-accessed underground at 4.0g/t at unit costs benchmarked to Barrick’s Loulo-Gounkoto generates an NPV<sub>5%-1850</sub> of US\$64m assuming first production in 2025 and pre-production development costs of US\$75m.

**Figure 4 Plan view of the Morila main pit and N-S and E-W cross sections**

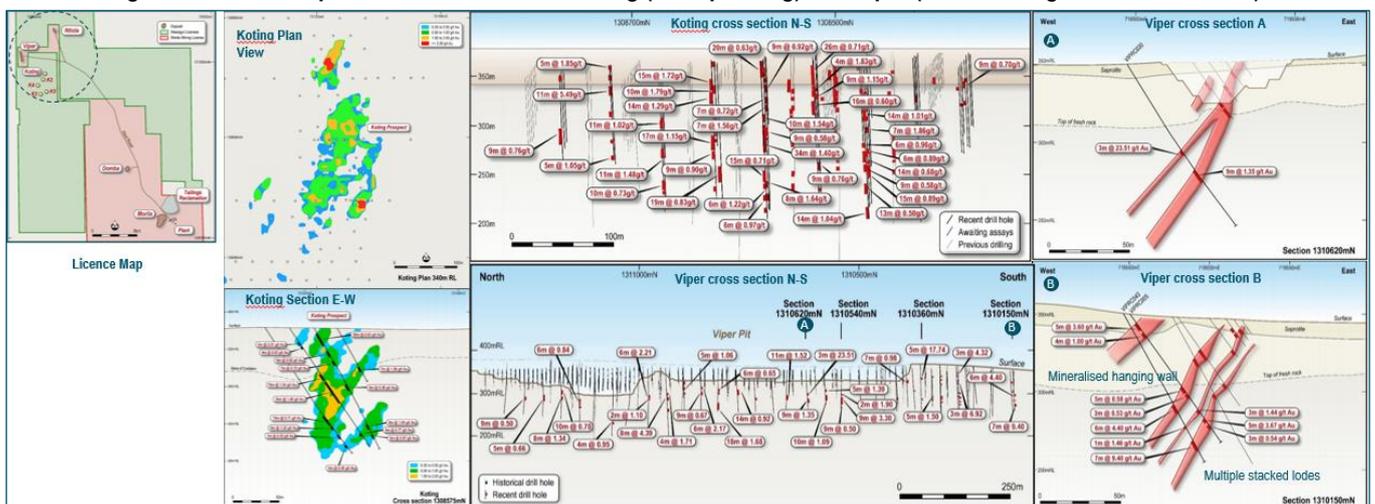


Source: Firefinch

**Satellite drilling exceeding expectations, smooth transition to Morila main plus more**

Currently there are ~140koz of complaint resources in satellites and we believe recent drilling has defined up to 300koz of mineable ounces, more than enough to smooth the mining transition to the Morila main pit. These include (1) Koting (currently no MRE) with multiple lodes defined over a strike length of ~250m and to a depth of ~200m (SCPe 40koz); (2) Viper, extends over a strike of 1.6km with several stacked lodes intersected and new mineralization in the hanging wall (SCPe 80koz) and N'Tiola, which has a JORC MRE of 43koz at 1.4g/t. The deposits are classic orogenic shear zone style deposits hosted in metasediments. As these deposits tend to occur in clusters, we believe there is potential for multiple further satellite discoveries to lengthen mine life and provide oxide feed to optimise ore blending.

**Figure 5 License map and cross sections of Koting (MRE-pending) and Viper (43koz at 1.4g/t before extension)**

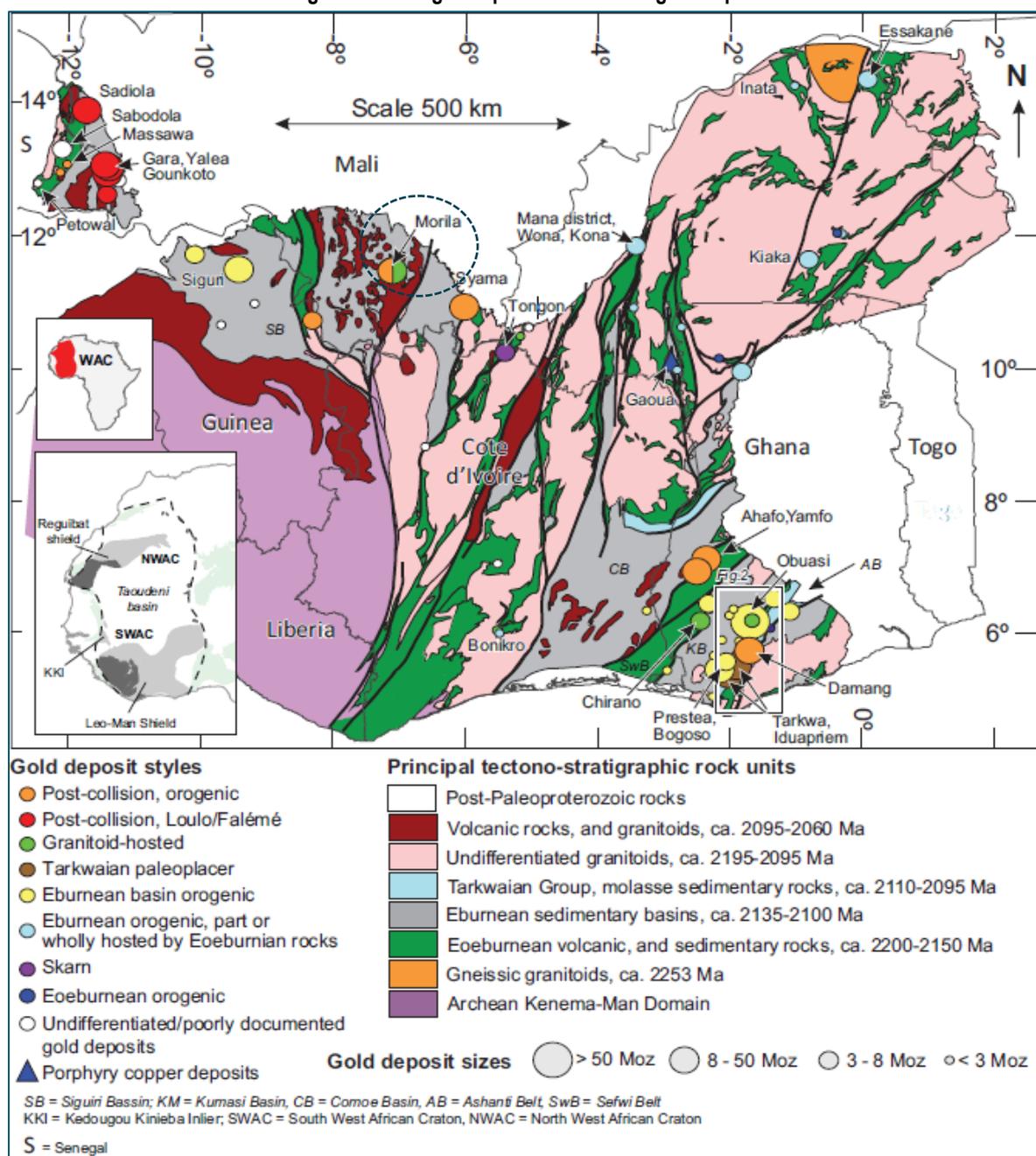


Source: Firefinch, SCPe

## Potential for a big discovery: 685km<sup>2</sup> land holding in under-drilled Archean terrane

Firefinch's exploration potential is compelling with a district landholding with one world-class asset and a conspicuous lack of other discoveries. Compare this to the prolific, but well-drilled and competitively staked established West-African districts that include the Kedougou Kinieba Inlier (Loulo-Goukoto, Sadiola, Sabodala-Massawa, and Mako), the Hounde Belt (Hounde, Mana, Yaramoko, and Golden Hill), and the Ashanti Belt (Obuasi, Tarkwa, Damang, Wassa, Asanko, and Prestea). We believe exploration at Morila was constrained by the relative lack of outcrop, Randgold's constrained financial position before Morila's development, and difficulty coordinating reinvestment in the Randgold-Anglogold Morila JV once in production (Randgold found and developed Loulo-Goukoto, bought and developed Kibali with AngloGold, and AngloGold suffered near-bankruptcy in 2013-2015). Though debate exists over categorization of Morila's deposit type, there are clearly orogenic components present including metavolcaniclastic and metagreywacke units and evidence of multiple phases of magmatism. This suggests potential for other major deposits in the area, not unlike the Faleme belt which hosts the Loulo, Gara, Yalea and Goukoto multi-million ounce deposits that form the Loulo-Goukoto mining complex.

