PITT STREET RESEARCH

Rafaella Resources Ltd

High-potential tungsten play

Share Price: A$0.08

ASX: RFR

Sector: Materials

2 December 2020

Rafaella Resources Ltd (ASX: RFR), a Brisbane-based resources company, owns the Santa Comba tungsten project in Spain. Tungsten is a critical material for industrial applications and thus is in high demand, notably for automotive applications and manufacturing of high-precision cutting tools. With the results of the Pre-Feasibility Study (PFS) and project flow sheet in place, RFR is set to fast-track the open-pit mining operations in order to generate sales in 2021.

Investment case

The Santa Comba project is a high-potential tungsten play having considerable upside — near-surface exploration target of 16.2 Mt to 48.6 Mt grading 0.15–0.23% WO_3. The presence of pre-existing infrastructure, offtake agreements and mining permissions are expected to support RFR's plans for ramping up its development efforts. Further, the latest DFS indicates the possibility of additional underground resources which adds to the appeal of the already favourable project economics. RFR also owns an early-stage copper-cobalt exploration site and a high-grade nickel sulphide project in Canada, which can provide it medium-term growth options.

Valuation range of A$0.197 – A$0.352 per share

We value RFR at A$19.7 cps base case and A$35.2 cps bull case using a DCF analysis of the Santa Comba project based on the latest PFS assumptions. An uptick in the site development work is anticipated to drive favourable sentiment and re-rating of the stock. Key risks that we see include 1) delay or other challenges in project financing; 2) contraction in tungsten prices and 3) metallurgical recovery being lower than estimates.

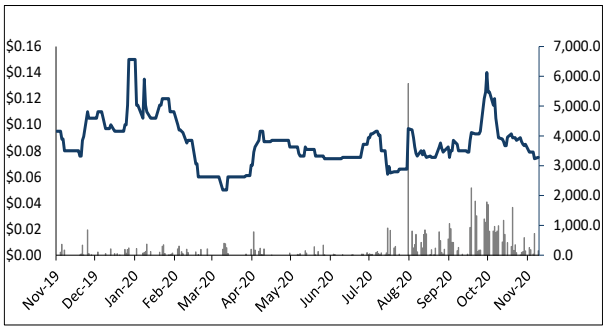
Year to June (A$)	2019A	2020A	2021f	2022f	2023f
Sales (m)	0.0	0.0	0.0	3.6	9.0
EBITDA (m)	-1.1	-2.4	0.0	2.5	6.5
Net Profit (m)	-1.1	-2.4	-0.0	-0.4	3.0
EPS (A cents)	-3.1	-3.7	-0.0	-0.3	2.2
EBITDA Margin (%)	NM	NM	NM	70%	72.4%
RoA (%)	NM	NM	NM	nm	12.3%
EV/Sales	NM	NM	NM	3.0x	1.5x
EV/EBITDA	NM	NM	NM	4.3x	2.0x
P/E	NM	NM	NM	NM	NM

Source: Company, Pitt Street Research

Market Cap. (A$ m)	8.5
# shares outstanding (m)	105.7
# shares fully diluted (m)	153.0
Market Cap Ful. Dil. (A$ m)	12.2
Free Float	76.4%
52-week high/low (A$)	0.22 / 0.05
Avg. 12M daily volume ('1000)	215.4
Website	www.rafaellaresources.com

Source: Company, Pitt Street Research

Share price (A$) and avg. daily volume (k, r.h.s.)



Source: Refinitiv Eikon, Pitt Street Research

Valuation metrics	
DCF fair valuation range (A$)	0.197 – 0.352
WACC	11%
Assumed terminal growth rate	None

Source: Pitt Street Research

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Rafaella Resources Ltd

Profit & Loss (A$m)	2019A	2020A	2021F	2022F	2023F	2024F	2025F	2026F	2027F
Sales Revenue	**-**	**-**	**-**	**3.6**	**9.0**	**18.1**	**18.1**	**18.1**	**18.1**
Operating expenses	(1.1)	(2.4)	-	(1.1)	(2.5)	(4.7)	(4.5)	(4.4)	(4.3)
EBITDA	**(1.1)**	**(2.4)**	**-**	**2.5**	**6.5**	**13.4**	**13.6**	**13.7**	**13.8**
Depn & Amort	-	(0.0)	(0.0)	(2.1)	(1.8)	(1.5)	(1.3)	(1.2)	(1.1)
EBIT	**(1.1)**	**(2.4)**	**(0.0)**	**0.4**	**4.7**	**11.8**	**12.2**	**12.5**	**12.7**
Net Interest	0.1	0.0	0.0	(0.7)	(0.7)	(0.7)	(0.7)	(0.6)	(0.6)
Profit before tax	**(1.1)**	**(2.4)**	**(0.0)**	**(0.4)**	**4.0**	**11.1**	**11.6**	**11.9**	**12.1**
Tax expense	-	-	-	-	(1.0)	(2.7)	(2.8)	(2.9)	(2.9)
NPAT	**(1.1)**	**(2.4)**	**(0.0)**	**(0.4)**	**3.0**	**8.4**	**8.8**	**9.0**	**9.2**

Cash Flow (A$m)	2019A	2020A	2021F	2022F	2023F	2024F	2025F	2026F	2027F
Profit after tax	(1.1)	(2.4)	(0.0)	(0.4)	3.0	8.4	8.8	9.0	9.2
Depreciation	-	0.0	0.0	2.1	1.8	1.5	1.3	1.2	1.1
Changes in working capital	(0.5)	(3.2)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Other operating activities	0.0	1.0	-	-	-	-	-	-	-
Operating cashflow	**(1.6)**	**(4.5)**	**(0.3)**	**1.5**	**4.5**	**9.7**	**9.8**	**9.9**	**10.0**
Development capex	-	-	(6.5)	-	-	-	-	-	-
Maintainence capex	-	-	-	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Payments for exploration and evaluation	(0.7)	(3.4)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
Other investing activities	0.7	3.5	(8.9)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)
Investing cashflow	**-**	**0.2**	**(9.4)**	**(1.2)**	**(1.2)**	**(1.2)**	**(1.2)**	**(1.2)**	**(1.2)**
Equity raised (repurchased)	0.1	2.3	2.7	-	-	-	-	-	-
Net proceeds from borrowings	-	(0.1)	6.2	-	-	-	-	-	-
Other financing activities	(0.4)	(0.0)	(0.0)	-	-	(0.0)	(0.0)	(0.0)	(0.0)
Net change in cash	(1.9)	(2.1)	(0.8)	0.3	3.4	8.5	8.6	8.7	8.8
Cash at End Period	3.3	1.2	0.4	0.7	4.0	12.5	21.1	29.9	38.7

Balance Sheet (A$m)	2019A	2020A	2021F	2022F	2023F	2024F	2025F	2026F	2027F
Cash	3.3	1.2	0.4	0.7	4.0	12.5	21.1	29.9	38.7
Total Assets	4.3	12.7	21.7	21.6	24.8	33.5	42.5	51.7	61.1
Total Liabilities	0.2	0.3	6.7	6.9	7.1	7.3	7.5	7.7	7.9
Shareholders' Funds	4.0	12.3	15.0	14.6	17.7	26.1	34.9	43.9	53.2

Ratios	2019A	2020A	2021F	2022F	2023F	2024F	2025F	2026F	2027F
Net Debt/Equity	-81.1%	-9.6%	39.0%	37.9%	12.4%	-24.1%	-42.8%	-53.8%	-61.0%
Total Cash/Total Assets	76.6%	9.3%	1.7%	3.1%	16.2%	37.4%	49.8%	57.8%	63.3%
Return on Equity (%)	nm	nm	nm	nm	18.8%	38.6%	28.8%	22.9%	19.0%

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Introducing Rafaella Resources, ASX: RFR

Rafaella Resources (ASX: RFR) is a Brisbane-based resources company, engaged in developing near-term projects in Spain and Canada. In Spain, RFR is developing its wholly-owned Santa Comba tungsten project, for which it has secured an offer for a 5-year offtake with H.C. Starck Tungsten GmbH (HC Starck). The project has potential for both open pit and underground mining, with a JORC 2012 mineral resource estimate of 10.6 Mt at 0.17% tungsten oxide (WO_3). The company also owns acreage in Canada, via the McCleery copper-cobalt project located in the Yukon Territory. Further, in August 2020, RFR acquired a 100% stake in the Midrim and Laforce nickel-copper-PGE exploration projects in Quebec, Canada.

