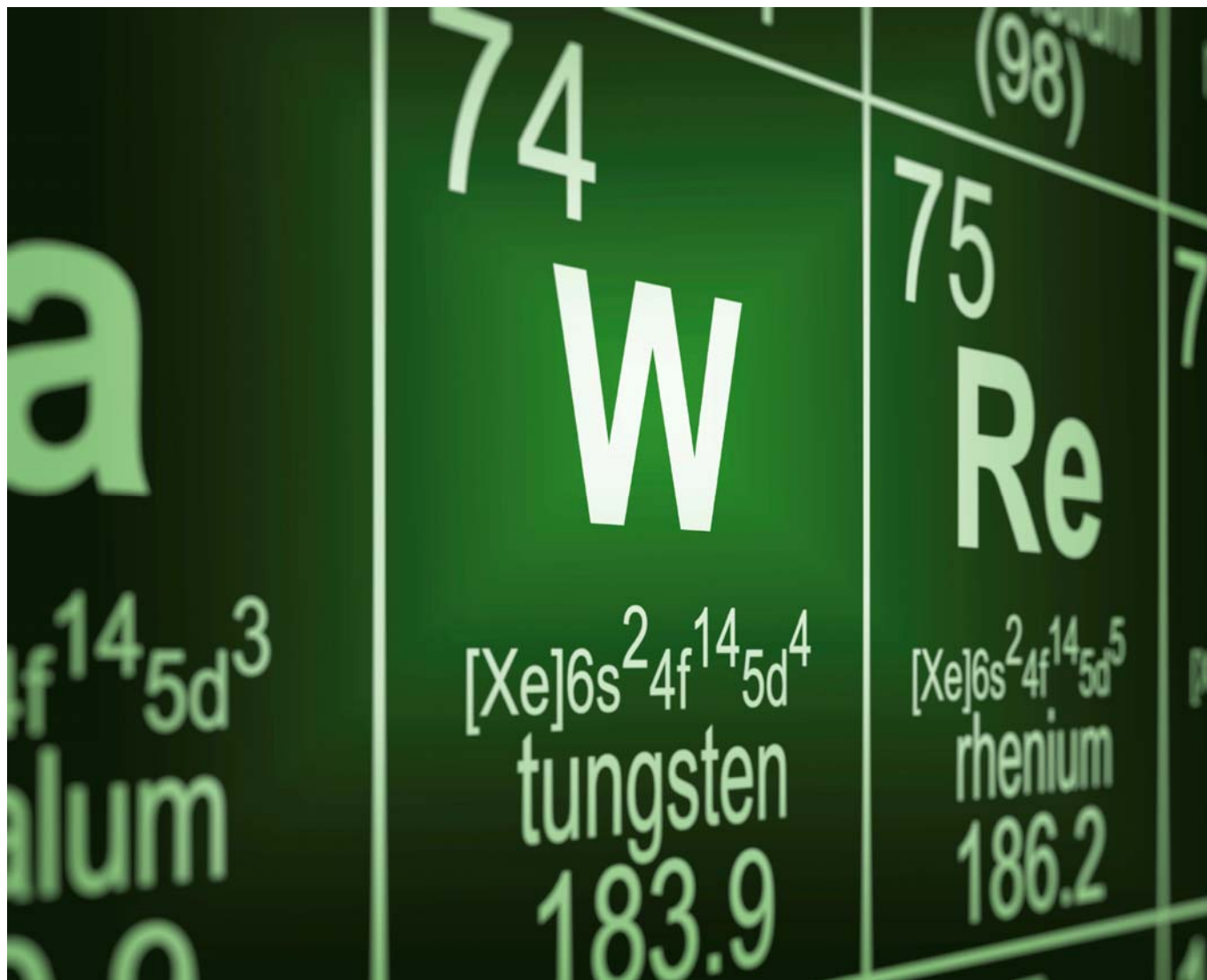




EDISON



©iStockphoto.com/JacobH

Tungsten

Small sector for big returns

Sector report, December 2014

Published by Edison Investment Research

Tungsten

Small sector for big returns

Sector report

Metals & mining

9 December 2014

Global tungsten demand has enjoyed strong historic growth due to the metal's increasing usage in tooling and a variety of other engineering solutions. Despite slower growth ahead, we expect global tungsten consumption to expand at a CAGR of 3.5% in 2014-18e. Coupled with lagging supply, this leads us to see potential for an APT price recovery. Our view is supported by incentive price analysis suggesting that an APT price above US\$350/mtu is required to bring new mine capacity into production. At the equities level, we see a number of producing and advanced tungsten projects that offer good industry exposure.

Tungsten demand: Slower growth ahead...

Our analysis suggests that tungsten demand growth is likely to slow over the next five years against the backdrop of weaker economic growth in emerging markets, China in particular, and uneven economic recovery in the developed countries. Still, we see global tungsten demand reaching 111kt of W equivalent in 2018e, a 3.5% CAGR from 2013. This compares to a more conservative 2.6% CAGR forecast from Roskill and a 5.4% historic CAGR in 2000-13. In China, after an explosive 10.0% CAGR in 2000-13, near-term tungsten consumption growth is likely to slow to low single digits, potentially having a negative impact on the international market.

...but is a new supply shortage already looming?

With Nui Phao ramping up in 2014 and Hemerdon slated for first production in H215, the global tungsten market looks relatively balanced in 2015/16. That said, while Nui Phao produces APT, the market for concentrates will only see 345kmtu of WO₃, or c 3% of global consumption, in new material from Hemerdon. This means that the upstream segment could remain relatively undersupplied, with concentrate discounts to APT potentially narrowing. Based on a forecast demand CAGR of 3.5% in 2014-18e, we expect the global tungsten supply-demand balance to tighten towards 2017/18, as new capacity additions continue to lag consumption.

APT prices have to recover to bring new mine supply

APT price weakness is likely to continue in 2015 due to improved material availability and slower demand. However, we believe that tungsten prices are set to recover in 2016-18, as new mine supply will be required to meet growing demand. We estimate that the APT price has to move above US\$350/mtu to bring new mine capacity into production. Our analysis of the most advanced tungsten projects suggests a capacity-weighted APT price of c US\$389/mtu is required for new projects to generate IRR of 20%, with greenfield capacity requiring higher prices.

Equities: How to invest in the sector

At the equities level, the tungsten sector is not the easiest to invest in due to the relatively small scale of projects and micro-cap nature of the stocks. Still, there are a number of producers and advanced projects that offer good industry exposure. Among the independent miners and near-term producers, we would highlight Almonty and Wolf Minerals, while the advanced mine projects include several Australian players, as well as Northcliff in Canada and Ormonde in Europe.

Companies profiled in this report

Almonty Industries*	ALI.CN
Carbine Tungsten	CNQ.AU
King Island Scheelite	KIS.AU
North American Tungsten	NTC.CN
Northcliff Resources	NCF.CN
Ormonde Mining	ORM.LN
Tungsten Mining	TGN.AU
Vital Metals	VML.AU
Wolf Minerals	WLF.AU
Woulfe Mining	WOF.CN
W Resources*	WRES.LN

*Denotes an Edison client

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

Contents

Tungsten: An overview	2
Tungsten demand: Slower growth ahead	4
Tungsten consumption forecast by region	9
Supply: China plays the main role	14
Historic tungsten prices and forecasts	19
Valuation: Resource multiples are not very revealing	21
Company profiles	23
Almonty Industries	24
Carbine Tungsten	25
King Island Scheelite	26
North American Tungsten	27
Northcliff Resources	28
Ormonde Mining	29
Tungsten Mining	30
Vital Metals	31
Wolf Minerals	32
Woulfe Mining	33
W Resources	34

Tungsten: An overview

The focus of this report is tungsten supply-demand fundamentals and long-term price analysis. Despite the anticipated reduction in near-term growth rates on the back of weaker economic growth in emerging economies, China in particular, and the uneven economic recovery in developed countries, we see global tungsten consumption expanding at a relatively healthy CAGR of 3.5% in 2014-18e compared to 5.4% in 2000-13. While the ramp up of commissioning at Nui Phao (Vietnam) and Hemerdon (UK) is likely to improve the near-term availability of material (although Nui Phao produces APT, while the upstream market will only see 345kmtu (metric tonne unit) of WO_3 pa in concentrate from Hemerdon), the supply side continues to lag demand. We therefore expect market tightness to become more apparent towards 2017/18, forcing tungsten prices to recover. Our incentive price analysis suggests an APT (ammonium paratungstate; the most traded intermediate tungsten product) price above US\$350/mtu is required to bring new tungsten mine supply into production.

Tungsten's unique properties explain everything

Tungsten's unique characteristics make it the material of choice when it comes to the complex engineering solutions required to withstand deformation, heavy load, high pressure and temperature, as well as corrosion. Global tungsten consumption growth is predominantly driven by cemented carbides (60% of total tungsten demand in 2013), a range of composite materials with widespread use in the oil and gas, power, mining and automotive industries. The market for cemented carbides is dominated by Sandvik, IMC and Kennametal and was estimated by Roskill at US\$15bn in 2013. Other tungsten uses include steel alloys (25% of total), tungsten mill products (14%) and chemicals (2%).

Tungsten demand growth: Not all about China

Global tungsten demand has almost doubled since 2000, reaching 93kt of W in 2013. This growth was predominantly driven by cemented carbides, with tungsten usage in this category increasing at a CAGR of 6.1% in 2000-13, as well as steel alloys (5.0%) and chemicals (4.3%). At a regional level, China is the largest consumer of tungsten with a global share of 48% in 2013. It has also been the major regional driver behind the increase in global tungsten demand, demonstrating a CAGR of 10.0% in 2000-13. However, unlike many other commodities, developed countries play an important role in shaping tungsten demand, with a combined share of North America and Europe in global tungsten consumption of 38%. These regions achieved respective consumption CAGRs of 4.7% and 3.3% in 2000-13.