Figure 6: Geologic map of West African gold deposits



Source: Society of Economic Geology (SEG)

## Significant upside to producer peer multiples

Firefinch is trading at a significant discount to the West African (plus Centamin) producer peer average valuation ranges at just 0.3x NAV and US\$58/oz vs the producer peer average of 0.7x NAV and US\$112/oz. Of the producers, Firefinch is one of few with transformational organic growth opportunities in the near term and with a 685km<sup>2</sup> license area with one proven world-class asset but otherwise a conspicuous lack of large discoveries. Moreover, Firefinch is trading within the P/NAV and per ounce multiple ranges of West African gold developers and explorers, but with the advantage of significant infrastructure in place, therefore less capital requirement to define and develop its ounces.

Figure 7: Comp table of West African gold producers

Ticker	Market Cap	EV	NAVPS	P/NAV	EV/EBITDA		EV/Revenue		FCF yield		EV/oz			
					2021e	2022e	2021e	2022e	2021e	2022e	2P	M&I	M&I	
	US\$m	US\$m	US\$/sh	(X)	(X)	(X)	(X)	(X)	(X)	%	%	US\$/oz	US\$/oz	US\$/oz
Endeavour	TSX:EDV	5,373	5,529	26.21	0.8x	3.8x	3.5x	2.1x	2.1x	14%	17%	\$307	\$195	\$150
Centamin	LSE:CEY	1,710	1,436	1.42	1.0x	4.3x	3.6x	2.0x	1.8x	6%	11%	\$287	\$100	\$80
Perseus	ASX:PRU	1,135	1,230	1.27	0.7x	6.8x	3.6x	2.5x	1.5x	3%	26%	\$375	\$242	\$172
West African	ASX:WAF	656	796	1.11	0.7x	3.1x	4.8x	1.9x	2.3x	19%	23%	\$530	\$259	\$156
Resolute	ASX:RSG	396	622	0.86	0.6x	3.0x	2.3x	1.0x	1.0x	19%	26%	\$132	\$75	\$57
Roxgold	TSX:ROXG	570	592	2.31	0.6x	4.8x	4.1x	2.4x	2.2x	4%	2%	\$834	\$227	\$191
Golden Star	TSX:GSC	366	504	6.73	0.5x	3.6x	3.2x	1.7x	1.5x	15%	15%	\$358	\$137	\$43
Galiano <sup>(1)</sup>	TSX:GAU	266	197	1.87	0.6x	2.2x	3.1x	0.5x	0.6x	28%	18%	\$187	\$122	\$110
Hummingbird	AIM:HUM	103	134	0.42	0.7x	2.6x	1.8x	0.7x	0.7x	30%	55%	\$198	\$68	\$48
<b>Firefinch</b>	<b>ASX:FFX</b>	<b>147</b>	<b>136</b>	<b>0.63</b>	<b>0.3x</b>	<b>5.8x</b>	<b>2.0x</b>	<b>1.2x</b>	<b>0.6x</b>	<b>neg</b>	<b>neg</b>	<b>--</b>	<b>\$112</b>	<b>\$58</b>
<b>Mean</b>					<b>0.7x</b>	<b>3.8x</b>	<b>3.3x</b>	<b>1.6x</b>	<b>1.5x</b>	<b>15%</b>	<b>21%</b>	<b>\$356</b>	<b>\$158</b>	<b>\$112</b>
<b>Weighted Average</b>					<b>0.8x</b>	<b>3.9x</b>	<b>3.4x</b>	<b>1.8x</b>	<b>1.7x</b>	<b>12%</b>	<b>18%</b>	<b>\$295</b>	<b>\$156</b>	<b>\$111</b>
<b>Average excluding high and low</b>					<b>0.7x</b>	<b>3.6x</b>	<b>3.3x</b>	<b>1.7x</b>	<b>1.6x</b>	<b>15%</b>	<b>19%</b>	<b>\$320</b>	<b>\$157</b>	<b>\$110</b>
<b>75th Percentile</b>					<b>0.7x</b>	<b>4.3x</b>	<b>3.6x</b>	<b>2.1x</b>	<b>2.1x</b>	<b>19%</b>	<b>26%</b>	<b>\$375</b>	<b>\$227</b>	<b>\$156</b>
<b>Median</b>					<b>0.7x</b>	<b>3.6x</b>	<b>3.5x</b>	<b>1.9x</b>	<b>1.5x</b>	<b>15%</b>	<b>18%</b>	<b>\$307</b>	<b>\$137</b>	<b>\$110</b>
<b>25th Percentile</b>					<b>0.6x</b>	<b>3.0x</b>	<b>3.1x</b>	<b>1.0x</b>	<b>1.0x</b>	<b>6%</b>	<b>15%</b>	<b>\$198</b>	<b>\$100</b>	<b>\$57</b>

Sources: Market data from S&P Capital IQ, company disclosure, SCPE; NAVs per CIQ consensus except FFX; (1) Adjusted for production since last R&R update if more than 12 months out of date

Figure 8: Comp table of West African gold developers and explorers

Ticker	Market Cap	EV	NAVPS	P/NAV	Project		Contained		Grade		EV/oz			
					Name	Country	2P	MI&I	2P	MI&I	2P	MI&I	MI&I	
	US\$m	US\$m	US\$/sh	(X)			Moz AuEq	Moz AuEq	g/t AuEq	g/t AuEq	US\$/oz	US\$/oz	US\$/oz	
Orezone	TSXV:ORE	267	202	1.91	0.4x	Bombore	Burkina	1.84	6.16	0.82	0.54	\$110	\$40	\$33
Thor	TSXV:THX	121	137	0.72	0.3x	Segilola	Nigeria	0.52	0.68	4.02	4.64	\$265	\$226	\$203
Roscan	TSXV:ROS	184	158	--	--	Kandiole	Mali	--	--	--	--	--	--	--
Tietto	ASX:TIE	131	74	0.57	0.4x	Abujar	Cote D'Ivoire	--	3.02	--	1.16	--	\$59	\$24
Chesser	ASX:CHZ	56	44	--	--	Diamba	Senegal	--	--	--	--	--	--	--
Predictive Discovery	ASX:PDI	64	54	--	--	Bankan	Guinea	--	--	--	--	--	--	--
Newcore	TSXV:NCAL	53	37	1.38	0.4x	Enchi	Ghana	--	1.22	--	0.72	--	--	\$30
Oklo	ASX:OKU	58	45	0.25	0.4x	Dandoko	Mali	--	0.67	--	1.83	--	\$84	\$67
Montage	TSXV:MAU	78	45	1.55	0.4x	MGP	Cote D'Ivoire	--	3.16	--	--	--	--	\$14
African Gold Group	TSXV:AGG	21	15	0.62	0.2x	Kobada	Mali	--	2.33	--	2.30	--	\$13	\$7
<b>Firefinch</b>	<b>ASX:FFX</b>	<b>147</b>	<b>136</b>	<b>0.63</b>	<b>0.3x</b>	<b>Morila</b>	<b>Mali</b>	<b>--</b>	<b>2.35</b>	<b>--</b>	<b>1.51</b>	<b>--</b>	<b>\$112</b>	<b>\$58</b>
<b>Mean</b>					<b>0.3x</b>			<b>0.24</b>	<b>1.72</b>	<b>0.48</b>	<b>1.12</b>	<b>\$188</b>	<b>\$85</b>	<b>\$54</b>
<b>Weighted Average</b>					<b>0.3x</b>							<b>\$201</b>	<b>\$55</b>	<b>\$32</b>
<b>Average excluding high and low</b>					<b>0.4x</b>			<b>0.06</b>	<b>1.38</b>	<b>0.10</b>	<b>0.82</b>	<b>--</b>	<b>\$61</b>	<b>\$34</b>
<b>75th Percentile</b>					<b>0.7x</b>			<b>--</b>	<b>2.85</b>	<b>--</b>	<b>1.66</b>	<b>\$227</b>	<b>\$84</b>	<b>\$50</b>
<b>Median</b>					<b>0.4x</b>			<b>--</b>	<b>0.95</b>	<b>--</b>	<b>0.63</b>	<b>\$188</b>	<b>\$59</b>	<b>\$30</b>
<b>25th Percentile</b>					<b>0.6x</b>			<b>--</b>	<b>0.17</b>	<b>--</b>	<b>--</b>	<b>\$149</b>	<b>\$40</b>	<b>\$19</b>