Santa Comba is a well-researched project with existing infrastructure

Santa Comba's acreage encompasses an old tungsten mine and shows great potential for additional resources

The Santa Comba project, located in Galicia, an autonomous community of north-west Spain, encompasses an old tungsten mine that was last worked in 1985. In 2012, the mine was acquired by Spanish construction company, Incremento Grupo Inversor, which commenced construction of a new processing plant on the site. The plant was estimated to be 70% complete when the company became insolvent, leading to Santa Comba's assets being acquired by Galicia Tin & Tungsten SL (GTT SL), in May 2015. Later, in May 2019, the owners of GTT SL vended their interests into RFR for shares. RFR inherited the partly installed processing plant, with an installed crushing capacity of 682 ktpa run-of-mine ore as well as an underground access ramp. In our view, the existing mining infrastructure should reduce the re-commissioning time, thus fast-tracking the cash flow generation.

Tungsten holds an important place in the industrial value chain

Tungsten is a critical material in several major global markets owing to its economic importance and high supply concentration. Tungsten, a heavy, hard metal with the highest melting point, has a wide range of industrial and commercial uses. Notably, the automotive industry is a heavy user of tungsten, accounting for 30% of global demand. China accounts for over 80% of tungsten's global supply and thus plays a dominant role in price determination.

Tungsten carbide, one of the hardest manmade materials, is predominantly used in the production of cemented carbide. Tungsten carbide products are extensively used in drill bits, high-speed cutting tools, lathes and milling cutters.

Management is not relying solely on its flagship project

The company also owns projects in high-potential Canadian regions

Besides the Santa Comba project, the company owns an undrilled, early stage copper-cobalt exploration opportunity in the Yukon Territory of Canada – the McCleery project. The project has been selected in the Yukon Mineral Exploration Program under which up to 60% of eligible expenses (up to C$40,000) will be reimbursed by the government. In addition, RFR owns the Midrim and Laforce projects in Quebec, which is considered to have high prospects for significant nickel sulphides associated with gabbroic intrusive rocks. Moreover, the project lies in the Belleterre-Angliers Greenstone Belt, which was heavily explored by Falconbridge prior to its takeover by Glencore. We believe that owning a set of projects which target different minerals can provide the benefit of diversification to RFR in the long term, protecting it from risks faced from any particular end market.

What comes next for RFR?

The company has completed the Pre-Feasibility Study (PFS) for the Santa Comba project. With the PFS results and the process flow sheet in place, RFR plans to fast track the development of the open-pit mining operations at the site. Our understanding is that the PFS has secured firm quotes for most of the capital items and contract mining thereby providing feasibility level confidence. Given the low start-up costs RFR does not intend to produce a Definitive Feasibility Study, but rather plans to commence development activities from the start of 2021. Underpinned by the offtake agreements in place, RFR aims to begin generating sales by the end of 2021.

Ten reasons to look at RFR

1) **The Santa Comba project is a high-potential tungsten play**, with a JORC 2012 resource of 10.6 Mt tonnes at 0.17% WO_3 as per latest drill results, located in a well-researched area. Additionally, the project has considerable exploration upside, with near surface target ranging from 16.2 Mt to 48.6 Mt grading between 0.15% and 0.23% WO_3.
2) **Having acquired a project with substantial infrastructure in place commissioned by previous owners, allows RFR to hit the ground running**. Through its acquisition, RFR inherited a partially completed processing plant as well as an underground ramp. We believe that this will enable the company to fast-track the development process. Moreover, the project is in proximity to an operating quarry and concrete plant, with access to cheap grid power and is well-connected to three deep-water ports.
3) **Santa Comba has potential to provide near-term cash flows**. The company has all the necessary permissions for construction of the process plant and underground mining and through the local quarry operator can access the open pit material. With the PFS and process flow sheet in place, the company is targeting to start generating cash flows in 2021.
4) **PFS highlights significant underground potential**. The feasibility study indicates that there is substantial exploration potential for disseminated ore in high-grade quartz veins that are located to the immediate south of the current pit.
5) **Process flowsheet allows for significant cost savings**. RFR plans to use an X-ray ore sorting technology for pre-concentrate, which is expected to reduce the size of the process plant by ~50%, leading to significant capex and cost savings.
6) **The project enjoys strong industry support** in the form of a 5-year offer for offtake by HC Starck, a Germany-based provider of tungsten powders, as well as strategic investment by Transamine Trading. Notably, Transamine has also offered a 3-year, 100% offtake agreement for the tungsten and tin concentrate produced at the project site.
7) **Tungsten is expected to remain popular driven by its position as a strategic mineral** because of its wide industrial and commercial applications. Tungsten has a favourable long-term pricing environment as the global tungsten industry is correlated to economic growth and also because China, the world's dominant tungsten producer, is a key supplier.
8) We believe the fast tracking of the Santa Comba project in Spain is a **step in the right direction to help Western European nations reduce their reliance on Chinese supplies of tungsten.** There are several tungsten projects lined up in Spain and Canada, at the financing and permitting

stages, which signifies that European governments are supportive of initiatives to reduce dependence on China.

9) **The leadership team, which has rich experience in the resources sector,** will be an asset for RFR across different growth stages and geographies. Steven Turner, CEO and MD, has 25+ years of experience in the natural resources sector and has worked in Spain in the past.

10) **In our view, RFR is heavily undervalued as investors are not factoring in the full future potential of the company nor the low capital costs required to commence operations.** Our intrinsic value for RFR at A$0.197 in base case and A$0.352 in optimistic case, is significantly higher than the current market value. We believe a re-rating will be driven by RFR's success in securing the required funding, further offtake arrangements and meeting project milestones on schedule.

Santa Comba – the 'company maker' for RFR

Santa Comba, which has significant tungsten mineralisation, holds permits for underground mining, construction of the process plant and has access to open pit material via the local quarry operator

RFR entered into a Heads of Agreement on 27 May 2019 to acquire GTT SL which owns the Santa Comba development project in north-west Spain. Santa Comba is located 33 km north of the famous town of Santiago de Compostela and ~60 km to the south of the port town of A Coruña. Located in a productive tungsten and tin province, the project has permits for both open-pit and underground mining. The region has 36 sq km of active mining concessions and is 7 km from Santa Comba town, the likely source for much of the project's workforce. The project boasts impressive resources with a JORC 2012 resource of 10.6 Mt at 0.17% WO_3 and 154 ppm tin (Sn) for ~18,500 tonnes of tungsten oxide and 1,600 tonnes of Sn (Figure 1).

Figure 1: Mineral resource estimate for open-pit and underground mining at Santa Comba[1]

Type	Classification	Mt	WO_3%	Sn ppm	WO_3 t	Sn t
Near-surface	Measured	1.21	0.16	118	1,916	143
	Indicated	4.93	0.16	90	7,647	445
Total Measured + Indicated		**6.13**	**0.16**	**96**	**9,563**	**588**
Near-surface	Inferred	4.24	0.16	91	6,747	386
Underground[1]	Inferred	0.23	0.95	2,797	2,221	655
Total Inferred		**4.48**	**0.20**	**233**	**8,968**	**1,041**
Grand Total		**10.61**	**0.17**	**154**	**18,532**	**1,629**

Source: Company

There are a number of advantages for RFR with Santa Comba that are outlined below.

A long established history of tungsten in the region. Tungsten was first discovered at Santa Comba as far back as 1940. However, large-scale mechanised underground mining was commenced at Mina Carmen in 1980 by Coparex, a French company, with 150–250 ktpa ore mined and processed, over a four-year period. The extraction then was impressive as 66% WO_3 concentrate was produced with no deleterious elements while recovery stood at ~70%. Owing to a long history of mining in the region, there are large datasets available for historical exploration, processing and mine planning. We believe this will aid RFR in gaining an in-depth understanding of the operating region in a relatively short timeframe.