Up to 1.5mmtu of new WO_3 equivalent consumption by 2018

Demand for tungsten is linked to general economic activity and can be usefully correlated with regional GDP. Based on historic data and economic forecasts from the IMF, our analysis suggests that global tungsten demand could reach 111kt of W equivalent in 2018e, an implied 2013-18e CAGR of 3.5%. A slightly more conservative forecast from Roskill implies tungsten consumption of 106kt in 2018. In tungsten trioxide (WO_3) terms, our estimates translate into total incremental tungsten consumption of 2.2mmtu (2014-18), while Roskill's forecast points to 1.6mmtu in new demand. Adjusted for scrap recycling, this would imply a need for new mine supply of 1.5mmtu and 1.1mmtu respectively. Given the new mine capacity from Nui Phao and Hemerdon, the market seems to be relatively well balanced in the next three to five years. However, new mine supply outside China is likely to be needed to meet growing demand beyond 2018. Given a delivery time of at least two years, both 2015 and 2016 will therefore be crucial in terms of advancing new projects to the funding and construction stages.

APT prices above US\$350/mtu are required to bring new mine capacity on line

We believe an APT price above US\$350/mtu is currently required by the market to bring on line new tungsten mine supply. Our analysis of the most advanced tungsten projects yields a capacity-weighted incentive APT price of US\$389/mtu (among other things we assume a required IRR of 20%). This compares to the spot APT price of US\$320/mtu. We note that greenfield projects, which normally offer scale and long-term security of supply, have higher required APT prices compared to the brownfield ones, which often stems from their higher capital intensity. This, coupled with the fact that large-scale greenfield projects such as Nui Phao and Hemerdon (though not 100% greenfield) have recently been the main source of new mine supply, should in our view provide additional support to tungsten prices in the longer term.

Betting on the APT price recovery towards 2017/18e

We expect the APT price to remain under pressure in 2015/16e against the backdrop of improved product availability and weaker demand in China, and potentially in Europe. The announced removal of export quotas on concentrate in China is likely to have some impact on the market as well. However, we do not expect any material increase in exports as China's focus remains on the higher value-add downstream products and it considers tungsten a strategic mineral. This, as well as high industry concentration, with one state-owned enterprise (SOE) controlling the bulk of reserves and production, suggests that China's tungsten production and exports should remain under control. In the longer term, as global consumption growth continues, albeit at a slower pace now, and primary supply continues to lag, we expect tungsten prices to recover to bring new mine capacity on line. In nominal terms, we model a tungsten price of US\$400/mtu in 2018e, which is based on our long-term price assumption of US\$370/mtu in 2014 real terms.

No shortage of new projects, but funding remains scarce

There are a number of advanced greenfield and brownfield tungsten projects, with the majority having completed bankable/definitive feasibility studies, permitting and offtake. At the same time, project finance is difficult to secure and we do not expect this situation to change in the near term given the deterioration in the APT price. In general, we believe that greenfield projects offering scale and long-term security of supply are likely to be the main source of new mine capacity. However, based on current supply-demand forecasts, it does not seem likely that the market will be able to absorb another large-scale project in the next three to five years. At the same time, we still believe that past producing projects that offer scale, have competitive opex and low capital intensity, as well as a short lead time, could still make it into production.

How to invest in the sector

At the equities level, the tungsten sector is relatively difficult to invest in due to the small scale of the projects (even the biggest ones barely have EBITDA exceeding US\$100-150m) and the micro-cap nature of the stocks (among the publicly traded independent miners Wolf has the largest market cap of US\$168m). Liquidity is sometimes also an issue. Still, there are a number of independent producers and advanced projects that offer good industry exposure, especially for an investor prepared to tolerate risk. Among the independent miners and near-term producers, we would highlight Almonty Industries (AII) and Wolf Minerals (WLF), while the most advanced exploration and development projects include Australian players such as Vital Metals (VML), King Island Scheelite (KIS), Carbine Tungsten (CNQ), as well as Ormonde (ORM) in Europe and Northcliff (NCF) in North America. The companies with less advanced mining projects include W Resources (WRES) and Tungsten Mining (TGN).

Tungsten demand: Slower growth ahead

Tungsten's unique characteristics explain it all

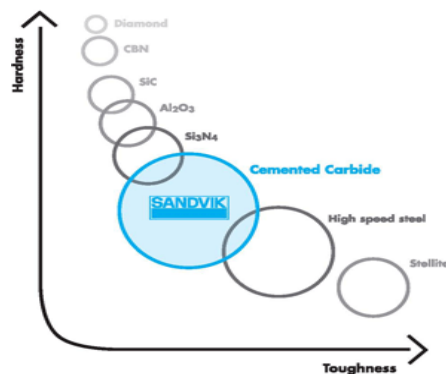
Tungsten (wolfram, W) is involved in a variety of specialised industrial applications and is known to have relatively poor substitutability by other metals. This is due to tungsten's outstanding physical and chemical characteristics, which include the highest melting point among all non-alloy metals (second only to carbon among all elements), the highest tensile strength, the lowest coefficient of expansion of any pure metals, as well as high density.

About 60% of tungsten demand is represented by cemented carbides, which is a range of composite materials consisting of hard carbide particles bonded together by a metallic binder. Tungsten carbide, together with cobalt as a binder, forms the basic cemented carbide structure, which can withstand deformation, heavy load, high pressure and temperature, and corrosion. As a result, cemented carbides find widespread use in high tech and machine tools production, in particular for metal cutting and rock drilling, as well as many other engineering applications.

The second largest category of tungsten consumption, which accounts for about 24% of the total, is steel alloys, whereby tungsten is added to steel to improve its properties. Again, speciality steel alloys such as high-speed steels, heat-resistant steel and tool steel are mainly used in metal cutting and specialist engineering applications. Another example of steel alloys are the so-called super alloys or high-performance alloys that are widely used in aerospace, gas and marine turbine industries due to their high corrosion and wear-resistance characteristics.

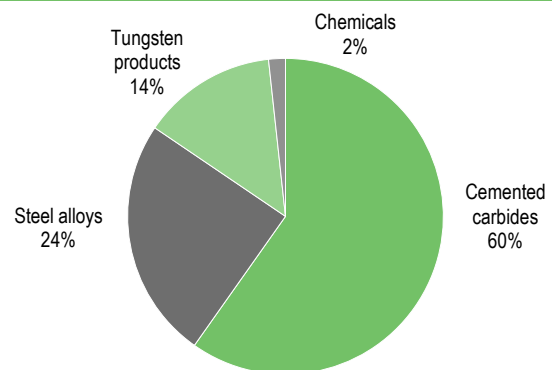
The remaining c 16% of tungsten consumption is represented by chemicals (catalyst and pigment applications) and tungsten mill products. The latter include tungsten wire, sheets or rods, as well as electronic and electric applications, in particular light bulb filaments and heating elements that make use of tungsten's high melting point and electric conductivity.

Exhibit 1: Cemented carbide vs other hard materials



Source: Sandvik

Exhibit 2: Tungsten consumption by product

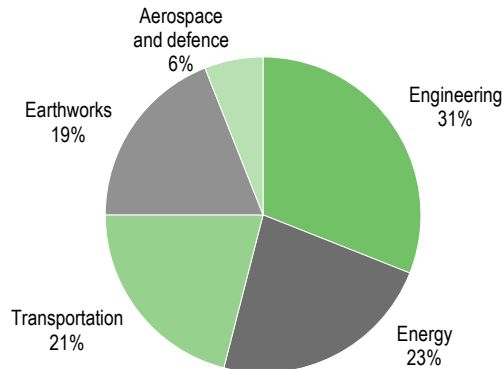


Source: Roskill

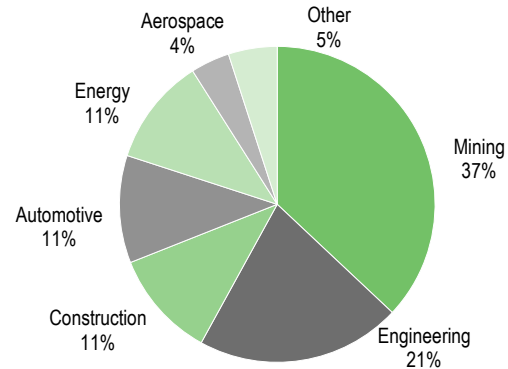
Demand by industry: Oil, mining, auto and aerospace

The end-user market for cemented carbides, which according to Roskill was estimated at US\$15bn in 2013, is dominated by the three major producers of tooling equipment and more broadly tungsten-related engineering solutions. The key market players are Sweden's Sandvik (SAND; FY13 total revenue US\$13.4bn), US-based Kennametal (KMT, FY14 revenue US\$2.8bn) and Netherlands-headquartered International Metalworking Companies (IMC, N/A). While IMC is a private company with very limited public disclosure, Sandvik's and Kennametal's order books and sales data provide some insight into tungsten's (or, more specifically, cemented carbides') end-user demand composition. With some relatively moderate discrepancies between these companies, the key industries for understanding tungsten consumption patterns appear to be energy (oil and gas,

power generation), mining and construction (earthworks equipment; both open-pit and underground for mining), transportation (cars, trucks, rail and ship building), aerospace and defence (engines, air frames, helicopters, etc) and general engineering solutions. Mining, engineering and energy segments in total accounted for 73% of Kennametal's and 69% of Sandvik's sales in 2013.