Sources: Market data from S&P Capital IQ, company disclosure, SCPE; NAVs per CIQ consensus except FFX

## Valuation

We value Firefinch using a discounted cash flow methodology using a 5% discount rate and US\$1,850/oz gold price, in line with our metrics for other gold producers and developers. We model an open pit mine inventory of 35.0Mt at 1.50g/t Au, plus tailings mining through early Q3, generating life of mine production of 1.56Moz at AISC of US\$1,247/oz. This generates a project NPV<sub>5%-1850</sub> of US\$405m (A\$533m). To this we subtract A\$53m for central costs and G&A (SCPe A\$8m per year at steady state production) and interest costs. We add A\$20m for cash and ITM options, subtract A\$10m for current debt, and add A\$25m for exploration, A\$20m for ounces outside our SCPe mine inventory (594koz at US\$25/oz) and A\$132m (US\$100m) for Goulamina. This generates a total NAV of A\$665m on a fully diluted share count of 819.8m shares, or A\$0.81/sh. To this we add A\$20m for our assumed equity component of capital funding, and add SCPe 100m shares, for a fully diluted, fully funded NAVPS estimate of A\$0.74/sh.

### Initiate with BUY rating and A\$0.50/sh price target based on 0.75x NAV<sub>5%-1850</sub>

We initiate with a BUY rating and A\$0.50/sh price target based on 0.75x NAV<sub>5%-1850</sub>/oz. This multiple is in line with our target multiple for DFS stage developers. Compared to a typical developer, the funding quantum for Firefinch is significantly lower relative to production potential due to the mill and infrastructure in place and positive cash flow from tailings currently and satellites in H2. Stepping back, we firmly believe that growth is the attribute

that is most rewarded for small cap gold producers, particularly in West Africa, and in our view Morila gives Firefinch an initial asset with the size and scale to be a growth platform in the region. Moreover, Firefinch has control over a significant exploration land package that, usually for the region, has yielded just one major mine, and we believe this points to the significant regional exploration potential on the license.

## Risks

Geological: We view this risk as low. Structural controls for existing mineralization are well understood and are supported by 10 years of historical mining and 20 years of processing at Morila.

Mining: We view this risk as low. Open pit mining is well established in Mali with several large open pit mines that utilize contractors. Companies operating open pits in country include Barrick, B2Gold, Resolute Mining, and Hummingbird Resources.

Development: We view this risk as moderate. The key workstream in our view is dewatering the main pit. We note that permits have been received to discharge water from the pit. The pit will also require some tailings to be removed followed by rehabilitation of the benches.

Processing/Metallurgy: We view this risk as low. The processing plant has 20 years of operating history and the mills operated as recently as 2018. Refurbishment works are largely completed. Gold recovery has historically been very good, averaging 91% of the producing history of the asset.

Infrastructure: We view this risk as low. The mine and processing plant have a long operating history and the associated infrastructure is already in place.

Environmental: We view this risk as in low. Morila is an already disturbed mining site and the tailings facility has been nearly completely reprocessed, therefore the facility will soon be available to again receive tailings material.

Social: We view this risk as moderate. Mali is a developing economy with a per capita GDP of US\$879/year according to the world bank, which presents some challenges. There is also an Islamist threat in the north of the country but this has not been a disruptive issue in the southwest, where Morila is located. Despite these factors, Morila operated without incident and the mine's previous operators, Randgold and Barrick had a very strong reputation for social license to operate in Africa.

Political: We view this risk as moderate to high. The country experienced a military coup in 2020 after a contested election result. Thus far, mine production in Mali has continued uninterrupted. Firefinch was also served a tax assessment relating that claims that 2017 mine revenues were understated by US\$54.25m. Firefinch noted that Morila has unused tax credits to offset a potential claim and has publicly stated that it believes the claims are unwarranted. A resolution of the tax claim would be a material de-risking event in our view, though we also note that other permits have been received by Firefinch since the tax assessment, indicative of a good working relationship with the Government.

## Why we like Firefinch

1. 2.35Moz at 1.51g/t resource base gives potential for 10-year mine life at 150-200kozpa
2. 20-year Morila production history with operating plant and infrastructure
3. At depth and regional exploration potential with 685km<sup>2</sup> land package in Paleoproterozoic district
4. Building strong management team and board and with experienced operating team in country

## Catalysts

- Late April / Early May 2021: Updated mine plan
- 2H21: Mill restart and production from satellites
- 1H22: Re-commencement of mining from the Morila Main Pit

<b>Ticker:</b> FFX AU	<b>Price / mkt cap:</b> A\$0.23/sh, A\$180m	<b>Market P/NAV:</b> 0.28x	<b>Assets:</b> Morila
<b>Analyst:</b> J Chan / B Gaspar	<b>Rec / PT:</b> BUY / A\$0.50	<b>1xNAV<sub>2020</sub> FD:</b> A\$0.81/sh	<b>Country:</b> Mali