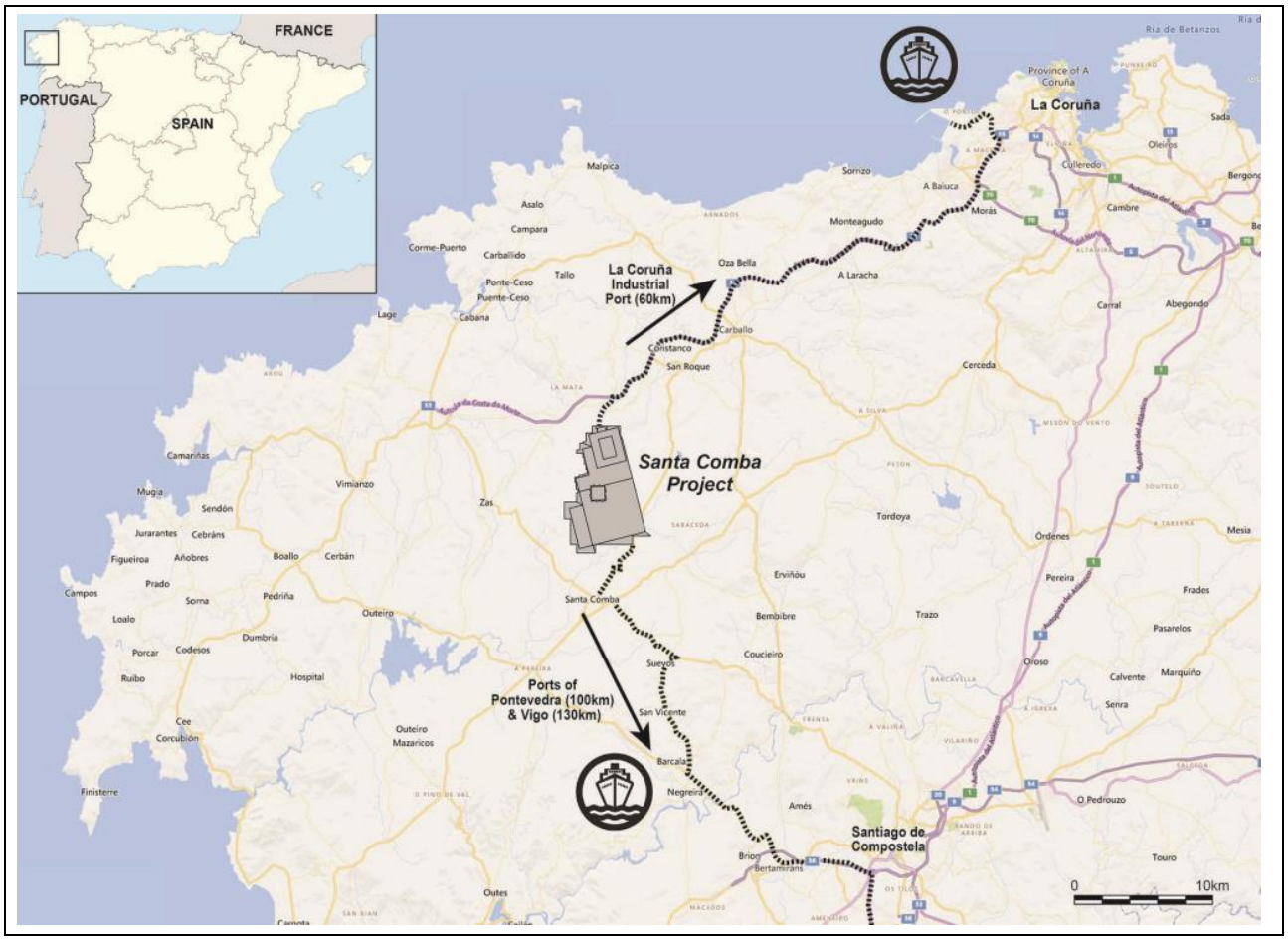
[1] 0.05% WO_3 cut-off for near surface resources; 0.53% cut-off for underground resources; 2016 underground inferred MRE remains unchanged.

Strategic location with good connectivity. The project is well-connected with three different ports namely, La Coruña (60 km), Pontevedra (100 km) and Vigo (130 km) (Figure 2). We believe that first-world infrastructure such as sealed roads, proper water sources and existing power lines will open the project to rapid development while also providing easy access to key end markets in Europe and USA.

Existing infrastructure to help production ramp-up

Significant existing infrastructure to enable quick production start. GTT SL had already commenced the installation of the processing plant in this region in 2012 with a crushing capacity of 680 ktpa. The underground access ramp is still in excellent condition. Not all the installed process equipment is fit for purpose, however the foundations and proximity of low cost grid power will allow for rapid installation and commissioning of a simplified inexpensive modular process plant.

Figure 2: Santa Comba project is favourably located near three ports



Source: Company

Local administration is supportive of mining activities. Galicia has a strong tradition in mining and its administration promotes mining activities with its initiative called 'Supporting Mining of Galicia'. Additionally, the local Santa Comba council is supportive of the project as it brings economic development and employment to the region. In fact, many local residents had worked for Coparex back in the 1980s. RFR already has the environmental and restoration bond in place with the Galician administration. In addition, the mining concessions have been granted until 2068. We believe a strong and

supportive administration will greatly enable ease of mining operations for RFR.

Site is available for both open-pit and underground mining. The site has the capability and permissions for both open-pit (via the quarry operator) and underground mining. While RFR will initially develop Santa Comba as an open-pit operation producing tungsten concentrates at the existing quarry site, it will gradually move to underground operations and will slowly ramp-up production to blend high-grade underground ore with open-pit material.

The project has pre-existing offtake agreements

Offtake offers and financing already in place. HC Stark, a leading Germany-based consumer, has offered a 5-year offtake agreement. Further, RFR has secured a strategic investment from Transamine Trading (Transamine), the world's oldest privately held commodity trader based in Geneva. Transamine has also agreed to provide logistical support and offtake for 100% of the tungsten and tin concentrate over a 3-year period. In our opinion, these offers provide strong revenue visibility to the company in its early commissioning period. Given the very low start-up cost and short payback period, the Company should benefit from several funding options.

PFS results support Santa Comba's upside potential

As per the results of the latest PFS completed by RFR, there is significant exploration potential for additional 'open pittable' ore at the Santa Comba project. Further, there is potential for additional underground resources. The 2016 study had indicated an underground JORC inferred mineral resource estimate of 0.234 Mt @ 0.95% WO_3 and 0.28% Sn (cut-off 0.53% WO_3). However, this did not include the disseminated ore between the high-grade veins. RFR estimates that taking the disseminated ore into account should yield an underground non-JORC resource of 3.4 Mt @ 0.59% WO_3 and 0.17% Sn.

PFS provides details on the geology at Santa Comba

The Santa Comba project site plays host to an intrusive body which includes metamorphic rocks. As part of the recent drilling programme, RFR drilled the southern part of the Varilongo Granitic, which is composed of mainly three types of granite:

- 2-Mica exogranite (EXG).
- Biotitic exogranite (BEXG).
- Endogranite (ENG).

Notably, all of these granites are cut by abundant quartz veins, which are known to contain tungsten and tin mineralisation, usually in conspicuous and condensed form. In addition, the endogranite also plays host to lower grade bulk disseminated tungsten mineralisation.

Quartz veins with diverse mineralogy are common in the area

The quartz veins in the Mina Carmen and Varilongo areas include diverse mineralogy. The chief economic minerals include wolframite (an iron manganese tungstate mineral), scheelite (a calcium tungstate mineral) and cassiterite (a tin oxide mineral).