Exhibit 3: Kennametal sales by end-market


Source: Kennametal

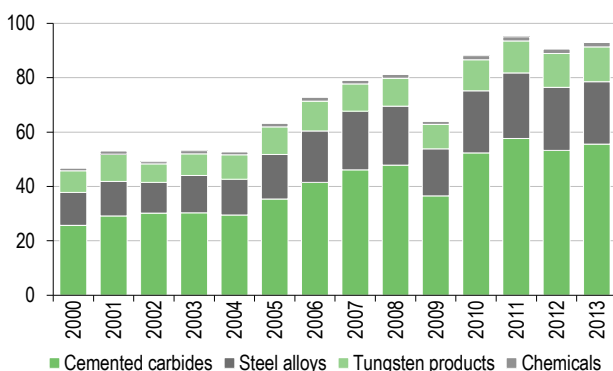
Exhibit 4: Sandvik sales by customer area


Source: Sandvik

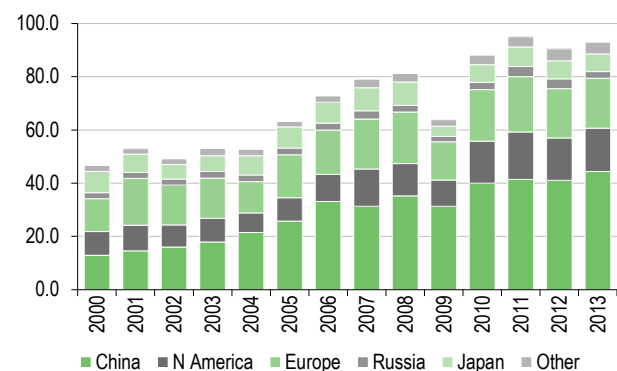
Historic consumption trends: Not all about China

Global tungsten consumption has almost doubled since 2000, reaching 93kt of W equivalent in 2013, a CAGR of 5.4%. This growth was predominantly driven by the increased production of cemented carbides, which account for c 60% of global tungsten demand. Tungsten consumption in cemented carbides has shown a CAGR of 6.1% in 2000-13, while demand growth in other categories has demonstrated more moderate growth, with steel alloys (CAGR of 5.0%) outpacing chemicals (4.3%) and tungsten products (3.8%). More recently, global tungsten consumption increased 2.8% y-o-y in 2013, following a 4.8% y-o-y decline in 2012. A record level of global tungsten consumption was achieved in 2012 at 95kt of W and is yet to be surpassed.

At a regional level, China is the largest consumer of tungsten, with a global share of 48% in 2013. Last year, Chinese tungsten demand reached 44kt of W equivalent compared to just 13kt in 2000, an impressive CAGR of 10%. That said, unlike many other commodities, developed countries play an important role in driving overall tungsten consumption higher. We believe this is a reflection of tungsten's exposure to high-tech and technologically advanced industries and therefore indirectly to consumer demand rather than the investment-heavy, infrastructure-related and fixed assets investment cycle (a good proxy for steel-intensive and bulk commodities demand). Both Europe and the US are significant consumers of tungsten, with respective regional shares of 20% and 18% of total demand.

Exhibit 5: World tungsten demand by end use (kt of W)


Source: Roskill

Exhibit 6: World tungsten demand by region (kt of W)


Source: Roskill

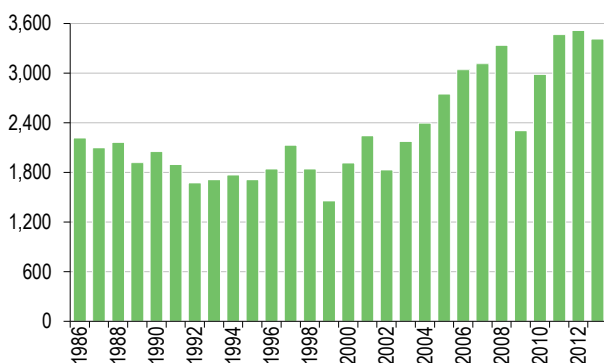
Demand drivers: A closer look at key industries

Tungsten demand growth is underpinned by the performance of its key consuming industries – oil and gas, mining, construction, aerospace and automotive.

Oil and gas: Shale boom has a big impact, but lower oil price is a risk

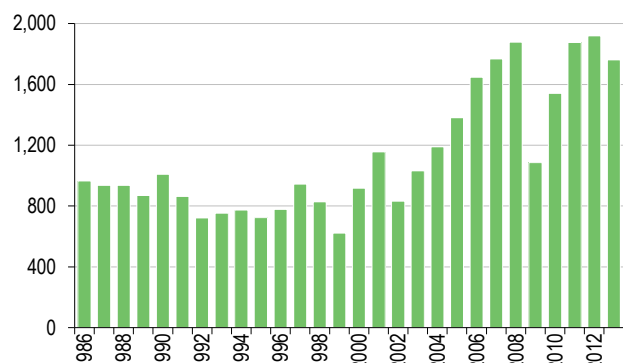
The oil and gas sector is one of the main drivers behind the growth in tungsten consumption, both in the US and globally. Higher drilling activity, coupled with growing geological complexity of on-land and deep-water basins, as well as the overall acceleration in E&P spending in major producing regions, has led to increased tungsten usage. Unique characteristics make tungsten a material of choice when it comes to producing drill bits, where tungsten is used in the form of inserts, flow control systems and other applications. In the US, the shale gas and tight oil boom had a major impact on drilling activity and consequently tungsten demand. Exhibits 7 and 8 show a visible step-up in the average number of operating rigs in the US and globally over the last 10 years, with a major setback in 2009 as a result of the global financial crisis followed by a subsequent strong recovery in drilling activity. Overall global E&P expenditure has been on the rise since 2009, demonstrating a five-year period of mid-single-digit growth as energy prices and demand growth expectations remained supportive. However, the current decline in the oil price is putting E&P budgets under pressure and could also affect relatively high-cost shale gas and tight oil projects in the US, which may have a negative impact on global tungsten consumption.

Exhibit 7: Global rig count (number of rigs)



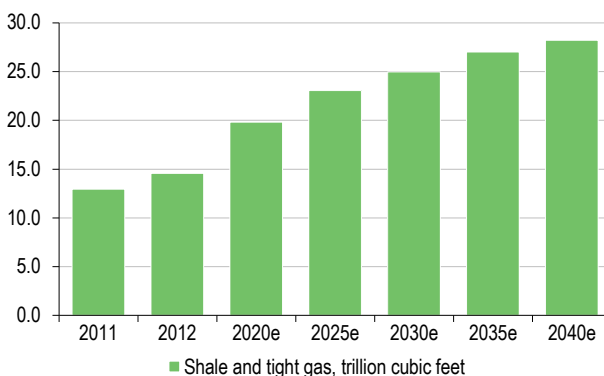
Source: Baker Hughes

Exhibit 8: US rig count (number of rigs)



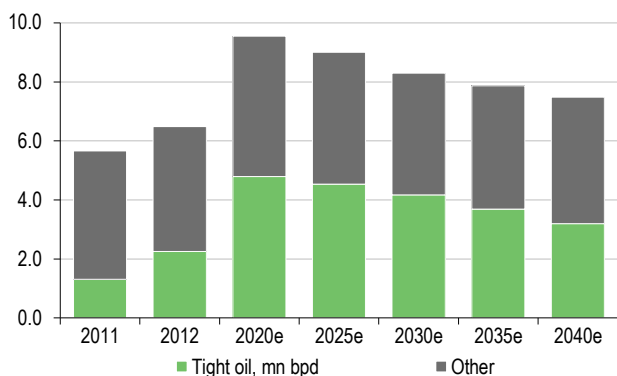
Source: Baker Hughes

Exhibit 9: US shale gas production forecast



Source: EIA

Exhibit 10: US tight oil production forecast



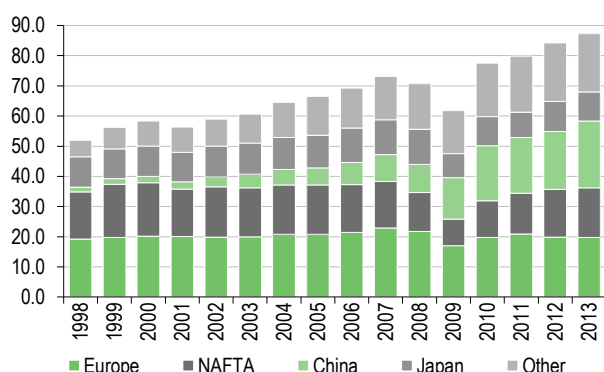
Source: EIA

Automotive: China-driven growth to continue, but other key regions look more challenging

Tungsten is used in both car manufacturing and various automotive applications such as fuel pumps, injectors, valve trains, compressors and turbochargers. Due to the unique engineering properties that, according to Kennametal, often outlast tool steel and other wear materials by as much as 10 times, cemented carbides offer solutions that successfully withstand deflection, deformation, extreme wear and impact, as well as corrosion and high temperatures. This explains tungsten's growing use in the automotive industry, which has experienced strong growth over the last few years. According to the International Organisation of Motor Vehicle Manufacturers (OICA), global vehicle production reached 87.3m units in 2013, demonstrating a 13-year compounded annual growth rate of 3.1%. China has been the main driving force behind the global car market expansion, enjoying a 13-year CAGR of 20%. Having produced 22.1m vehicles in 2013, China accounted for 25% of the world total compared to a share of less than 5% in 2000. Despite this explosive growth, China's car penetration remains low and is far from saturation. According to McKinsey, passenger car penetration in China is expected to reach 15% (150 cars per 1,000 people) by 2020 compared to less than 10% in 2013. By comparison, car penetration in Europe and Japan is currently about 60%. As economic growth and urbanisation in China continues, albeit at a slower pace now, the proportion of high-income households will expand, driving both car consumption and demand for higher-quality and technically more advanced cars. At the same time, the key risks to the generally upbeat car consumption/production outlook in China are the fight against pollution and slower economic growth.

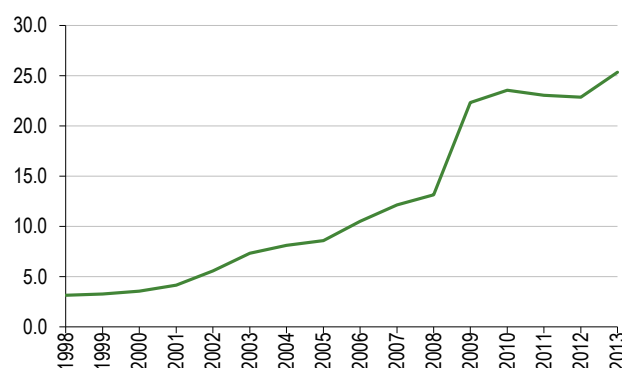
It is worth noting that not all key regions have been enjoying the same dynamics as China. In Japan, the automotive industry, which is the main consumer of tungsten, has been stagnating against the backdrop of growing competition and unfavourable currency moves. In 2000-13, Japan's vehicle production showed a negative CAGR of 0.4%. According to the Japan Automotive Manufacturers Association, car sales are expected to decline further.