Group-level SOTP valuation					Resource / Reserve				
	4Q20	1Q21E			Mt	000oz	EV/oz		
	A\$m	O/ship	NAVx	A\$/sh	Measured, ind. & inf.	48	2,353	58	
Morila NPV 1Q21E	532	80%	0.75x	0.49	SCPe Mine Inventory	40	1,759	77	
Central SG&A & fin costs 1Q21E	(55)	-	0.75x	(0.05)	<b>Commodity price</b>	<b>CY20E</b>	<b>CY21E</b>	<b>CY22E</b>	<b>CY22E</b>
Ounces outside mine plan (\$25/oz)	20	100%	0.75x	0.02	Gold price (US\$/oz)	1,631	1,760	1,799	1,850
Cash and restr. cash 4Q20	17	-	0.75x	0.02	<b>Share data</b>				
Cash from options	3	-	0.75x	0.00	Basic shares (m): 782.3	FD + options (m):	819.8	FD/FF	919.8
Debt 4Q20	(10)	-	0.75x	(0.01)	<b>Ratio analysis</b>	<b>CY20E</b>	<b>CY21E</b>	<b>CY22E</b>	<b>CY22E</b>
Exploration	25	-	0.75x	0.02	FD shares out (m)	782	882	882	882
Goulamina	132	-	0.50x	0.08	EPS (A\$/sh)	0.00	0.00	0.03	0.05
<b>1xNAV5% A\$1850/oz fully diluted, pre-funded</b>	<b>665</b>			<b>0.57</b>	CFPS before w/c (A\$/sh)	(0.01)	0.04	0.06	0.06
Assumed equity component of project	20		0.75x	0.02	FCFPS pre growth (A\$/sh)	(0.02)	0.03	0.05	0.05
<b>1xNAV5% A\$1850/oz fully funded</b>	<b>685</b>			<b>0.52</b>	FCF/sh (A\$/sh)	(0.01)	(0.01)	(0.02)	0.05
<b>1x fully funded NAVPS sensitivity to gold price and discount / NAV multiple</b>					FCF yield pre growth (A\$/sh)	(7%)	14%	23%	23%
<b>1xNAV asset (US\$m)</b>	<b>\$1500oz</b>	<b>\$1700oz</b>	<b>\$1850oz</b>	<b>\$2000oz</b>	<b>\$2200oz</b>	FCF yield (%)	(4%)	(6%)	(9%)
8% discount	0.40	0.56	0.67	0.79	0.94	EBITDA margin (%)	1%	21%	30%
7% discount	0.42	0.57	0.69	0.81	0.97	FCF margin (%)	(46%)	(9%)	(7%)
6% discount	0.43	0.59	0.72	0.84	1.01	ROA (%)	0%	2%	10%
5% discount	0.44	0.61	0.74	0.87	1.05	ROE (%)	0%	3%	17%
4% discount	0.46	0.64	0.77	0.91	1.09	ROCE (%)	0%	9%	30%
<b>Valuation (A\$/sh)</b>	<b>\$1500oz</b>	<b>\$1700oz</b>	<b>\$1850oz</b>	<b>\$2000oz</b>	<b>\$2200oz</b>	PER (x)	813x	47x	8x
0.50xNAV	0.18	0.27	0.34	0.40	0.49	P/CF (x)	5x	11x	4x
0.75xNAV	0.30	0.43	0.52	0.62	0.75	EV/EBITDA (x)	636x	6x	2x
1.00xNAV	0.41	0.58	0.71	0.84	1.01	<b>Income statement</b>	<b>CY20E</b>	<b>CY21E</b>	<b>CY22E</b>
1.20xNAV	0.49	0.70	0.86	1.01	1.22	Revenue (A\$m)	20	143	294
<b>Valuation over time</b>	<b>1Q21E</b>	<b>1Q22E</b>	<b>1Q23E</b>	<b>1Q24E</b>	<b>1Q25E</b>	COGS (A\$m)	(17)	(106)	(198)
Mines NPV (A\$m)	516.5	563.9	598.0	526.9	451.9	<b>Gross profit (A\$m)</b>	<b>3</b>	<b>36</b>	<b>96</b>
Cntrl G&A & fin costs (A\$m)	(55.4)	(52.8)	(55.6)	(2.0)	14.8	Expenses (A\$m)	--	--	(4)
Net cash at 1Q (A\$m)	14.6	(4.7)	42.8	122.9	204.8	Impairment & other (A\$m)	--	--	--
1xNAV (US\$m)	476	506	585	648	672	Net finance costs (A\$m)	1	(2)	(5)
P/NAV (x):	0.30x	0.28x	0.24x	0.22x	0.21x	Tax (A\$m)	(0)	(7)	(20)
1xNAV share px FD (A\$/sh)	0.76	0.81	0.94	1.04	1.08	Minority interest (A\$m)	(1)	(3)	(9)
ROI to equity holder (% pa)	232%	88%	60%	46%	36%	<b>Net income attr. (A\$m)</b>	<b>3</b>	<b>24</b>	<b>61</b>
1.2xNAV share px FD (A\$/sh)	0.92	0.98	1.13	1.25	1.29	EBITDA (A\$m)	0	30	88
ROI to equity holder (% pa)	298%	106%	70%	53%	41%	<b>Cash flow</b>	<b>CY20E</b>	<b>CY21E</b>	<b>CY22E</b>
<b>Morila 1xNAV sensitivity to grade and strip ratio</b>					Profit/(loss) after tax (A\$m)	0	4	25	42
<b>1xNAV asset (US\$m)</b>	<b>SR: 6.0x</b>	<b>7.0x</b>	<b>8.0x</b>	<b>9.0x</b>	<b>10.0x</b>	Add non-cash items (A\$m)	35	14	29
Grade: 1.30g/t	332	285	238	191	144	Less wkg cap / other (A\$m)	(42)	13	(2)
Grade: 1.40g/t	415	368	321	274	227	<b>Cash flow ops (A\$m)</b>	<b>(6)</b>	<b>32</b>	<b>52</b>
Grade: 1.50g/t	499	452	405	358	311	PP&E (A\$m)	(0)	(45)	(71)
Grade: 1.60g/t	582	535	488	441	394	Other (A\$m)	(46)	--	--
Grade: 1.70g/t	666	619	572	525	477	<b>Cash flow inv. (A\$m)</b>	<b>(49)</b>	<b>(45)</b>	<b>(71)</b>
<b>Morila 1xNAV sensitivity to gold price and mining cost per tonne</b>					Debt draw (repayment) (A\$m)	--	30	20	(20)
<b>1xNAV asset (US\$m)</b>	<b>\$1500oz</b>	<b>\$1700oz</b>	<b>\$1850oz</b>	<b>\$2000oz</b>	<b>\$2200oz</b>	Equity issuance (A\$m)	69	20	--
Mining: US\$2.50/t	264	385	475	566	687	Other (A\$m)	--	--	--
Mining: US\$2.75/t	228	349	440	531	651	<b>Cash flow fin. (A\$m)</b>	<b>69</b>	<b>50</b>	<b>20</b>
Mining: US\$3.00/t	193	314	405	495	616	Net change post forex (A\$m)	14	37	1
Mining: US\$3.25/t	158	279	369	460	581	<b>FCF (A\$m)</b>	<b>(9)</b>	<b>(13)</b>	<b>(19)</b>
Mining: US\$3.50/t	123	243	334	425	545	<b>Balance sheet</b>	<b>CY20E</b>	<b>CY21E</b>	<b>CY22E</b>

Production (100%)						
	CY20E	CY21E	CY22E	CY22E	CY22E	CY22E
Morila (000oz)	11	62	124	177	177	177
Morila cash cost (US\$/oz)	1,202	1,206	1,106	1,110	1,110	1,110
Morila AISC (US\$/oz)	1,401	1,376	1,247	1,248	1,248	1,248
Group (000oz)	11	62	124	177	177	177
Group cash cost (US\$/oz)	1,128	1,313	1,215	1,221	1,221	1,221
Group AISC (US\$/oz)	1,328	1,939	1,698	1,282	1,282	1,282

Balance sheet					
	CY20E	CY21E	CY22E	CY22E	CY22E
Cash (A\$m)	17	54	55	83	143
Accounts receivable (A\$m)	14	14	15	35	35
Inventories (A\$m)	37	34	35	47	47
PPE & exploration (A\$m)	60	90	133	98	64
Other (A\$m)	11	11	11	11	11
<b>Total assets (A\$m)</b>	<b>139</b>	<b>204</b>	<b>248</b>	<b>274</b>	<b>300</b>
Debt (A\$m)	10	40	60	40	20
Other liabilities (A\$m)	30	41	40	44	45
Shareholders equity (A\$m)	134	154	154	154	154
Retained earnings (A\$m)	(37)	(33)	(8)	34	79
Minority int. & other (A\$m)	2	2	2	2	2
<b>Liabilities+equity (A\$m)</b>	<b>139</b>	<b>204</b>	<b>248</b>	<b>274</b>	<b>300</b>
Net cash (A\$m)	8	15	(5)	43	123
Net debt to NTM EBITDA (x)	(0.3x)	(0.2x)	0.0x	(0.3x)	(0.9x)

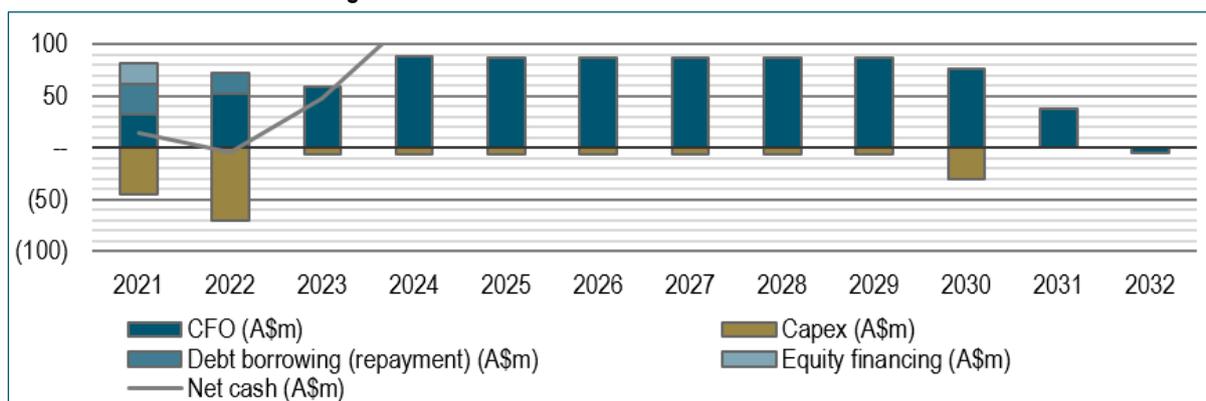
Source: SCP estimates

## Corporate and Financial Summary

**Share structure:** Firefinch has 782.3m shares outstanding with 28.7m options at A\$0.15/sh (A\$4.3m) and 2.0m options at A\$0.40/sh, with 8.9m performance/deferred share units (PSUs/DSUs) outstanding. We assume a further A\$20m of equity at A\$0.20/sh for 100m shares, thus base our valuation on a fully-diluted, fully-funded assumed share count of 919.8m shares.

**Balance sheet:** As the end of 2020, Firefinch had A\$17m of cash and A\$14m of trade receivables against A\$9.7m of loans and A\$9.6m of trade payables. We estimate US\$86m (A\$112m) of capex between from January 2021 through the end of 2Q22, offset by A\$62m of operating cash flow over that period, creating a total external funding requirement of A\$50m. We assume this is financed through A\$50m of debt at a 12% cost of capital, and A\$20m of equity, creating a safety margin of A\$30m through ramp up.