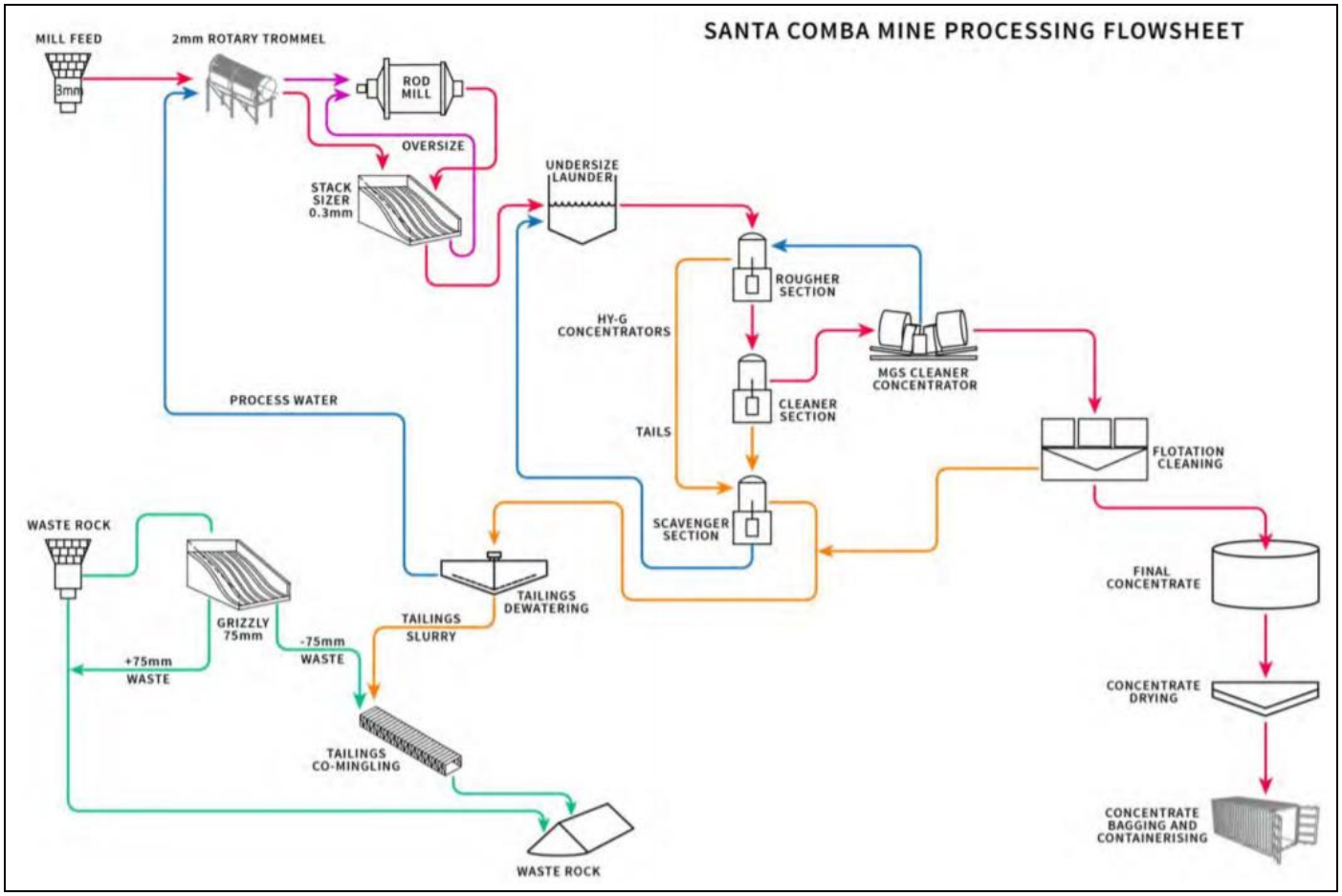
RFR to fast-track early cash flows in phase 1 by targeting the existing open-pit permit

The project is expected to produce ~765 kt/yr of sorted 'pre-concentrate' from 1.3 Mt/yr of ore. RFR has termed the first three years of production as phase 1, and plans to fast-track towards early cash flows by accessing ore through the existing open-pit permit held by Canteira da Minas (CdM). It plans to outsource the drilling and blasting processes, while the logistics and offtake will be managed by Transamine Trading for the initial three years of production. Stage 2 is the period when RFR operates under its own open pit permits.

Based on the open-pit mining schedule, the project has a mine life of approximately five years. The company has indicated an additional capacity for increasing the run-of-mine ore to up to 1.6 Mt/yr if underground operations start from about year 4 or earlier, at a rate of 150,000–200,000 t/yr.

Process flowsheet includes X-ray ore sorting which is expected to deliver significant operating and capital costs savings. RFR has based its mineral processing on proven extraction processes and technology (Figure 3). Additionally, RFR plans to use X-ray sorting pre-concentration technology after secondary crushing and before sending the upgraded product grading (~0.25% WO_3) into the fine crushing section and onto the processing section.

Figure 3: Santa Comba mine processing flowsheet



Source: Company

X-ray sorting helps increase head grade while simultaneously reducing the volume of tailings. The X-ray ore sorting can be used for both vein and disseminated ore type found in the Santa Comba acreage, and allows pre-concentration of crushed particles from 8 mm to 75 mm. Moreover, the use of ore sorting helps reduce the size of process plant by ~50%, leading to savings in energy consumption, tailings disposal volumes and staff employed.

RFR is currently designing the process plant for a throughput of ~ 765 kt of ore per year, assuming a 70% recovery. The company has initially included only primary sorting in its process flowsheet, but plans to carry out further tests to determine if an additional stage of secondary sorting will increase recovery and efficiency.

Project economics look promising. The company has determined the project economics taking into account three mining and processing rates each under three economic scenarios. The three economic scenarios are based on the recent prices for Ammonium Para Tungstate (APT), which is sold in 10 kg lots called mtu. These scenarios are as below.

- Optimistic pricing – US$300/mtu.
- Nominal flat Management Case pricing – US$ 240/mtu.
- Nominal flat Pessimistic pricing – US$ 180/mtu.

Based on the Optimistic pricing and process rates for a 6.5-year mine life, RFR is expecting to extract tungsten at a rate of ~1,000–1,400 t/yr from ~765 kt of sorted concentrate. The production and price estimates translate to the following key pre-tax financial results that will be highly favourable to RFR:

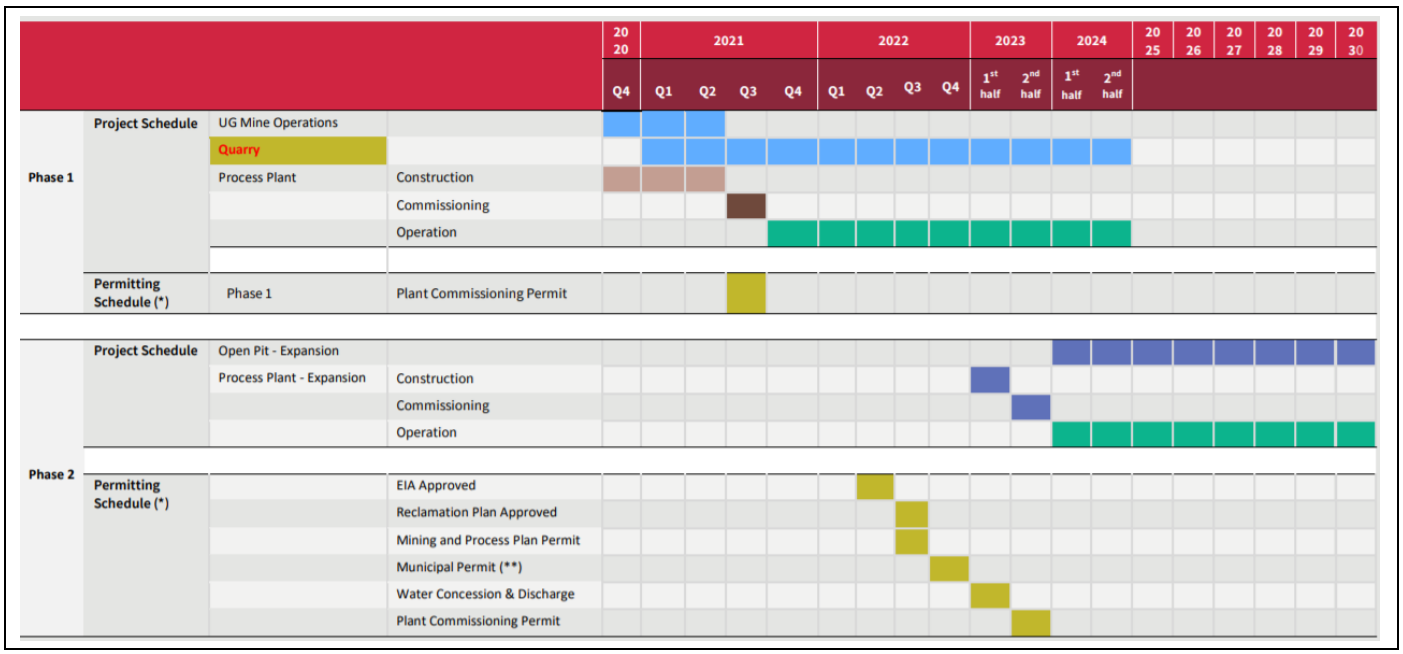
- Cumulative cash flow – US$80.9m.
- Net Present Value (NPV) – US$58.6m.
- Internal Rate of Return (IRR) – 203%.
- Payback: 0.42 years.