Exhibit 11: World vehicle production (m units)



Source: OICA

Exhibit 12: China's share in global vehicle output (%)



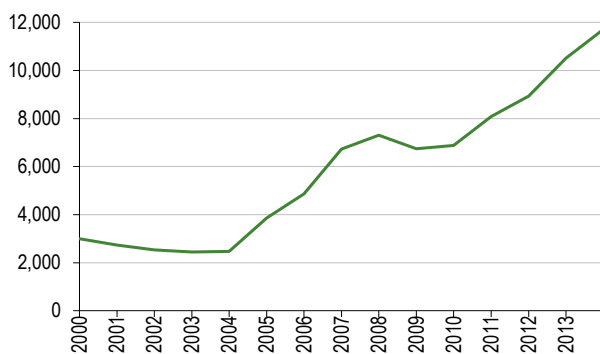
Source: OICA

Aerospace: Record commercial aircraft backlog

Aerospace and defence is another industry where tungsten, thanks to its unique properties, plays an important role. The commercial aerospace industry continues to maintain positive momentum, achieving record aircraft deliveries and orders in 2013. The total order backlog for Boeing and Airbus reached 11,708 aircraft in 2013, a 10% CAGR from 2010. This order book translates into nine years of production based on the current deliveries rate. The latest Farnborough Air Show was a big success for Airbus and Boeing, as both companies reaped the benefits of their investment in new products over the last few years. In particular, Airbus announced MoUs for 138 aircraft worth US\$37bn and purchase orders for 358 aircraft worth US\$38bn, bringing the total to 496, while Boeing ended the show with order commitments for 269 new aircraft.

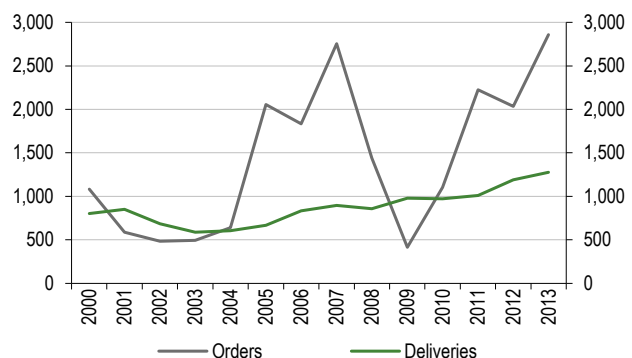
Overall, growth in the sector continues to be driven by emerging economies, with domestic traffic in Asia, Latin America and the Middle East demonstrating high single-digit annual expansion. Still, flights per capita remain low in comparison to developed countries. According to Airbus, Latin American and Caribbean airlines will need 2,294 new passenger aircraft between 2014 and 2033 to meet the growing intra-regional and domestic passenger traffic. At the same time, Boeing estimates that the Asia-Pacific region will require 12,820 new airplanes in the next 20 years, representing some 36% of global new aircraft deliveries. The Asia-Pacific fleet is expected to nearly triple by 2032, reaching 14,750 airplanes compared to just 5,090 in 2012. While near-term economic setbacks might have a negative impact on new order rates, with the record levels achieved in 2013 unlikely to be sustained in 2014 and 2015, longer-term industry fundamentals appear to remain intact. This growth should also be supportive of tungsten consumption.

Exhibit 13: Record order backlog (number of aircraft)



Source: Company data

Exhibit 14: Boeing and Airbus orders and deliveries

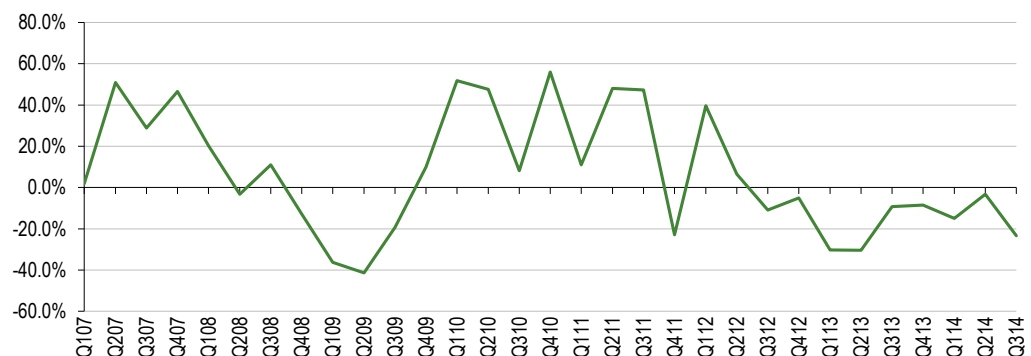


Source: Company data

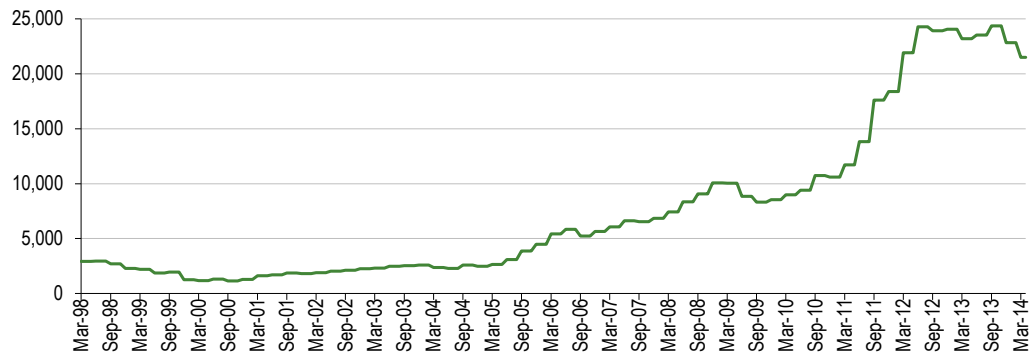
Mining: Still looking for stabilisation

As a big part of tungsten consumption, the global mining industry was hit hard by slowing economic growth, which in some instances was exacerbated by a significant build-up in production capacity. The resulting fall in commodity prices had a pronounced negative impact on capital budgets across the sector. As the industry-wide focus on cost-cutting and spending discipline remains intact, a number of leading indicators suggest that the sector is not yet out of the woods. In particular, we note Sandvik's order intake growth from mining companies, which continues to show volatility without any major signs of improvement. Thus, in Q314, Sandvik reported a 23% y-o-y reduction in mining orders compared to a seemingly slower decline of only 3% in Q214 and a major 15% drop in Q114. The major miners, such as Rio Tinto, BHP Billiton, Vale and Anglo American, all guide to a reduction in capital spending in the coming years, which, coupled with weak commodity price sentiment, suggests that mining capex is unlikely to recover in the near to medium term.

Exhibit 15: Sandvik's mining order intake evolution (% y-o-y)



Source: Sandvik

Exhibit 16: Australia's new mining capex (A\$m)


Source: Bloomberg

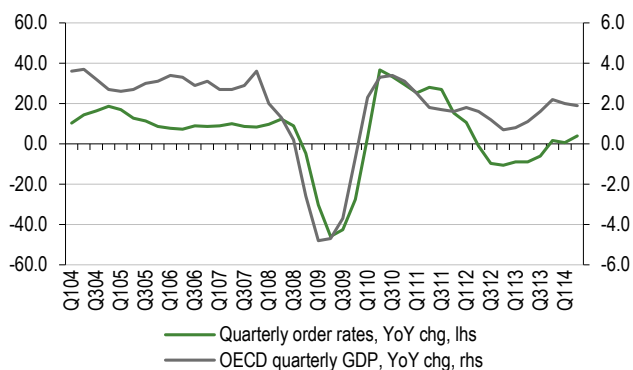
Tungsten consumption forecast by region

As an industrial commodity, tungsten demand is highly dependent on general economic activity. As a result, tungsten consumption patterns could be relatively well described by comparison with regional GDP performance. Indirectly, this relationship can be seen in the historic order intake evolution of two major tungsten consumers – Kennametal, which has a particular focus on North America, and Sandvik, which has a strong footprint in Europe – against regional tungsten consumption and GDP. In both cases, order backlog seems to be closely related to the economic activity, while regional tungsten consumption appears to be relatively well correlated with the companies' order rates on a like-for-like basis (see Exhibits 17-20).

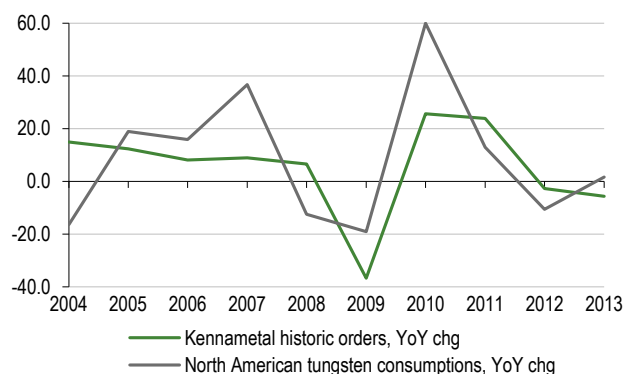
Uneven economic growth is a major short-term risk...