Figure 9: SCPe cash flow and balance sheet estimates



Source: SCPe

**Cash flow and profitability:** We estimate a LOM EBITDA margin of 32% at US\$1850/oz. Per share return metrics are excellent due to current low entry price. We estimate a 32% FCF yield in 2023, rising to 46% in 2024 through 2029 at US\$1,850/oz and 39% at spot US\$1,750/oz. Likewise, we estimate a strong average return on capital employed (ROCE) of 22% in 2023 through 2029.

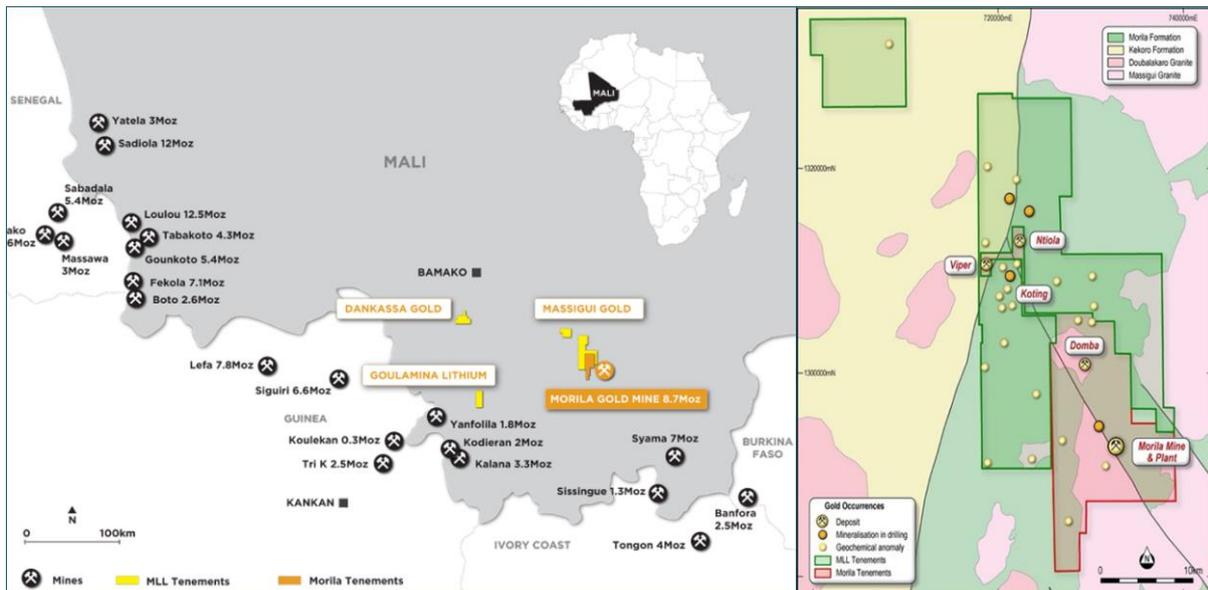
**Government and stakeholders:** Ownership: Firefinch owns an 80% ownership stake in Morila SA, the Malian entity that owns and operates the Morila Mine, while the Government of Mali owns a 20% stake in Morila SA. We assume the Government is free carried for its share of capex. Tax assessment: In February 2021, Firefinch flagged that the Malian Government issued a partial tax assessment relating to 2017 gold sales. The Government tax agency claimed that total 2017 gold sales revenue should be US\$146.9m but Barrick, AngloGold and smelter records corroborate the audited sales figure of US\$92.65m. Given the value of potential reinvestment into the Morila Mine to restart mining operations, and the fact that both Barrick and AngloGold are publicly-listed audited companies, we are optimistic that this issue can be resolved in a timely manner to incentivize investment into Morila. The profit tax rate in Mali is 30% with a 6% net sales royalty.

**Goulamina divestment strategy:** We attribute the Goulamina project a nominal value of US\$100m (A\$0.16/sh) in our NAV estimate and apply a 0.5x NAV multiple, for a contribution of A\$0.08/sh towards fully diluted (pre-funded) NAV per share. Firefinch has indicated its intention to divest Goulamina, most likely through a spin-out to existing shareholders.

**Morila (80% Firefinch, 20% Government of Mali)**

Morila is located in southern Mali, 180km southeast of Mali’s capital city of Bamako. The project belonged to BHP Minerals but was acquired by Randgold in 1996, along with the Syama Mine, and a large exploration package that included what is now Barrick’s Loulo-Gounkoto mining complex. Construction of Morila commenced in 1999 and Randgold sold half of its 80% interest in the mine to AngloGold in July 2000 for US\$132m. The Government of Mali was a free-carried 20% owner of the mine and retains its 20% stake. Morila produced 5.9Moz in its first 10-years of production from 2000-2009 and a further 1.5Moz from 2010-2020 from processing of stockpiles, the waste dumps, and then tailings reprocessing. Morila’s Exploitation License and Establishment Convention came into effect in April 1992 with a 30-year term, therefore the Establishment Convention will need to be renewed in April 2022. This has precedent in country, including the Syama Mine, which renewed in 2019 without incident.

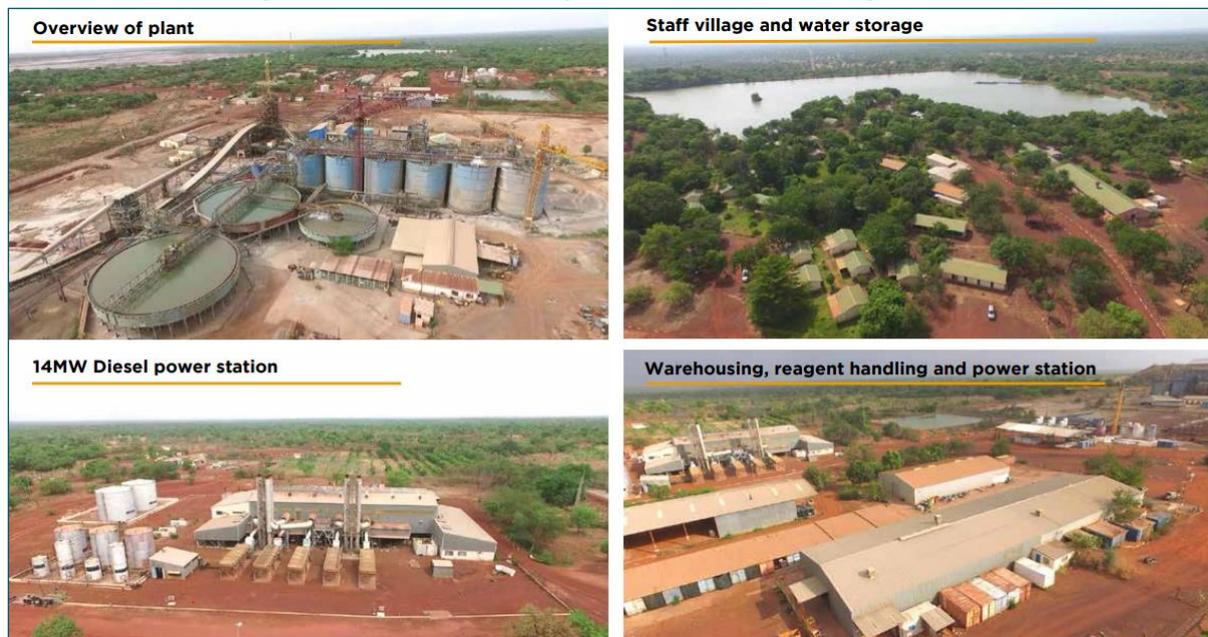
**Figure 10 Asset location, map of Morila and Missingui license**



Source: Firefinch

**Infrastructure and site access:** The project is road accessible, approximately 4.5 hours from the capital city of Bamako. The operation is powered by a 14MW diesel power generating station. Other infrastructure includes an accommodation camp, reagent handling facility, and water storage facility.