RFR has robust plans in place to reduce capital and operating costs

RFR plans to use a combination of new, used and refurbished equipment. Based on this plan, the company has estimated a capex of US$7.1m (including a 10% contingency) for upgrading the crushing and process plant. It expects to benefit from significant cost savings by using the ore sorting technology before the feed is sent to the process plant. The company has estimated the operating costs at 500,000 tpa to be US$6 per dry tonne. Since the ore is already pre-sorted at a sorting cost of ~EUR0.32/t (vs. US$6/t to treat ore) it reduces the volume of ore that is treated at the plant by approximately 50–55%.

Plant commissioning and equipment installation will require 9-12 months of permitting. Once RFR starts generating cash flows (Figure 4), it plans to expand its operations by applying for an open-pit permit within the Grupo Minero Santa Comba concession boundaries – phase 2 of the project.

Figure 4: Project and permit timeline[2]



Source: Company

Tungsten – a critical feedstock for industrial applications

Tungsten is a heavy metal with several unique properties including the highest melting point and being the second-hardest material (after diamond). It also has the highest tensile strength of any element and is highly conductive and corrosion resistant. These properties make tungsten extremely suitable for a wide gamut of industrial and commercial applications.

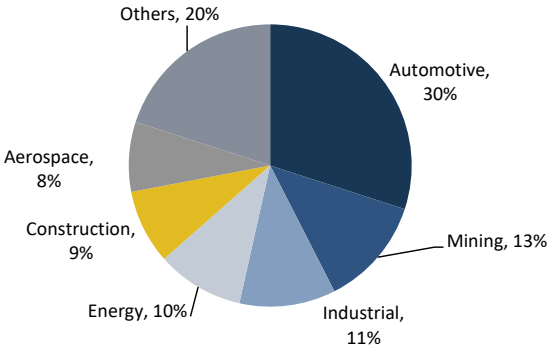
Automotive industry is a heavy user of tungsten with a share of 30% of total consumption

The main end-use sector (Figure 5) for tungsten is the automotive industry (tyre studs, ball joints, brakes, crank shafts and other parts), followed by mining, industrial, energy, construction, aerospace, consumer and defence (armour-piercing ammunition) industries. Notably, tungsten is also used in jewellery (it is a good substitute for gold as they have a similar density) and personal electronics (when coupled with cobalt and neodymium, this is what helps mobile phones vibrate).

In terms of product usage, there are four primary tungsten products (Figure 6). Tungsten is primarily used in the production of cemented carbide, as the latter's main component is tungsten carbide, one of the hardest manmade materials. Tungsten carbide products are used in heavy machine tooling and drilling including drill bits, high-speed cutting tools, lathes and milling cutters. As tungsten alloys are good conductors of electricity and have high tensile strength, they are used in rocket engine nozzles, turbine blades, wear-resistant parts and coatings. Tungsten chemicals are used in the oil, lubricants, mining, electronics and medical industries.

[2] (*)This chart includes the maximum legal time for the Administrations to process the applications and issue a resolution. But there could be delays in the process and issuance of the permits. (**) In the scope of the Autonomous Community of Galicia the need to obtain a municipal activity licence is generally suppressed. Notwithstanding the exploitation project could include works that should be authorised by the Town Council.

Figure 5: Use of tungsten in various industries



Source: Almonty

Figure 6: Primary tungsten products

Source: Happy Creek Minerals Ltd

Tungsten has been declared a critical raw material by the European Commission, the US Congress and the UK Geological Survey

Tungsten has been declared a critical raw material by the European Commission owing to its high economic importance and supply risk. Notably, strategic/economic importance and market importance/supply risk are the two key parameters used to determine the criticality of any material. As tungsten scores high on both the parameters (Figure 7), it is amongst the top three critical mineral resources. The US Congress passed the National Strategic and Critical Minerals Production Act in 2018, categorising tungsten as a critical mineral, and the UK Geological Survey places tungsten at the top of the supply risk list. In October, Australia released its updated Critical Minerals Prospectus 2020 reaffirming tungsten as a key critical mineral. As China remains a key supplier of tungsten, the supply risk is expected to remain high on account of geopolitical tensions, trade wars and the ongoing COVID-19 crisis.

Figure 7: Scoreboard of top five critical mineral resources

	Strategic Importance (A)				Market Importance (B)						
MINERAL RESOURCE	Contribution to New Business	Future Growth Probability	Frontline Industry Connection	Sub-total	Ubiquity of Resources	Ubiquity of Production	Degree of Resource Depletion	Scale of Import	Fluctuation of import volume	Sub-total	TOTAL (A+B)
Cobalt	12	10	8	30	2	2	2	7.5	8	21.5	51.5
Lithium	12	10	8	30	4	4	0	5	8	21	51
Tungsten	**12**	**5**	**8**	**25**	**3**	**4**	**3**	**5**	**8**	**23**	**48**
Nickel	12	2.5	8	22.5	0	0	3	10	8	21	43.5
Manganese	12	2.5	8	22.5	3	3	3	7.5	4	20.5	43

Source: Almonty

~60% of the world's total tungsten reserves lie in China

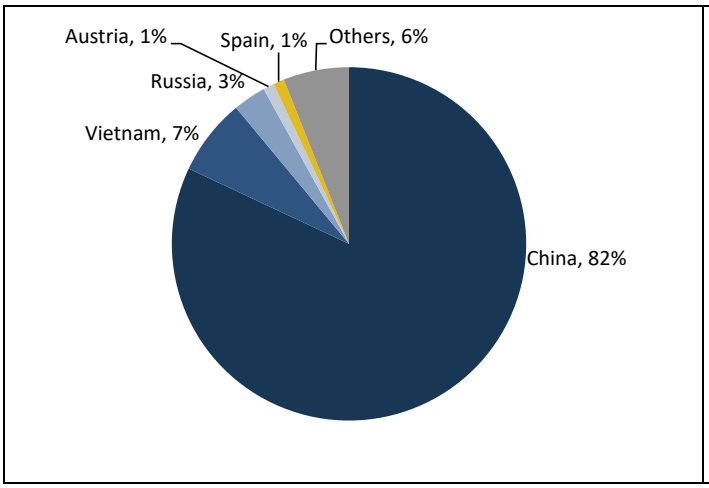
While the annual global production of tungsten hovers at ~90,000 tonnes, China produces over 80% (Figure 8) of the world's tungsten. ~60% of the global tungsten reserves are found in China (Figure 9) followed by Russia, Vietnam and Spain which in total make up ~11% of the reserves. The Chinese government, to curb supply, has regulated its tungsten industry by limiting the number of mining and export licenses, imposing quotas on concentrate production, and placing constraints on mining and processing.

The global tungsten market is expected to grow at a 3.7 CAGR during 2020–2027, in terms of volume

It is evident that non-Chinese supply of tungsten is limited, with miniscule contributions from Vietnam and Russia. Even Europe produces less than half of the 16,000 tpa demand originating from this region. As the need of the hour is to develop new mines outside of China, two large-scale Spanish tungsten mines, La Parrilla and Barruecopardo, came online in 2019. Further, there are several projects lined up in Spain and Canada at the financing and permitting stages, highlighting that the western economies are trying to

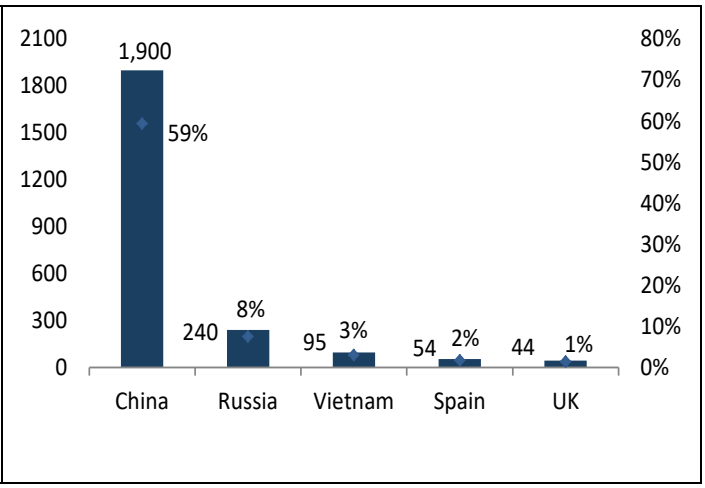
ramp-up tungsten production apart from seeking supply from the OECD. Notably, Roskill, an international research institute for metals and mineral products, projects that China's market share in tungsten will drop below 72% by 2029, unless new businesses are launched to compensate for the decline led by asset depletion. We believe that the fast tracking of the RFR's Santa Comba tungsten and tin mine in Spain is a step in the right direction which can provide Western Europe a long-term reliable source of tungsten concentrate.