Weaker underlying order growth in H214

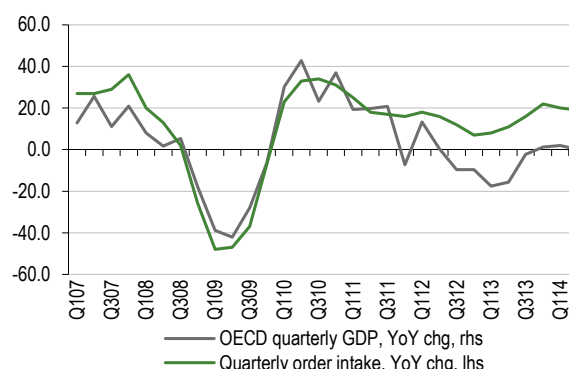
Kennametal demonstrated rather encouraging order growth rates in 9m14, with a 3% average monthly increase (based on a three-month rolling average). This compares to a 6% decline in total orders in FY13. However, Kennametal's October orders were down 2% compared to the same period in 2013. Similarly, Sandvik enjoyed a relatively strong first half of 2014, with growth in organic order intake averaging 1.4% compared to a 9% decline in FY13. At the same time, the company saw a 5% y-o-y drop in orders in Q314. The recent decline in order books for both companies points to a slower industry growth in H214 and possibly 2015.

Exhibit 17: Kennametal order growth vs GDP


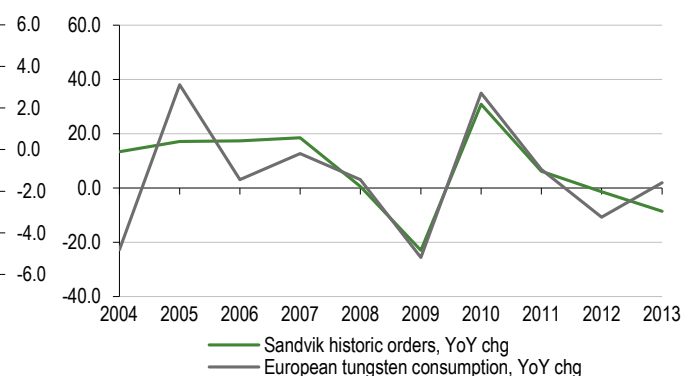
Source: Kennametal

Exhibit 18: Kennametal orders vs tungsten demand


Source: Kennametal

Exhibit 19: Sandvik order intake against GDP


Source: Sandvik

Exhibit 20: Sandvik orders vs tungsten consumption


Source: Sandvik

IMF highlights downside risks to global economic growth

In its latest world economic outlook report released in October 2014, the IMF highlighted uneven economic recovery in developed countries, with economic growth expectations for 2014 and 2015 revised downwards across Europe and Japan. The US appears to be the only economic stronghold among the developed countries, with growth supported by lower energy input costs. The fall in the oil price could also support the European economy, but the real extent of any positive impact remains to be seen. At the same time, emerging markets, especially China, Brazil and Russia, remain weak, adding to overall economic uncertainty. Slower economic activity represents the major risk for global tungsten consumption and prices in 2015 and 2016.

While the IMF expects global GDP growth in 2014 to be in line with the previous year at 3.3%, then accelerating to 3.8% in 2015, the estimates represent a 0.1 and 0.2 percentage point downgrade compared to its April forecast. The euro area is now forecast to grow at 0.8% in 2014 and 1.3% in 2015, a reduction of 0.3 and 0.2 percentage points respectively compared to previous estimates. At the same time, economic expansion in the US was upgraded from 1.7% to 2.2% for 2014, but left unchanged at 3.1% for 2015. Growth expectations for Japan, the fourth largest regional consumer of tungsten, were trimmed for both 2014 and 2015. Beyond 2015, the IMF expects a gradual pick-up in economic activity in developed economies, especially the EU, while forecasting relatively subdued growth in emerging markets. Growth in China is expected to slow down further, with GDP expansion falling to 6.6% in 2018.

Exhibit 21: IMF October 2014 GDP growth forecasts (%) and revisions

	2012	2013	2014e	Revision vs April 2014, pp	2015e	Revision vs April 2014, pp
US	2.3	2.2	2.2	0.5	3.1	0.0
Germany	0.9	0.5	1.4	(0.5)	1.5	(0.2)
France	0.3	0.3	0.4	(0.4)	1.0	(0.5)
Italy	(2.4)	(1.9)	(0.2)	(0.5)	0.8	(0.3)
Japan	1.5	1.5	0.9	(0.7)	0.8	(0.2)
UK	0.3	1.7	3.2	0.0	2.7	0.0
China	7.7	7.7	7.4	0.0	7.1	0.0
Russia	3.4	1.3	0.2	0.0	0.5	(0.5)

Source: IMF

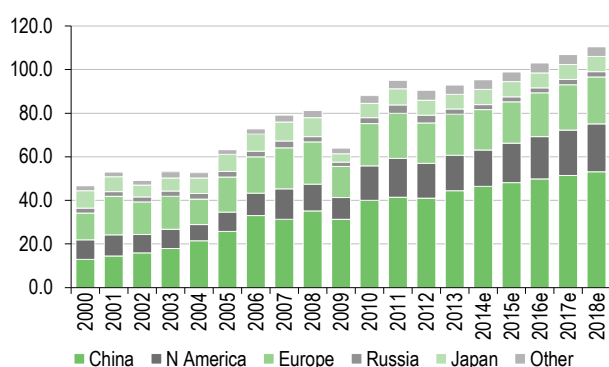
...but what to expect in the longer term?

We employ a combination of simple and multiple regression analysis to assess future tungsten demand for each region in the longer run, using real GDP as an explanatory variable. While we realise the drawbacks of this approach, especially for out-of-sample forecasting, a short series of available tungsten consumption data (14 annual observations) precludes us from using more sophisticated forecasting techniques. We therefore aim to provide a rather directional view on

tungsten demand as our forecasts tend to smooth out demand growth volatility. We use GDP data from the IMF to forecast future tungsten demand.

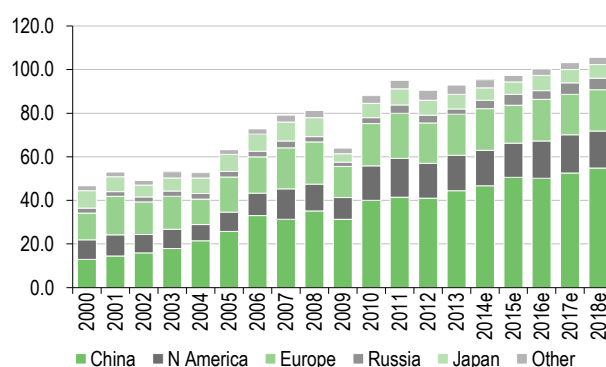
Overall, our analysis suggests that global tungsten demand can reach 111kt of W equivalent by 2018e, an implied 2013-18e CAGR of 3.5%. This compares to a 2000-13 CAGR of 5.4%. While we see long-term growth rates for almost all major regions moderating on the back of slower economic activity, we expect relatively healthy demand growth to continue in the US and China. In fact, North America is the only region where we see the CAGR for 2013-18e exceeding that for 2000-13 on the back of forecast strong GDP expansion.

Exhibit 22: Historic regional tungsten consumption and Edison forecast



Source: Roskill, Edison Investment Research

Exhibit 23: Historic regional tungsten consumption and Roskill forecast



Source: Roskill

Exhibit 24: Edison's tungsten consumption forecast by region (tonnes of W)

	2012	2013	2014e	2015e	2016e	2017e	2018e
China	41,070	44,390	46,398	48,162	49,854	51,498	53,118
North America	15,980	16,240	16,773	18,116	19,457	20,745	21,928
Europe	18,510	18,870	18,464	19,003	20,038	20,871	21,527
Russia	3,600	2,490	2,250	2,200	2,300	2,400	2,500
Japan	6,820	6,660	7,025	7,055	6,825	6,878	6,944
Other	4,510	4,340	4,450	4,350	4,500	4,500	4,500
Total	90,490	92,990	95,360	98,887	102,974	106,892	110,517
Incremental W, tonnes			2,370	3,527	4,087	3,918	3,625
Incremental WO ₃ , kmtu			298,850	444,760	515,424	494,011	457,111
Cumulative WO₃, kmtu			298,850	743,610	1,259,034	1,753,045	2,210,157

Source: Edison Investment Research, Roskill

Roskill expects W consumption to reach 106kt by 2018e

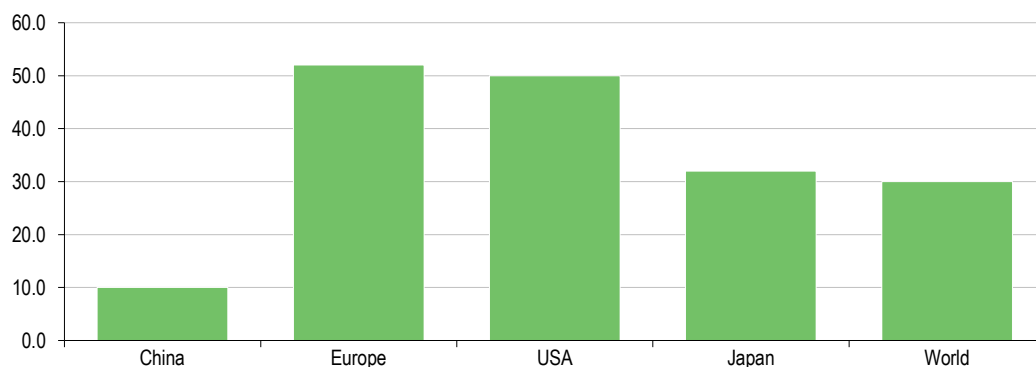
Roskill's tungsten demand forecast appears to be slightly more conservative as it sees global tungsten consumption reaching 106kt of W, an implied CAGR of 2.6% in 2013-18. The key discrepancies arise from Roskill's more cautious view on Europe and North America, with both regions forecast to show a CAGR of less than 1% over the next five years. At the same time, we seem to be somewhat less aggressive on China, where we expect tungsten demand to grow at a five-year CAGR of 3.7% compared to Roskill's forecast of 4.3%; and especially Russia, where we see weak economic growth negatively affecting tungsten consumption (Roskill's forecast implies a Russian CAGR of as much as 16%). Our more positive view on North America is underpinned by the anticipated acceleration of growth in the US (the IMF expects US GDP to grow 3.1% in 2015 following a 2.2% expansion in 2014 and 1.9% growth in 2013). At the same time, we are relatively neutral on Europe, as we expect improving economic activity to support global tungsten demand in 2016-18, following a period of weaker growth in 2014 and 2015.