**Figure 11: Infrastructure already in place and maintained in good order**

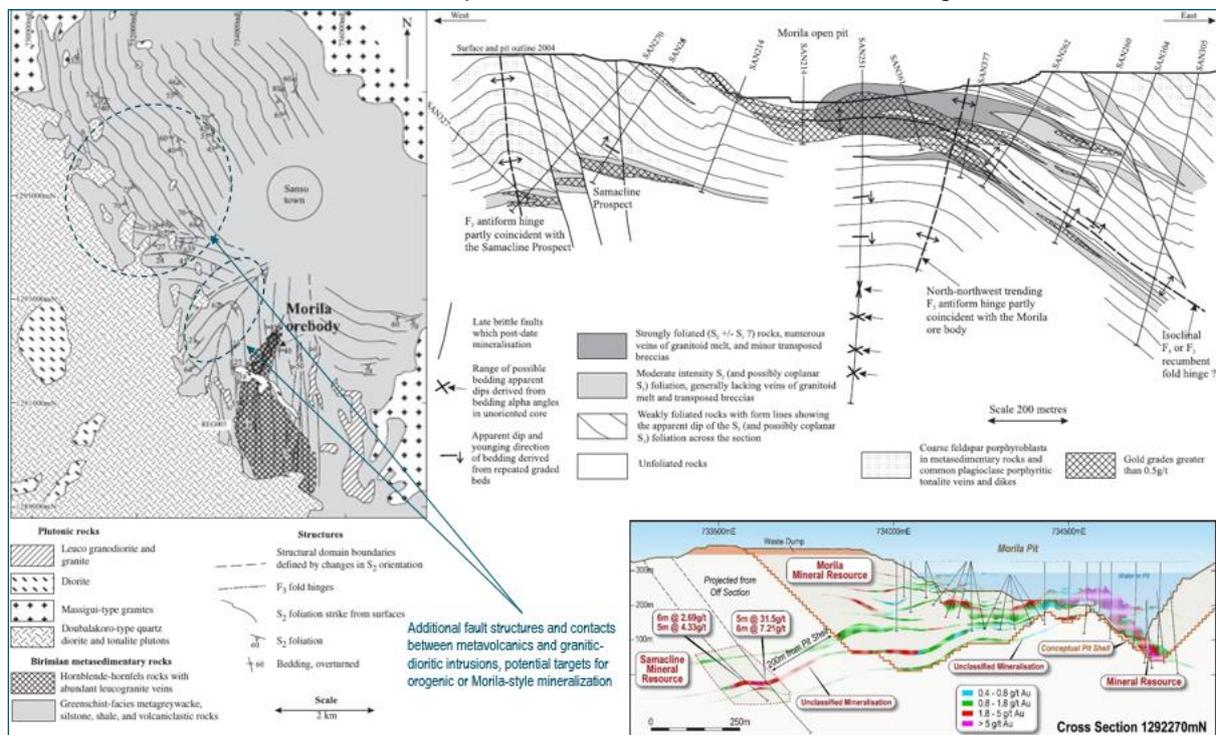


Source: Firefinch

Geology

The Morila license is located in the northern portion of the West African Craton, hosted by Paleoproterozoic Birimian meta-volcanic and meta-sedimentary sequences intruded by a large Eburnian granitoid intrusion. The principal regional shear structure is the 50-km wide Banafin shear zone which strikes NNE-SSW for 200km through southern Mali and northern Cote D'Ivoire. Gold mineralization is hydrothermal in origin and contained within metamorphosed sediments (a strongly foliated zone of hornfelsed biotite schist) close to the contact with an intrusive tonalite and hosted within a shallow dipping shear zone, known as the Mali shear. The metasediments are metagreywacke and metavolcaniclastic. Gold is associated with polymineralic mains, occurring as a quartz-sulphide stockwork and disseminated arsenopyrite hosted in an intrusive contact zone. The majority of gold is free with up to 60% recoverable by gravity or attached to sulphides with minor amounts within arsenopyrite grains or within pyrite and pyrrhotite.

Figure 12 Regional geology of Morila, E-W cross section of Morila pit with interpreted geology (McFarlane 2011), cross section of current pit with 2021 mineral resource and estimated grades



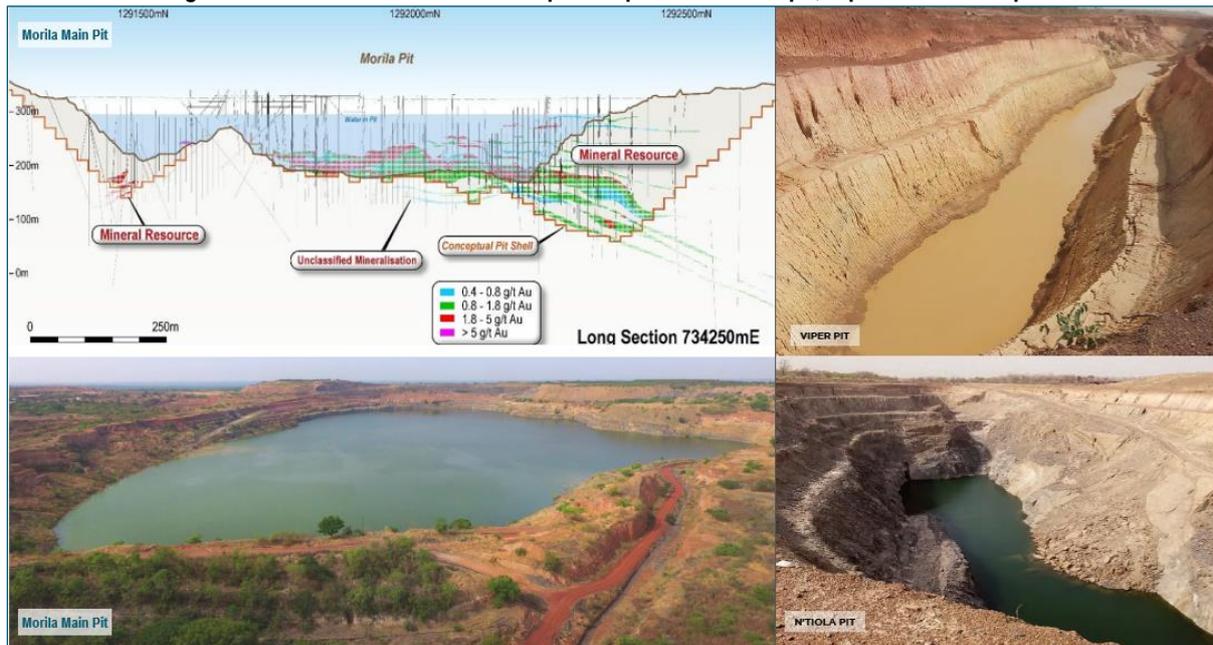
Source: SEG, McFarlane et al 2011, Firefinch

**Significant exploration potential:** Debate exists over the precise genetic model at Morila as it displays characteristics of younger West African orogenic gold hosted in metavolcanics, but there is evidence for an intrusion related system, as evidenced by higher grades in hornfelsed sediments, proximate to contact with the intrusive tonalite, and intrusion related mineralisation assemblage Au-Mo-Sn. Neither model would disclaim the potential **at depth**, as shear-hosted gold systems in the Birimian have demonstrated significant vertical extent, while the intrusion system at Morila has not been conclusively explored nor mined out. We believe **regional exploration potential** is significant noting the presence of i) a major regional scale fault structure (the Banafin shear zone) to act as a feeder structure, ii) paleoproterozoic aged metavolcanic and metasedimentary units, ie-the right host rocks; and iii) confirmation that these structures and associated magmatism have resulted in at least one major gold deposit and with successful regional exploration for orogenic-style satellites. Granitic/dioritic intrusions have been shown at Morila to be vectors for high grade mineralization. Exploration for these intrusions can be better targeted using modern geophysics, which represents a major opportunity in our view, as we believe the relative lack of outcrop and thicker sedimentary cover is the main reason for a lack of major regional discoveries around Morila.

Mining and processing

**Mining:** The resource base is amenable to conventional drill and blast, truck and shovel mining, with the exception of the deeper Samacine zone (308koz at 2.56g/t). Current mining is hydromining to slurry and process tailings material but we expect hard rock mining at the satellites to recommence in the second half of Q2 while the Morila main pit is dewatered and dredged. We expect Firefinch to recommence open pit mining using contractors, with expected rates between US\$2.70-3.50/t based on other operators. Open pit mining contractors are well developed in Mali and open pit operations utilizing contractor mining include Barrick’s Goukoto open pit, Hummingbird’s Yanfolila mine, B2Gold’s Fekola and Resolute Mining’s Syama Tabakoroni operation. When Randgold actively mined the main pit, the fleet consisted of 100-tonne Caterpillar 777s.