Figure 8: China produces over 80% of the world's tungsten



Source: Almonty

Figure 9: Tungsten reserves (kmt, ls) and share of top five countries (%, rs)



Source: US Geological Survey

China dominates both global tungsten production and consumption, as it accounts for ~55% of tungsten use. Other major consuming regions are Europe, the US and Japan. As per the latest report by ReportLinker, a market research solution provider, the global tungsten market is expected to reach ~128,000 Mt by 2027, registering a 3.7% CAGR during 2020–2027. Notably, cemented carbides are projected to witness a 3.8% CAGR to reach ~80,000 Mt by 2027. Cemented carbides will continue to account for the dominant share of processed tungsten consumption since higher production in the construction, mining, aerospace, machinery and metal products industries will provide impetus to demand for tungsten-containing cutting tools, dies, drills and weights.

Tungsten prices have remained resilient in the current pandemic

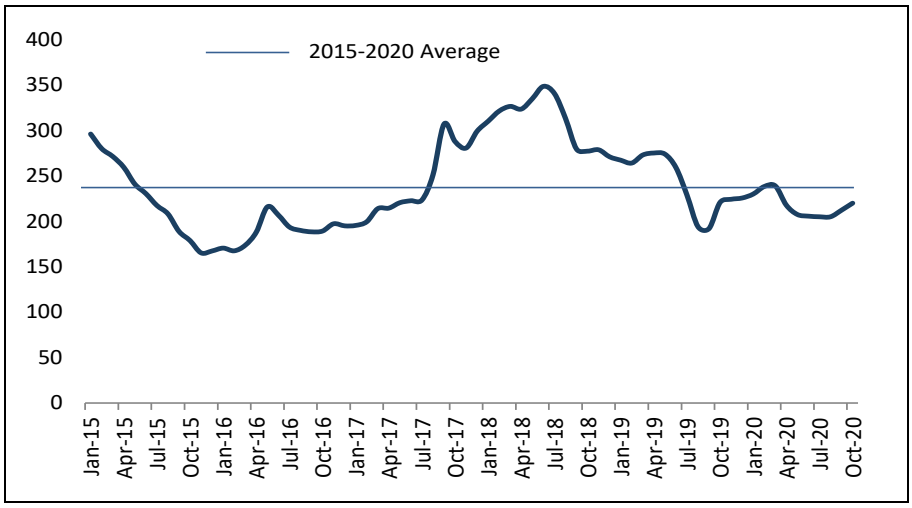
Tungsten prices are largely determined by China's output levels and this poses some pricing risk for the commodity. The internationally accepted benchmark price for tungsten products is based on APT which is a tungsten intermediate material commonly used to produce tungsten oxides.

In 2017, extensive environmental clampdowns in China drove tungsten prices up by ~50% as many large-scale operations were forced to halt production. The price (Figure 10) continued to rise until it hit a peak of US$352/mtu in June 2018. Following the resumption of operations by most of tungsten mines and APT smelters from late 2018, and sluggish demand in the Chinese automotive sector, prices plummeted to US$200/mtu in September 2019.

Tungsten prices have remained stable since October 2019

Tungsten prices have largely remained stable since October 2019 and have also recovered since the onset of the COVID-19 pandemic. We believe that a pick-up in economic activity from 2021 should support the long-term average tungsten price levels assumed in the RFR PFS of ~US$240/mtu.

Figure 10: US$ price of tungsten APT du Rotterdam (per mtu WO_3)



Source: Argus Media group

RFR Base Case price assumption contracts with more recent tungsten feasibility studies which have used $300/mtu. RFR has run a US$300/mtu pricing and production scenario for industry peer comparative purposes (Figure 11).

Comparable companies in the tungsten mining space

For RFR's peers, we have considered pure-play tungsten companies (Figure 11) across developed markets with a market capitalisation below US$500m.

- **Almonty Industries** (TSX: ALL): The company specialises in acquiring distressed and underperforming tungsten assets. It currently holds two tungsten projects in Spain, and one each in Portugal and South Korea. It is headquartered in Toronto, Canada.
- **Tungsten Mining NL** (ASX: TGN): It primarily focuses on owning and developing tungsten assets in Australia. It currently holds four assets across Australia with three underground and one open-pit mining projects. The company is based in Perth, Australia.
- **King Island Scheelite Ltd** (ASX: KIS): The firm is focused on the redevelopment of its 100%-owned Dolphin tungsten mine located in Tasmania, Australia. The company was previously known as GTN Ltd and it is based in Sydney, Australia.
- **Pan Asia Metals Ltd** (ASX: PAM): The company engages in the exploration and development of specialty and base metal projects in South East Asia. It holds two tungsten assets, one in Thailand and the other in Australia, both of which are underground mining projects. The firm is based in Bangkok, Thailand.
- **W Resources Ltd** (AIM: WRES): The company engages in the exploration, development, and production of tungsten, tin, copper, and gold. Its flagship project is the La Parrilla project located in Spain. The company was incorporated in 2003 and is based in London, the United Kingdom.

As displayed below, amongst the tungsten projects that have disclosed their economics output based on c.US$300/mtu WO3 pricing assumption, RFR generates the most robust economics, reflected in its highest pre-tax IRR of 203%. It is worth noting that RFR has the ability to quickly add value through drilling additional resources and supplementing lower grade open pit material from its underground operations, representing substantial upside potential to the current valuation of its open-pit operation.

Figure 11: Key tungsten mines comparable to the Santa Comba mine

Company	Ticker	Tungsten Project	Stage	Type	Pre Tax NPV (US$M)	Pre Tax IRR (%)	Payback Period (Yrs)	WO3 Price Applied (US$/mtu)
Almonty Industries	TSX: All	Panasqueira, Portugal	Producing	Underground	nm	nm	nm	nm
		Los Santos Mine, Spain	Producing	Underground	nm	nm	nm	nm
		Sangdong, South Korea	Development	Underground	97.0	nm	nm	300
		Valtreixal, Spain	Development	Underground	16.1	24	nm	370
Tungsten Mining NL	ASX: TGN	Mt. Mulgine, Australia	Development	Underground	nm	nm	nm	nm
		Watershed, Australia	Exploration	Open Pit	nm	nm	nm	nm
		Big Hill, Australia	Exploration	Underground	nm	nm	nm	nm
		Kilba, Australia	Exploration	Underground	nm	nm	nm	nm
King Island Scheelite Ltd	ASX: KIS	King Island Scheelite	Development	Underground	102.2	47	2.8	300
W Resources	LON: WRES	La Parrilla Project	Producing	Open Pit	59.0	64	2.0	300
		Régua Project	Producing	Underground	nm	nm	nm	nm
		Tarouca Project	Development	Underground	nm	nm	nm	nm
Pan Asia Metals Ltd	ASX: PAM	Khaoo Sun Tungsten, Thailand	Exploration	Underground	nm	nm	nm	nm
		Minter Tungsten, Australia	Exploration	Underground	nm	nm	nm	nm
Rafaella Resources	**ASX: RFR**	**Santa Comba, Spain**	**Development**	**Underground/Open Pit**	**58.6**	**203**	**0.4**	**300**

Source: S&P Capital IQ, Company Technical Reports

McCleery copper-cobalt project in exploration stage

The McCleery copper-cobalt project is an undrilled, early stage copper-cobalt exploration opportunity in Canada's Yukon Territory (Figure 12). The project is ~170 km southeast of Whitehorse, the territorial capital of Yukon. Teslin, the nearest town, with a population of 2,000 is ~40 km southwest of the project. The terrain is mountainous with precipitous northeast-facing cirques and ridges. Most of the area is covered by scree, with only the ridge-tops and cliff-faces providing outcrop. The property is entirely above the tree line with only alpine grasses present.