Implications for tungsten supply: Roskill's forecast suggests a balanced market to 2018

Our tungsten demand forecast implies cumulative incremental tungsten consumption of 18.0kt of W, or 2.2mmtu of WO₃ equivalent (1mtu equals 10kg) by 2018. Assuming some 30% of global tungsten demand is met by scrap recycling and that this share remains broadly unchanged, our forecast would suggest that primary tungsten supply will have to increase by about 1.5mmtu over the next five years. Based on a more conservative forecast from Roskill and assuming the same, and largely unchanged, share of scrap recycling, mine supply would have to grow by about 1.0mmtu of WO₃. With Nui Phao and Hemerdon adding some 1mmtu of WO₃ equivalent (although Nui Phao in the form of higher value-added APT), Roskill's forecast implies that the global tungsten market should be relatively balanced over the next three to five years, while our estimates suggest a possible market shortage emerging already in 2017/18. While China could in part fill the supply gap, its focus on the higher value-added segment, as well as its reluctance to increase concentrate exports, suggests that new mine capacity outside China is likely to be required to meet growing tungsten consumption in the western world and avoid shortages of concentrates beyond 2018. Given a construction time of about two years, both 2015 and 2016 will therefore be crucial years in terms of advancing new projects to the funding and development stages.

Having said that, we believe that scrap recycling will continue to play an increasingly important role in meeting global tungsten demand. In Europe and the US secondary sources already account for about 50% of overall tungsten consumption and could increase further, especially if the tungsten price environment remains robust, and while in China recycling currently represents only 10% of the country's total tungsten demand, its share will grow as scrap availability continues to improve. In general, the rate of scrap recycling is highly dependent on tungsten price levels as higher prices make scrap recovery profitable. The other drawback of scrap recycling is that it is not as pure as primary tungsten.

Exhibit 25: Secondary sources in the overall tungsten demand (%)



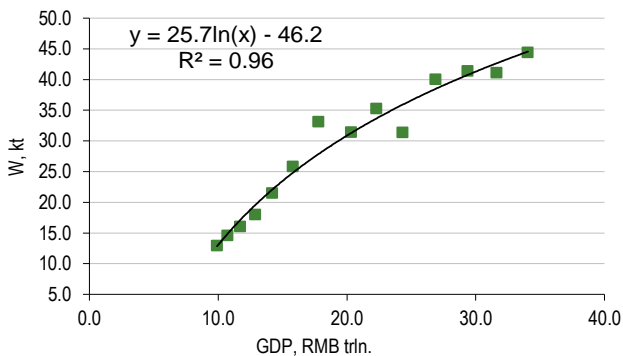
Source: Roskill

China: Slower growth adds to overall uncertainty

Based on our sample data, China's real GDP in local currency is almost perfectly correlated with tungsten consumption (sample correlation of 0.96). We consider a number of different functions (linear, exponential, logarithmic and polynomial) to assess the best fit to available data, using R-squared (R^2 , coefficient of determination) as the main criteria of quality of fit. In the case of China, the log function appears to provide a better fit to our sample data, with an R-squared of 0.96. (Simply put, this means 96% of the variation in China's tungsten consumption can be explained by changes in GDP.) The form of the curve seems to be reasonable given the gradual slowdown in growth rates. In all, we forecast China's tungsten consumption to increase by 4.5% y-o-y in 2014 on the back of a 7.4% expansion in real GDP, followed by a 3.8% growth in 2015 as GDP increases by 7.1%. Overall, we expect China's tungsten consumption to reach 53.1kt of W equivalent in 2018,

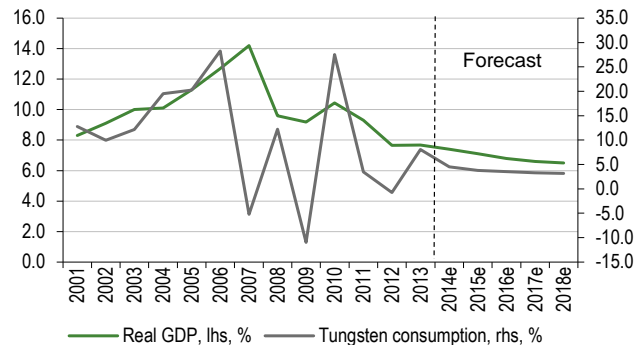
which implies a 20% increase compared to 2013 (44.4kt of W). This forecast is based on GDP growth slowing to 6.5% in 2018, which is in line with IMF projections.

Exhibit 26: W consumption regression against GDP



Source: Edison Investment Research

Exhibit 27: China's GDP vs W demand growth (%)

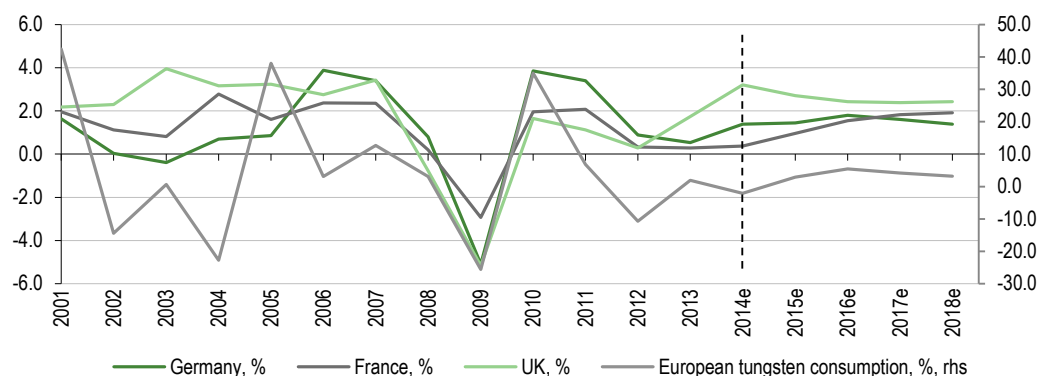


Source: IMF, Roskill, Edison Investment Research

Europe: Risks to growth in 2015

Our tungsten consumption forecast for Europe is based on a multiple linear regression. We use the real GDP of the largest European economies – Germany, France, the UK and Italy – as explanatory variables. This regression yields an adjusted R-squared of 0.65. Based on available observations, Europe's tungsten consumption has the highest correlation with the GDP of Germany (coefficient of correlation of 0.81) followed by France (0.73), the UK (0.64) and Italy (0.32). Using IMF economic forecasts as inputs, our model points to a reduction in tungsten consumption in Europe in 2014 (2.2% y-o-y to 18.5kt of W), followed by a moderate pick-up in 2015 (2.9% y-o-y to 19kt) and a further recovery in 2016 (5.4% y-o-y to 20kt) on the back of gradually improving economic activity in Germany and France. That said, given the uncertain economic outlook for 2015, the risks to our tungsten consumption forecast appear to be on the downside. To this end, we note the recent GDP downgrade for Germany from Bundesbank, which halved its 2015 growth forecast to 1.0%. If the German economy expands at only 1.0% in 2015 (compared to our current assumption of 1.5% based on the IMF forecast), our Europe tungsten demand forecast would imply 1.0% y-o-y growth compared to our current estimate of 2.9%.

Exhibit 28: European tungsten consumption versus GDP growth



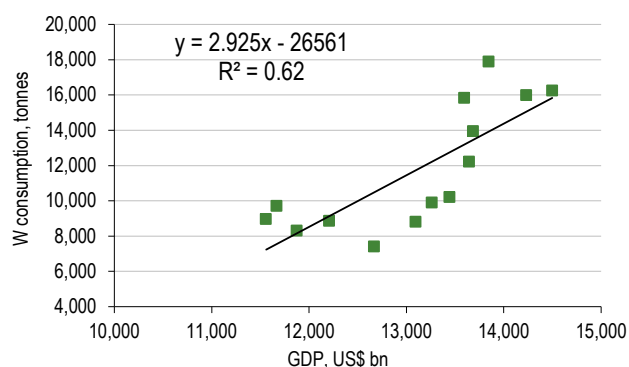
Source: IMF, Roskill, Edison Investment Research

North America: Supportive economic growth

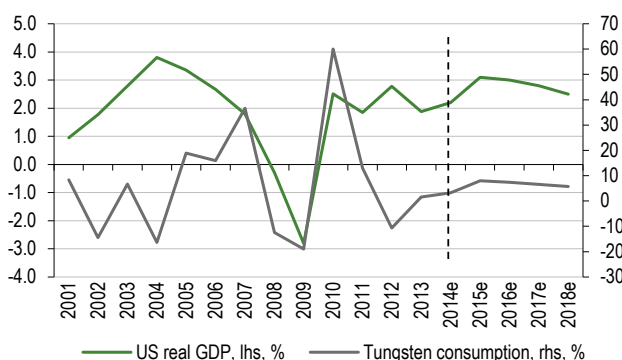
We use US GDP data as a main input for forecasting North America's tungsten consumption. While the polynomial function provides a good in-sample fit, it does not allow for correct out-of-sample forecasting and we therefore decided to use the linear regression function instead. The latter yields a relatively low R-squared of 0.62, with the respective F statistic suggesting this regression is only

significant at a 10% level. In general, it appears that tungsten demand in North America is difficult to forecast, especially given previous periods of strong economic growth that coincided with sharp contractions in tungsten demand. Thus, despite strong economic growth in 2002-07 (GDP growth averaged 2.7%), North America's tungsten consumption fell 14% in 2002 and 16% in 2004, with growth nevertheless averaging at 8% for the period. Historic demand volatility shows that strong economic growth does not always transpire into higher tungsten consumption (at least not always in the same year). The lingering effects of the global economic downturn that hit the developed countries in 1999-2002 could potentially be an explanation for the somewhat delayed response, but the short data series does not allow us to properly test for any possible lags in tungsten demand. However, it appears that at times of global economic weakness, especially in Europe, North America's tungsten demand suffers even if US GDP expands.