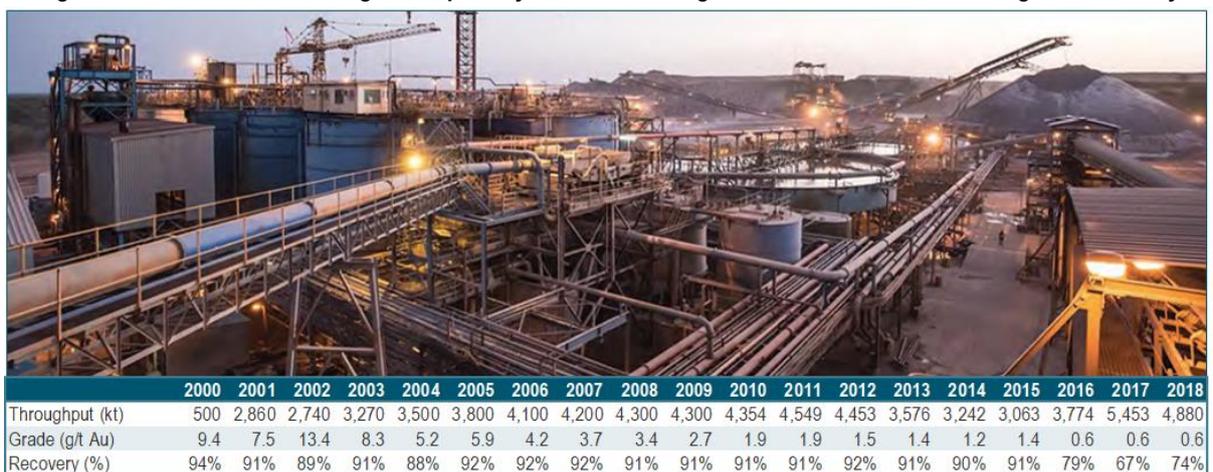
Figure 13: Schematic of Morila main pit and photos of main pit, Viper and N’Tiola pits



Source: Firefinch

**Processing:** The processing plant is rated for up to 4.5Mtpa of fresh rock with a conventional flow sheet that includes 3-stage crushing, SAG and ball milling (6MW each, grind size of P<sub>80</sub> 74µm) followed by three gravity concentrators and seven CIL tanks. Historical gold recovery is 91% with ~60% of gold recovered through gravity. The crushing and grinding circuits were turned off in 2018 following the completion of satellite mining and processing. Plant refurbishment works are nearly completed and comprise mainly minor part and steelwork refurbishment. The mills are expected to be turned back on in late Q2 as gold production from tailings is supplemented by satellite pits.

Figure 14 Plant with CIL in foreground, primary crusher in background, and historical tonnes, grade, recovery



Source: Randgold; Note: picture taken when plant was processing hard rock ore

**Tailings:** As the contents of the tailings dam has been processed, the facility can again be used as a repository for tailings. A temporary partition in the tailings dam is being built to enable hydromining of remnant mineralized tailings for re-processing, while simultaneously enabling tailings deposition in another section of the facility. We expect tailings re-processing to complete by the end of Q3.

## Economics

We model Morila as an open pit only operation, with an 8-year open pit mine life at 4.0Mtpa at 1.5g/t, with 90% gold recovery, resulting in average annual production of 174koz per year at AISC of US\$1230/oz. This generates an NPV<sub>5%-1850</sub> of US\$405m or A\$0.49/sh. For scenario analysis, we ran a 500kt decline-accessed underground mine at 4.0g/t starting in 2026 for initial capex of US\$75m. This generates an additional US\$64m of NPV<sub>5%-1850</sub> discounted the present, and an IRR of 29%. We do not include the UG operation in our base case valuation.

**Figure 15 Economic summary**

	Base case					Base case			
	OP	Tailings	Total	UG		OP	Tailings	Total	UG
Mine inventory (Mt)	35,000	4,577	39,577	3,000	Mining Cost (US\$/t)	3.00	2.00	2.98	50.00
Mine grade (g/t)	1.5	0.5	1.4	4.0	Processing Cost (US\$/t)	17.00	8.00	15.17	17.00
Mine ounces mined (koz)	1,688	71	1,759	386	G&A Cost (US\$/t)	5.00	4.00	4.82	5.00
Strip ratio (x)	8.0	--	8.0	--	Initial capex (US\$m)	80	--	80	75
Recovery (%)	90%	56%	89%	90%	Sustaining capital (US\$/oz)	41	--	47	24
Production rate (ktpa)	4,000	na	4,000	500	Royalty (%)	6.0%	6.0%	6.0%	6.0%
Mine Life (years)	8.8	1.1	9.9	6.0	AISC (US\$/oz)	1,242	1,545	1,254	802.3
Total Gold produced (koz)	1,519	40	1,564	347	NPV <sub>5%-1850</sub>			405	64.2
Average annual production (koz)	190	35	158	58	IRR (%)			175%	29%

Source: SCPe. Base case includes open pit and tailings only, UG shown as scenario analysis but not included in base case valuation

Below we benchmark our operating cost assumptions to Barrick's 2018 Loulo-Goukoto technical report, Endeavour Mining's 2021 PFS on the Kalana project in Mali, and Syama's 2020 feasibility study on the Tabakoroni underground. Our operating cost assumptions lie between Endeavour's cost estimates and Barrick's.

**Figure 16: Cost benchmarking vs Endeavour Mining and Barrick Gold**

	Morila	Kalana	Loulo-Goukoto
Source	SCPe	2021 PFS	2018 Tech Report
Open pit mining cost (US\$/t)	3.00	2.71	3.08
UG mining cost (US\$/t)	50.00	--	49.30
Processing cost (US\$/t)	17.00	13.28	19.00
G&A cost (US\$/t)	5.00	3.97	7.70

Source: SCPe, Endeavour Mining, Barrick/Randgold; Mining costs for LG refer to Goukoto pit and Goukoto UG

Below we show sensitivity to discount rate, gold price, costs, size and grade. The project NPV appears most sensitive to grade and strip ratio from an operational perspective, as well as gold price. Overall the sensitivities suggest that there is significant upside to Firefinch's current EV of A\$191m (US\$146m).

**Figure 17: Morila NPV sensitivities**

1xNAV asset (US\$m)	US\$1,700/oz	US\$1,750/oz	US\$1,850/oz	US\$1,900/oz	US\$2,000/oz	1xNAV asset (US\$m)	US\$1,700/oz	US\$1,750/oz	US\$1,850/oz	US\$1,900/oz	US\$2,000/oz
DR: 0.0%	402	440	516	554	630	Grade: 1.30g/t	160	186	238	264	316
DR: 2.5%	354	388	456	490	557	Grade: 1.40g/t	237	265	321	349	406
DR: 5.0%	314	344	405	435	495	Grade: 1.50g/t	314	344	405	435	495
DR: 7.5%	280	307	361	388	443	Grade: 1.60g/t	391	424	488	520	585
DR: 10.0%	250	275	324	349	398	Grade: 1.70g/t	469	503	572	606	675
1xNAV asset (US\$m)	OP inventory: 25.0Mt	30.0Mt	35.0Mt	40.0Mt	45.0Mt	1xNAV asset (US\$m)	Mining: US\$2.50/t	US\$2.75/t	US\$3.00/t	US\$3.25/t	US\$3.50/t
Grade: 1.30g/t	162	201	238	310	373	Processing: US\$13.00/t	530	494	459	424	389
Grade: 1.40g/t	225	274	321	403	472	US\$15.00/t	502	467	432	397	361
Grade: 1.50g/t	288	348	405	495	572	US\$17.00/t	475	440	405	369	334
Grade: 1.60g/t	351	422	488	588	672	US\$19.00/t	448	413	378	342	307
Grade: 1.70g/t	414	495	572	681	771	US\$21.00/t	421	386	350	315	280
1xNAV asset (US\$m)	Strip ratio: 6.0x	7.0x	8.0x	9.0x	10.0x	1xNAV asset (US\$m)	Strip ratio: 6.0x	7.0x	8.0x	9.0x	10.0x
Grade: 1.30g/t	332	286	238	191	144	Mining: US\$2.50/t	554	514	475	436	397
Grade: 1.40g/t	415	368	321	274	227	US\$2.75/t	526	483	440	397	354
Grade: 1.50g/t	499	452	405	358	311	US\$3.00/t	499	452	405	358	311
Grade: 1.60g/t	582	535	488	441	394	US\$3.25/t	471	420	369	318	267
Grade: 1.70g/t	666	619	572	525	478	US\$3.50/t	444	389	334	279	224

Source: SCPe; all NPVs shown at 5% discount rate and US\$1850/oz unless otherwise noted

**Goulamina Lithium**

Goulamina is located in southwestern Mali, 195km by road south of Bamako and 50km west of the town of Bougouni. A sealed road exists to within 27km of the project. The project area is covered by Savannah woodland and is within the Sakarani River catchment, therefore project water is to be drawn from the Selingue Hydroelectric Dam via a 29km pipeline, supplemented by limited groundwater extraction. Goulamina is fully permitted for development of an open pit mine and milling facility to produce spodumene concentrate.