Figure 12: Location of the McCleery project

Source: Company

Presence of copper mineralisation provides confidence to undertake further exploration exercises

Historical sample returned impressive results. In 1982, J.C. Stephen Explorations Ltd (JCSE) carried out geological mapping over the project and submitted 35 rock samples from several skarn horizons for analysis. 14 of the 35 samples were assayed for copper, with over half returning values greater than 1.0% copper. A single rock chip was analysed for cobalt which returned 0.76% cobalt and 14 g/t silver. Several other showings in the area were reported to host cobalt minerals, including cobalt bloom, a secondary cobalt mineral known as erythrite and cobaltite (cobalt sulphide).

Established base metal occurrence gives confidence for further exploration. The project was examined in the 1970s and 1980s by previous explorers who completed geological mapping, sampling and rock chip sampling. However, no drilling work has ever been done on this project. The presence of copper, silver and base metal occurrences within the project has given RFR the confidence to plan future exploration programmes in the project.

Government funding in place to support the geochemistry mapping programme

Government funding available for the project: RFR has recently been selected to receive government funding from the Yukon Mineral Exploration Program for exploration expenditure in 2020. This fund is designed to support companies to explore and develop mineral projects to an advanced exploration stage. The McCleery project is allowed a maximum reimbursement of 60% of the eligible expenses up to a maximum of C$40,000. RFR has successfully received the class 1 notification for the project, which will enable it to carry out Class 1 exploration work in identified areas around the territory.

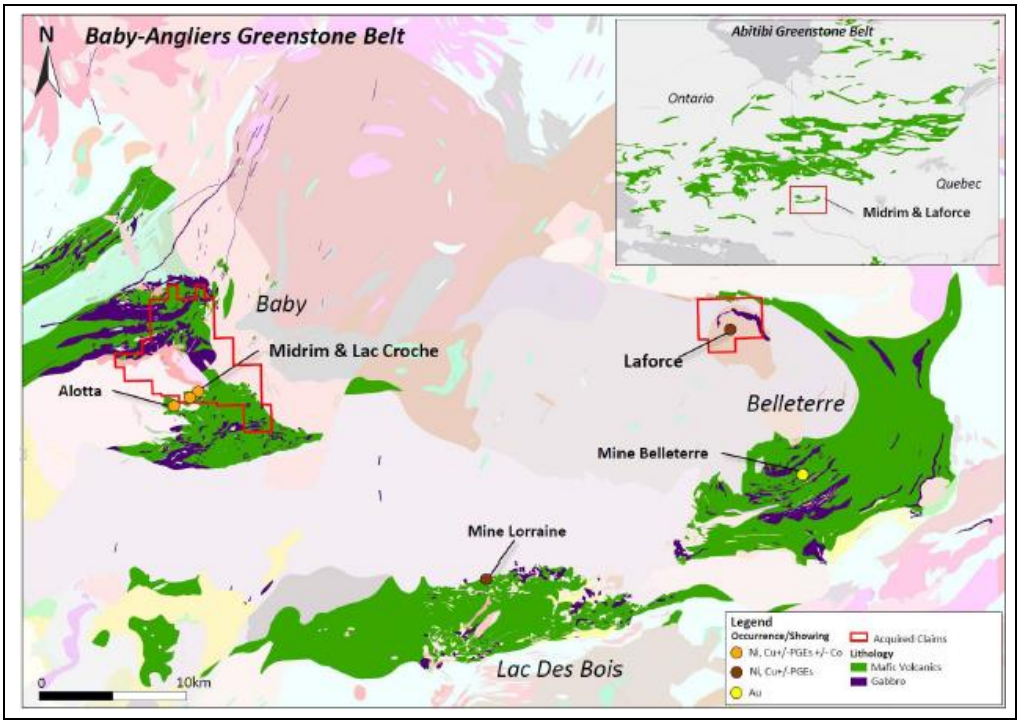
Midrim and Laforce projects provide diversification opportunities in medium term

In August 2020, RFR expanded its presence in Canada with the acquisition of Midrim and Laforce projects from Meteoric Resources NL and Ressources Meteore Sub Inc. The projects, located within the Belleterre-Angliers Greenstone Belt (BAGB) of Quebec, contain many drill holes of nickel-copper sulphide mineralisation with associated platinum group metals and cobalt credits.

The projects underpin RFR's expansion in Canada and provide opportunity for medium-term development

Midrim project is aligned closer to the company's business model. The Midrim project occurs in the Baby segment of the BAGB and is hosted within a 330 metre long and 85 metre wide gabbroic intrusion. The bulk of drilling in this region is shallow (sub 200 metre depth) and represents proof of concept that the gabboric intrusive system is fertile and productive for formation of high-grade, nickel-copper-platinum group elements mineralisation. This project is well-aligned with the company's focus on identifying shallow ore bodies potentially capable of straightforward open-pit mining operations. Based on the latest due diligence, nickel tenor at the Midrim equates to ~5% nickel in 100% sulphide.

Figure 13: Location of the Midrim and Laforce projects in BAGB



Source: Company

Laforce remains an unchartered territory when it comes to exploration. The Laforce project lies on the northern extent of the BAGB, which also hosts the historical Belleterre Gold Mines. The Laforce project has never been surveyed with the ground or borehole time-domain electromagnetic method which is considered the standard for nickel exploration. Similar to the Midrim project, the bulk of drilling is shallow (sub 200 metre depth). Based on the latest due diligence, Laforce returned an impressive 10% nickel in 100% sulphide.

RFR intends to conduct a low frequency Heli-EM survey across both the Midrim and Laforce claims in 2021 targeting anomalies that may assist it in identifying the feeder system to these small high grade pods of nickel-copper-

PGE mineralisation. This programme has the potential to unlock tremendous shareholder value and in our opinion would lead to a material rerating of the stock.

In our view, the addition of these two projects is in line with the company's broader objective of exploring shallow deposits. Further, based on the latest due diligence, the results in terms of consistency of presence of nickel are encouraging. Moreover, these additions are in a jurisdiction with which the company is very familiar.

Valuing RFR

We base our AUD 19.7 cps base case valuation and AUD 35.2 cps bull case valuation for RFR on a DCF analysis of the Santa Comba project.

Our base case modelling is based on the 6.1 Mt measured and indicated resource used in the PFS, a 70% recovery factor for WO_3, an open-pit average WO_3 grade of 15.7% and subsequent project development guidance from management.

Figure 14 shows our base case operating assumptions.

Figure 14: Base case assumptions

Santa Comba Project (100% owned by RFR)	Base	Bull
Mining	Open-pit	Open-pit
Year of mining and construction start	2021	2021
Years needed for commencement of commercial production	1	1
JORC Resource (Mt)	6.1	6.1
Ore extracted during the project (Mt)	5.9	6.0
Throughput rate / Plant capacity (Mtpa)	0.50	1.00
Open-pit average grade of WO3 (%)	15.7%	15.7%
Expected WO3 recoveries	70.0%	75.0%
Mine life (years)	13	6
Stripping ratio (t:t)	3.4	3.0
Price of WO3 (US$/mtu)	240	300
Tax rate	24.0%	24.0%
Pre-production capex (US$M)	6.5	5.9
Sustaining capex (US$M)	0.5	0.5
Long-run opex (US$/t)	6.0	5.7
Conversion from Mt to mtu	100,000,000	100,000,000
USD/AUD	1.37	1.37

Source: Company

Our other key DCF assumptions are as follows:

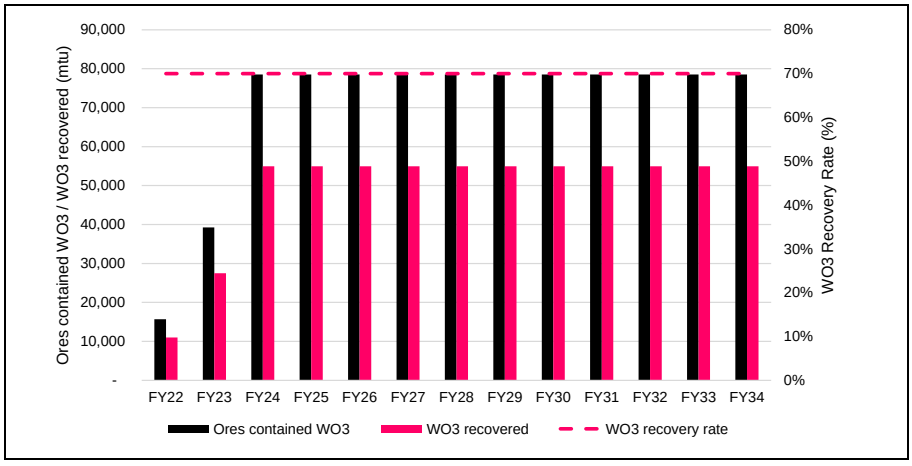
- **Discount rate.** We assume a WACC of 11.0%, reflecting a 15.3% cost of equity and a 9.1% cost of debt, as we expect that pre-production capex will be funded by a mix of debt and equity. Included within our elevated cost of equity is a layer of country risk premium of 2.4%[3] to price in any additional risks associated with operating in Spain.
- **Product pricing.** In line with the DFS, our base case conservatively assumes approximately US$240/mtu flat pricing for WO_3 recovered, with our bull case uplifting it to US$300/mtu. As mentioned earlier in the note, tungsten prices have largely remained stable since October 2019 and have also recovered since the onset of COVID-19. To reiterate, we believe that a pick-up in economic activity from 2021 should support long-term average price levels of tungsten at US$240/mtu.

[3] Country risk premium in Spain according to Aswath Damodaran.

- **Operating costs.** Guided by management, our base case assumes long-term operating costs of US$6/t. Combining this with our production and pricing assumptions, we obtain a long-term operating margin of >75%. Our bull case assumes RFR to achieve operating cost savings via the use of ore sorting to remove barren rock inclusions in the ore and thereby reduce the volume of ore being treated, resulting in lower sorting cost which in turn will drive higher margins than our base case.
- **Funding.** We assume development capex to be funded 70:30 between debt and equity. Our base case assumes that RFR will conduct its equity issuance at 8.5 AUD cps. Our bull case however assumes a higher equity price at 10.2 AUD cps to reflect RFR's potential re-rating as it achieves near-term milestones. And with a higher equity price from which RFR could base its capital raise on, the resultant effect would be less dilution.
- **Tax.** We assume a corporate tax rate of approximately 24%.

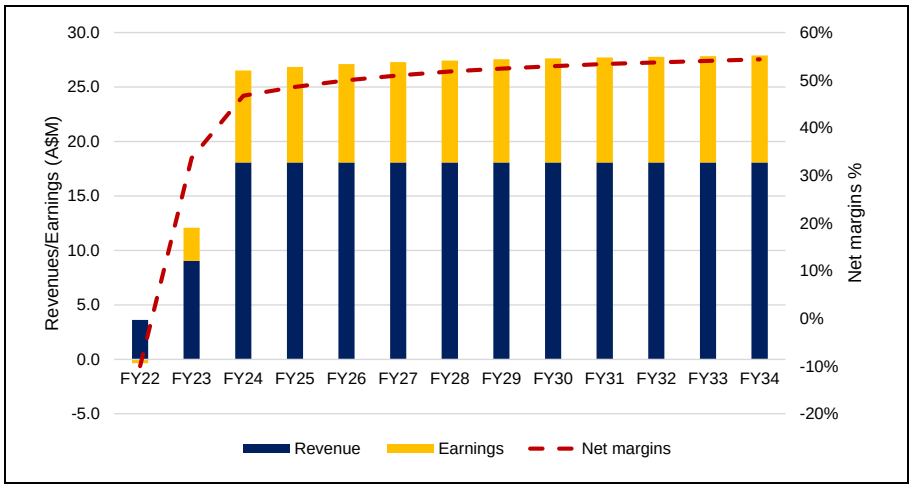
Figure 15 illustrates our base case production outlook for WO_3. Figure 16 shows our forecast revenue and net earnings profile, which assumes mine construction to commence in 2021, with the first production of WO_3 in 2022, sequentially ramping up towards its 500 ktpa nameplate capacity in 2024.

Figure 15: Base case WO_3 production outlook



Source: Pitt Street Research

Figure 16: Forecasted revenue and net earnings profile



Source: Pitt Street Research

Figure 17 shows our post equity financing valuation summary for the Santa Comba project. The midpoint of our valuation range is 27.4 AUD cps.

Included within our valuation is an assumed A$2.7m equity raising in 2021, which would increase share count to 184 million base case and 179 million bull case.

Figure 17: Valuation summary

Valuation (Post equity financing)	Base	Bull
NPV of Santa Comba Project	42.1	68.9
Net debt (cash)	5.8	5.8
Minority Interest (m)	-	-
Other Investments (m)	-	-
Equity value (A$M)	**36.3**	**63.1**
Diluted shares (M)	184.5	179.2
Implied price (AUD cents)	19.7	35.2
Current price (AUD cents)	8.0	8.0
Upside (%)	*145.7%*	*339.9%*

Source: Pitt Street Research

Re-rating RFR

We foresee the stock being re-rated, driven by the following factors:

- Timely arrangement of project financing (debt/equity) at attractive terms.
- Binding offtake agreements with other companies on remaining production from Santa Comba.
- Significant initiatives to improve the projects economics including drilling up additional resources and project enhancing recoveries.
- Achieving intermittent project milestones ahead of planned timelines.
- Politive results from the Midrim and Laforce planned heli-EM surveys

Highly experienced leadership

The current leadership team of RFR (Figure 18) possesses extensive experience in the natural resources sector with proven ability to grow junior mining companies.

Figure 18: RFR's board members

Name and Designation	Profile
Steven Turner **CEO and Managing Director**	• Steven has an extensive experience of over 25 years in the natural resources sector. • Most recently, he headed business development at a private mining group and successfully led the company's growth, from a junior to mid-tier Australian base metal operator. • He was previously the CFO of a dual-listed uranium mining company based in Spain. • He is a fellow of the Chartered Accountants of England and Wales and a member of the Australian Institute of Company Directors.
Robert Wrixon **Executive Director**	• He is currently a director of Starboard Global Ltd, a venture capital group, and has 20 years of experience in corporate strategy, commodities marketing, mining M&A and mineral exploration management. • He holds a PhD in mineral engineering from the University of California, Berkeley.
Ashley Hood **Non-executive Director**	• Ashley has over 15 years of experience in the mining industry and has worked for mining firms based in Australia and New Zealand. • He has personally held and managed a number of his own exploration projects. • He specialises in project and people management, native title negotiations, logistics, project diligence and acquisitions.
Peter Hatfull **Non-executive Chairman**	• Peter has over 30 years of experience in varied senior executive positions with Australian and international firms. • He is experienced in business optimisation, capital raising and company restructuring. • He graduated as a Chartered Accountant in the UK and worked for PwC in the initial years of his career.
Royston Denysschen **Non-executive Director**	• Royston is a Transamine Trading nominee. • He has been active in business development, commerce and logistics globally for over 20 years. • He has held Board positions in South African, Botswanian, Australian, and Canadian businesses. He is currently employed at Transamine Trading where he was Director for Africa for 10 years.

Source: Company

Appendix I – Capital Structure

Class	In million	% of fully diluted	Note
Ordinary shares	105.7	69.1%	
Listed and unlisted options	39.5	25.8%	Average exercise price 26.9 cents; expiry between October 2021 and Nov 2022
Performance shares	7.8	5.1%	
Fully diluted shares	**153.0**		

Source: Company

Appendix II – Major Shareholders

Meteoric Resources NL is currently the largest shareholder in RFR with a stake of 12.1%, followed by Adam Blumenthal and related parties at around 11.6%.

Appendix III – Analyst Qualifications

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.
- In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.
- Since 2018, Stuart has led Pitt Street Research's Resources Sector franchise, spearheading research on both mining and energy companies.

Cheng Ge is an equities research analyst at Pitt Street Research.

- Cheng obtained a B.Com in Finance and LL.B from University of New South Wales in 2013, and has passed all three levels of the CFA Program.
- Before joining Pitt Street Research, he has worked for several financial services firms in Sydney, where his focus was on financial advice.
- He joined Pitt Street Research in January 2020.

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