All in all, the IMF expects the US economy to grow 2.2% in 2014 and 3.1% in 2015, which, based on our regression model, implies tungsten consumption growth of 3.3% (to 16.8kt) in 2014 and as much as 8.0% (to 18.1kt) in 2015. However, should the upbeat growth expectations fail to materialise, we note that a 0.5 percentage point reduction in US GDP growth would lower our forecast tungsten consumption expansion for North America by 1.3pp.

Exhibit 29: US GDP versus tungsten consumption


Source: Edison Investment Research

Exhibit 30: US GDP vs tungsten demand forecast


Source: IMF, Roskill, Edison Investment Research

Supply: China plays the main role

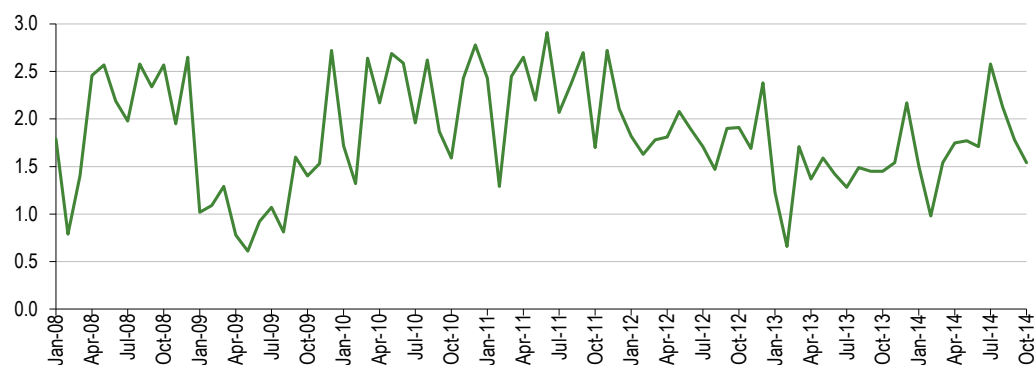
Primary tungsten supply is dominated by China, which accounted for about 80% of global mine tungsten production in 2013. This compares to a peak share of 84% in 2010. China's main production capacity is based in the Jiangxi and Hunan provinces, with both scheelite and wolframite ores extracted and then processed into concentrates and higher value-added products. The majority of China's tungsten reserves and production is controlled by a single SOE. Roskill expects China's share of global production to decline, reaching 78% by 2018. Along with the new non-China mine supply, China's market share is expected to be reduced by growing scrap recycling. This trend is especially visible in developed countries, as approximately 45% of tungsten demand in the US and Europe was met from secondary sources in 2013. In Japan, recycling accounts for about 30% of supply, while China's share is only about 15%. However, as the market saturates and scrap availability improves, the share of recycling in the overall supply balance in China should increase. Overall, some 22% of global supply in 2013 was sourced from recycling and, according to Roskill, this share will increase to 26% by 2018.

China's impact on the international market

As the largest consumer and the fastest growing market for tungsten, China introduced a number of measures to control tungsten production and exports. Most notably, the country imposed certain

limits on tungsten ore extraction, restrictions on mining licence applications and, until recently, export quotas on tungsten trioxide. Overall, China's tungsten production increased from 41kt of W in 2003 to almost 70kt of W in 2011, before sliding to 66.5kt in 2013 on the back of weaker demand in Europe. At the same time, according to Metal-Pages' report, the mining quota allocated to producing companies was raised from 50kt (65% WO₃) in 2007 to 87kt in 2011. In 2012 and 2013, the mining quota remained unchanged at 89kt. The report also notes that while the primary mining quota has grown from 57kt in 2007 to 71kt in 2013, the so-called recovery quota increased to as much as 18kt. This was to allow companies to increase production from secondary sources (tailings, etc) as they were facing challenges to maintain primary mine output on the back of falling grades. According to Metal-Pages, there were very few, if any, new mining licences granted in China over the past few years and no announcements regarding the commissioning of new mines. In fact, China continued to increase net imports of WO₃ concentrate to feed its growing domestic APT capacity. Thus, Metal-Pages estimates that in 9m13 China imported some 7.7kt of tungsten concentrate, a 16% increase compared to 9m12. During the same period, APT and tungsten carbide exports reached 2.1kt and 1.5kt respectively. This highlights China's focus on higher value-add tungsten products. This, as well as continuing growth in tungsten demand in China and the high degree of industry concentration (at least at the mining level), makes us believe that the recent removal of export quotas as a result of the WTO ruling will not lead to any visible increase in tungsten concentrate exports from China.

Exhibit 31: China's total monthly exports of tungsten products (kt)



Source: Bloomberg

Also of note is the distribution of tungsten reserve in China between wolframite and scheelite ores. Although China's overall tungsten reserves were estimated at about 1.8Mt of W in 2010, the higher-grade wolframite material accounted for only c 30% of the total. This implies the remaining life of wolframite reserves is about 12 years (as of 2010). While China's scheelite resources are substantial, they are believed to be of lower grade compared to wolframite mineralisation.

A closer look at independent market players

Independent tungsten producers are rare

A number of relatively large tungsten mines outside China are controlled by the vertically integrated producers of higher value-added tungsten products. These include Mittersill, a large underground tungsten operation in Austria that was originally commissioned in 1975 and acquired by Sandvik in 2009, as well as Panasqueira, a large-scale underground tungsten operation in Portugal with a long history of mining, which was acquired by Sojitz in 2007. To our knowledge, there are only two publicly traded non-Chinese independent pure tungsten producers with operations of meaningful scale. In particular, North American Tungsten (NTC) operates the Cantung project in Canada, while Almonty runs the Los Santos mine in Spain and has recently acquired the Wolfram Camp mine in

Australia. All three operations produce WO_3 in concentrate, which is sold into offtake and then processed into APT and further up the value chain.

Cantung is a large-scale, market-balancing capacity

Cantung is one of the largest operating tungsten mines outside China, as it is capable of delivering up to 300kmtu of WO_3 in concentrate pa. However, the project is a relatively high-cost producer and essentially plays the role of a market balancing capacity. The mine was put on care and maintenance several times in its history (most recently in 2009), which spans more than 50 years, as tungsten prices declined. In the nine months to June 2014, NAMT reported tungsten sales of 204kmtu of WO_3 (production of 211kmtu) from Cantung at a unit cash cost of sales of C\$272/mtu compared to a realised price of C\$316/mtu. Adjusted for DD&A, the cost of sales was C\$299/mtu. NAMT is currently undertaking a plant upgrade to increase production and reduce unit costs. In addition, Cantung has a relatively short mine life, which, following the recent resource upgrade, could be estimated at about three years (based on the probable reserve of 1.8Mt at 0.81% WO_3).

New market entrants and runners up to production

Only a few tungsten projects have either been brought into production recently or are currently under construction. The largest greenfield project is Nui Phao in Vietnam, a joint venture between Masan Group and HC Starck, which was commissioned in 2013 with an APT capacity of 3,800t of contained W. The project was expected to be upgraded to c 5,200t of W in APT (WO_3 equivalent of 650kmtu pa) by mid-2014. At full capacity, this project would therefore account for about 6% of global and 10% of non-Chinese annual tungsten consumption. In addition, Wolf Minerals is expected to bring its Hemerdon tungsten and tin project in the UK into production in H215. The project is expected to produce some 345kmtu of WO_3 in concentrate pa. We estimate that Hemerdon would represent some 3% of global and 6% of non-Chinese annual tungsten demand.

Of smaller scale are the Los Santos tungsten project in Spain and the Wolfram Camp tungsten-molybdenum mine in Australia (commissioned in 2011). These projects, which are owned by Almonty Industries (All CN), are capable of producing total c 150-170kmtu of WO_3 pa.

In addition to mining projects, there are a couple of tailings retreatment operations that have recently been brought into production. In Australia, the Mt Carbine (Carbine Tungsten; CNQ AU) reprocessing project was commissioned in 2012 and is capable of producing c 1,500mtu of WO_3 per month (c 18kmtu pa). Carbine Tungsten is currently working on bringing the hard-rock stockpile project, which has 12Mt at 0.07% WO_3 in indicated resource, into production. In Spain, W Resources launched the La Parrilla tailings retreatment operation in 2014. The project is expected to produce up to 30kmtu of WO_3 in concentrate per annum for about three years. At the same time, the company plans to fast-track the phased development of the larger scale past producing La Parrilla open-pit mine (47Mt at 0.09% WO_3) using the existing tailings infrastructure.

It is worth noting that the new large-scale tungsten capacity, ie Nui Phao and to a certain extent Hemerdon, is greenfield. It therefore appears that despite the relatively high capital intensity typically associated with greenfield developments, these projects were the most successful and the ones that eventually made it into production. We attribute this in part to the fact that greenfield tungsten projects offer scale, which is important given the general geological complexity and relatively small nature of tungsten deposits, and do not involve potential legacy issues. At the same time, environmental permitting could be an issue for some of the greenfield projects. That said, we still believe that some of the past producing projects have high chances of being executed should the tungsten market fundamentals remain robust. This is especially true of projects combining decent scale with low operating costs and capital intensity.

Advanced exploration projects: Funding to remain an issue as demand slows

There are a number of advanced exploration/development-stage tungsten projects that could potentially enter the market within the next two to four years. In Australia, these projects are Watershed (Vital Metals), Mt Carbine (Carbine Tungsten) and Dolphin (King Island Scheelite). In Europe, we would highlight Ormonde's past producing Barruecopardo project, which combines a relatively high-grade and long-life resource base with a relatively low capex requirement and very competitive opex. In North America, the most advanced greenfield tungsten projects are Northcliff's long-life but relatively low-grade open-pit Sisson project and North American Tungsten's high-grade but relatively short-life underground Mactung mine, both in Canada. All these projects have completed feasibility studies and are largely permitted and most of them have offtake arrangements in place. At the same time, securing project finance remains the major hurdle to overcome for the majority of the projects except for Hemerdon. We do not expect this situation to improve in the short term, as tungsten prices remain under pressure. Also of note is the relatively high discrepancy between the companies' current market valuations and the funding requirements to achieve first production, which could potentially lead to a visible dilution to existing shareholders. Wolf Minerals provides a good example, as the company had to raise c A\$182m in new equity, or c 60% of the overall funding package. However, this involved the repayment of a A\$75m bridge loan from RFC.