**Figure 18 Asset location and proposed site layout**



Source: Firefinch

**Geology**

Lithium-cesium-tantalum (LCT) pegmatites are formed in orogenic conditions and believed to derive from either melting of parental granites or zones of thickened crustal metasedimentary rocks. Goulamina is located within broadly N-S trending belts of Paleoproterozoic Birimian metavolcanic and metasedimentary rock intruded by syn and post-orogenic granitoids that host spodumene-bearing pegmatite dykes and sills. Outcrop is limited and geology is interpreted. Goulamina is composed of a series of sub-parallel spodumene-bearing pegmatite dykes that intrude the spodumene. Pegmatite contains between 0.5% and 25% of the Li-bearing spodumene.

**Figure 19: JORC-compliant reserves and resource estimate**

Property	P&P			M&I			Inferred			Total Resource		
	Tonnes (Mt)	Grade (%)	Li <sub>2</sub> O (kt)	Tonnes (Mt)	Grade (%)	Gold (kt)	Tonnes (Mt)	Grade (%)	Gold (kt)	Tonnes (Mt)	Grade (%)	Gold (kt)
Goulamina	52.10	1.51%	785	64.60	1.49%	965	43.90	1.38%	606	108.50	1.45%	1,571.000

Source: Firefinch DFS June 2020

**Mining and processing**

Mining is envisaged as standard drill-and-blast, load-and-haul open pit mining. The reserve pit contains 52.1Mt of ore and 169Mt of waste for a LOM strip ratio of 3.26x including 1.8Mt of inferred material classified as waste. Mining is scheduled to take place over 23 years plus an initial six-month pre-stripping campaign. Bench heights are 5m with some benches of 10m in waste. Planned fleet includes 2x 120-150t excavators and up to 10 90t haul trucks. The process plant is designed for throughput of 2.3Mtpa and consists of high pressure grind rolls (HPGR) followed by ball milling, magnetic separation and lithium flotation with total 15MW power draw. Ore is relatively hard with an average ball mill work index of 20.4kWh/t to achieve a grind size of P<sub>80</sub> 106-150µm. Testwork by Lydopodium indicated overall Li<sub>2</sub>O recovery of 81.1% with a finished concentrate of 6.11% Li<sub>2</sub>O with 0.56% and 290ppm MgO.

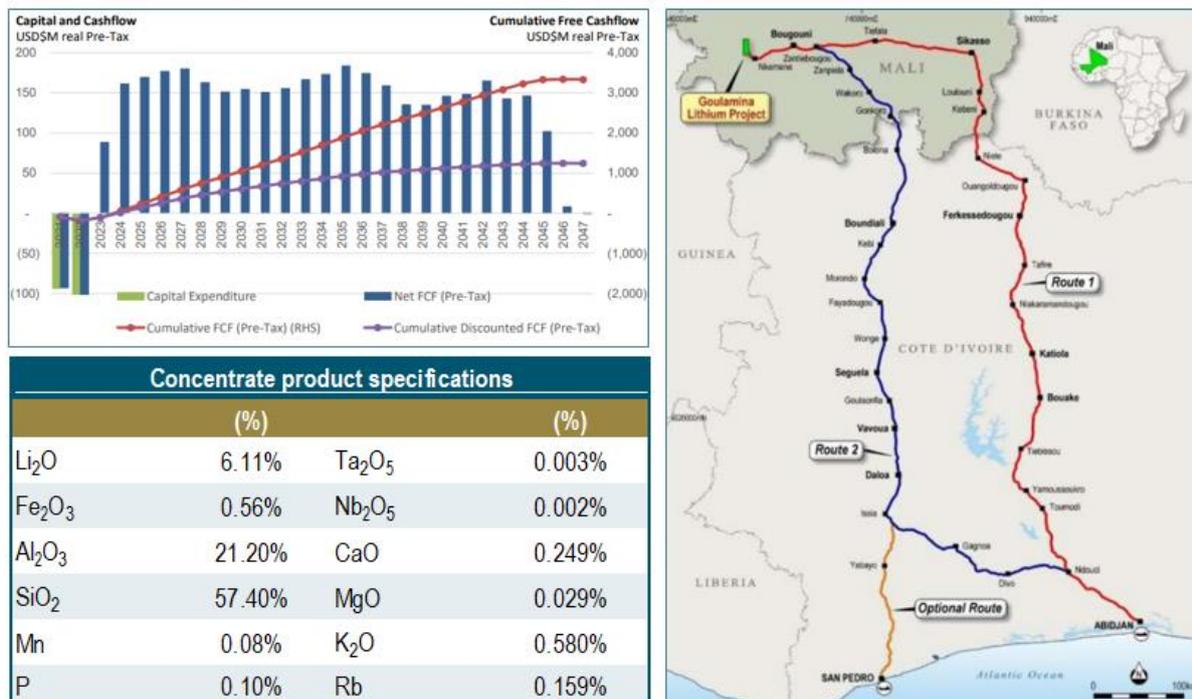
**Figure 20 Plant flowsheet and layout rendering**



Source: Firefinch

**Export and offtake considerations:** The product export transportation routes are both through Cote D'Ivoire to either the port of Abidjan or San Pedro. The product specifications include low magnesium and low iron levels, both advantageous to downstream processing. Major Chinese potential offtakers have expressed interest. China Minmetals commenced met testing on Goulamina ore in 2019, and General Lithium and signed an MOU to negotiate offtake of up to 55% of annual production in 2018, though a final binding agreement has not been reached.

**Figure 21 DFS cash flow summary, product specifications and export route**



Source: Firefinch; met testwork by Lycopodium in Perth

## Economics

The DFS generated a 23-year mine life producing 436kt of spodumene concentrate annually. Capex was US\$194m to build a 2.3Mtpa mill-flotation processing plant, a 15MW build-own-operate on-site diesel power station, a 29km water pipeline to draw water from the Selingue Dam, and associated site infrastructure. A life-of-mine concentrate price of US\$666/t was used, generating a post-tax NPV8% of US\$897m, IRR of 47% and 2-year capital payback period. At US\$450/t, the project generates an NPV8% of US\$288m. We currently attribute Goulamina a nominal NAV of US\$100m and apply a 0.5x NAV multiple in our NAV estimate for Firefinch.

**Figure 22 Economic summary of 2020 Goulamina DFS outcomes**

DFS outcomes			
Parameter	DFS outcome	Parameter	DFS outcome
Mine inventory (Mt)	52.0	Mining Cost (US\$/t mined)	3.72
Mine grade (% Li <sub>2</sub> O)	1.51%	Processing Cost (US\$/t processed)	16.08
Tonnes contained (kt Li <sub>2</sub> O)	785	G&A Cost (US\$/t processed)	2.69
Strip ratio (x)	3.3	Transport and handling (US\$/t concentrate)	98.98
Recovery (%)	77%	Royalty (%)	6.0%
Processing rate (ktpa)	2,300	C1 cash cost (US\$/t concentrate)	281
Mine Life (years)	23.0	AISC (US\$/t concentrate)	313
Concentrate grade (% Li <sub>2</sub> O)	6.11%	Price (US\$/t concentrate)	666
Total Tonnes produced (Mt concentrate)	9.9	LOM post-tax FCF (US\$m)	2,442
Average annual production (kt concentrate)	436	NPV8% (US\$m, post-tax)	897
Initial capex (US\$m)	194	IRR (% post-tax)	46.7%
LOM Sustaining capital (US\$m)	31	Payback period (years)	2

Source: Firefinch - 2020 Goulamina DFS

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TENDER:	0
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TOTAL	34

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