A more detailed description and comparison of the most advanced tungsten projects is provided in the table below.

Strategic investors in the sector

There are two most prominent strategic financial investors in the sector: Todd Corporation, a large New Zealand industrial conglomerate, and RFC, a mining-focused private equity firm. While RFC is invested in Wolf Minerals, controlling 42% of the company, Todd has interests in both Wolf (32%) and Northcliff (15%). It also controls a direct 11.5% interest in the Sisson project, which, combined with its investment in Northcliff, translates into an effective holding of 25% at the project level, and it has an option to increase its stake in the project to 21.5%. Another strategic agreement was reached between Woulfe Mining and IMC back in 2012, whereby IMC agreed to co-finance the Sangdong tungsten project (see Woulfe's profile for more details), but following the subsequent change in management and the project's scope this transaction is yet to be closed.

One of the most recent equity-level transactions in the sector was Todd's direct investment in Sisson, announced in 2013 and completed in 2014. According to the terms of the deal, Todd injected C\$14m in the project on a staged basis, gaining an initial 11.5% direct interest, and has an option to acquire an additional 10.0% for C\$20m upon a final investment decision to commence construction. Overall, the deal values Sisson at C\$158m (C\$34m for a 22.5% holding) and implies EV/reserve and EV/resource of C\$8.1/mtu and C\$4.5/mtu respectively. While the project's risk profile at the investment decision stage will be different to what it is now, this transaction might nevertheless be indicative of the intrinsic value of Sisson and similar advanced tungsten projects. The implied valuation metrics compare favourably to those currently prevailing on the market.

We also believe that the upstream segment of the tungsten market would in the longer term benefit from the potential consolidation of the standalone, large scale mining projects. This would increase pricing power and stability of supply. We would not rule out one of the strategic investors playing such a role and creating an industry champion. At the smaller scale project level, Almonty, with its acquisitive approach to growth, could be seen as an industry consolidator, acquiring Los Santos in 2011, Wolfram Camp in 2014 and further looking to grow if the timing and price are right.

Exhibit 32: Major exploration and development-stage tungsten projects

Project	Hemerdon	Watershed	Barruecopardo	Sisson	Mt Carbine	Molyhil	Mactung	Dolphin	Sangdong*	Northern Dancer	Kilba
Company	Wolf Minerals	Vital Metals	Ormonde Mining	Northcliff Resources	Carbine Tungsten	Thor Mining	NAMT	King Island Scheelite	Woulfe Mining	Largo Resources	Tungsten Mining
Location	UK	Australia	Spain	Canada	Australia	Australia	Canada	Australia	South Korea	Canada	Australia
Development stage	Construction	DFS	BFS	BFS	BFS	BFS	BFS	DFS	BFS	PEA	PEA
Mining method	OP	OP	OP	OP	OP	OP	UG	OP UG	UG	OP	OP
Project type	Greenfield	Greenfield	Brownfield	Greenfield	Brownfield	Greenfield	Greenfield	Brownfield	Brownfield	Greenfield	Greenfield
Offtake	GTP, WBH	Japan 30%	Noble	No	Mitsubishi	GTP	No	No	No	No	No
Permitting	Yes	Yes	Yes	No	Y/N	No	Yes	Y/N	Y/N	Yes	No
Funding	Yes	No	No	No	Y/N	No	No	No	No	No	No
Strategic partner/investor	Todd/RCF	JOGMEC	-	Todd	Mitsubishi	-	-	-	IMC	-	-
Mineral resource, Mt, (%WO ₃)	401.4 (0.13)	49.3 (0.14)	27.4 (0.26)	561.0 (0.06)	59.3 (0.12)	4.7 (0.28)	44.9 (0.85)	10.8 (0.81)	15.1 (0.62)	424.6 (0.096)	5.0 (0.27)
Mineral reserve, Mt, (%WO ₃)	26.7 (0.19)	21.3 (0.15)	8.7 (0.30)	334.4 (0.07)	18.0 (0.14)	3.0 (0.31)	10.8 (1.19)	-	-	-	-
Life of mine (years)	10	10	10	27	10	4	12	4 (OP) 9 (UG)	12	23	7
Plant throughput, ktpa	3,000	2,500	1,100	10,500	3,000	400	730	400	400	1,200	700
Processed grade, %WO ₃	0.19	0.15	0.30	0.07	0.12	0.31	1.08	0.55	1.01	0.43	0.26
Metallurgical recovery, %	66.0	73.6	78.0	77.0	76.0	85.0	81.7	85.0	85.0	85.0	81.2
Saleable concentrate (APT), kmtu WO ₃	345	250	227	557 (APT)	270	105	635	190	340	415 (APT)	148
Gross cash cost, US\$/mtu of WO ₃ (APT)	148	220	125	242 (APT)	134	256	127	123	152	185 (APT)	176
Net cash cost, US\$/mtu of WO ₃ (APT)	115	220	125	164 (APT)	134	171	127	123	152	172 (APT)	176
Total development CAPEX, US\$m	200	155	61	521	50	66	362	54	40	151	42
CAPEX per mtu in reserves, US\$/mtu	39	46	23	22	26	71	28	11	N/A	29	31
CAPEX per mtu of capacity, US\$/mtu	580	630	269	935	241	626	570	284	279	364	286
By-product metal	Tin	-	-	Moly	-	Moly	-	-	-	Moly	-

Source: Company data, Edison Investment Research. Note: Cash costs include royalty based on Edison estimates. Note: Exchange rates used for cost conversion: A\$/C\$/0.9/US\$. *The FS on Sangdong is currently under review and may result in significant changes in project parameters. The revised FS is expected to be reported by end-2014.

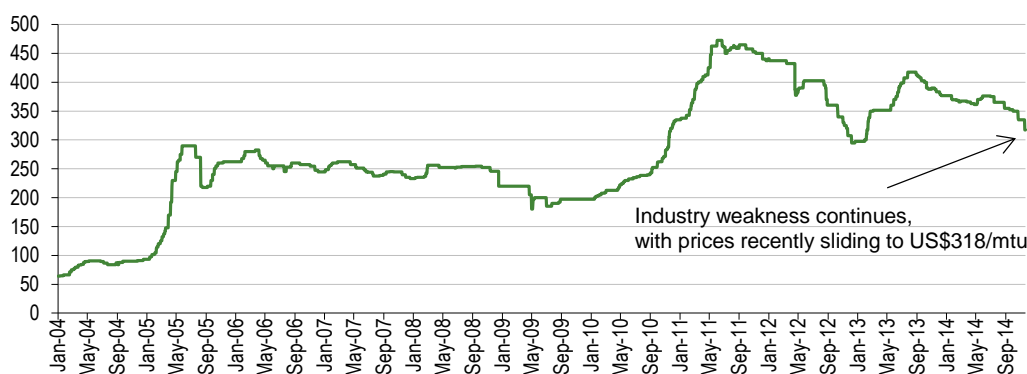


Historic tungsten prices and forecasts

APT prices to remain under pressure in 2015...

APT (ammonium paratungstate) is an intermediate tungsten product considered to be a universal industry price benchmark. It is used to set the price of WO_3 concentrate, with discounts currently ranging from 20% to 30% depending on the WO_3 content (benchmark 65% WO_3). The APT price experienced an explosive growth at the end of 2005 on the back of accelerated growth in emerging economies. Another step change in tungsten pricing occurred in the second half of 2010 and is believed to be associated with China curbing its presence on the international market through the introduction of export quotas on low value-add tungsten products. As a result, the APT price reached its peak of US\$470/mtu in mid-2011. More recently, pricing has been under moderate pressure, with APT currently trading at US\$318/mtu (a 16% drop ytd) against the backdrop of slowing economic growth in emerging markets, economic headwinds in Europe and the expectation of China lifting its export quotas following the WTO ruling in August. All these factors suggest that APT prices are likely to remain depressed in 2015, with some market weakness potentially exacerbated by the ramp-up of Nui Phao and commissioning of the Hemerdon project. In the longer run, the lack of new mine supply and China's likely reluctance to increase exports of concentrates (China deems tungsten a strategic metal, and the bulk of tungsten resources and production is controlled by a single SOE) should maintain a tight supply-demand balance at the upstream level and support tungsten prices.

Exhibit 33: APT price performance (US\$/mtu)



Source: Bloomberg

...but will have to move above US\$350/mtu to incentivise new mine supply

Our analysis suggests that an APT price of more than US\$350/mtu is required to incentivise new tungsten mine supply. We arrived at this conclusion by considering a number of the most advanced, both greenfield and past producing, tungsten projects that could potentially be brought into production over the next three to five years. For the purpose of this exercise, we used public information on the projects' economics (mining and production schedules, opex and capex estimate breakdowns from available technical reports or companies' public announcements). At project level, we applied a concentrate price discount to APT of 25% (adjusted for higher/lower WO_3 content, with 65% being the benchmark) and assumed a required IRR of 20% (while this might seem high, we view tungsten mining as relatively risky). For consistency, we do not take any potential tax credits or other incentives into account and use statutory tax rates and royalties. We made the only exception for the capital intensive Canadian projects – Sisson and Mactung – where we have incorporated the accelerated capital depreciation provision, which has a marginally positive impact on the IRR. In

general, while most of the projects are likely to benefit from tax holidays or tax credits in one way or another, these will have to be officially confirmed. Further, to account for the fact that some of the technical studies are at least several years old (Sangdong, Mactung, Barruecopardo), we inflated opex for these projects by 2% pa to 2014 and increased capital expenditure estimates by 10-20%. In the case of Sangdong, however, our assumptions may be irrelevant as the company has recently released an updated resource estimate (which significantly differs from the one announced in 2012) and is currently working on an updated feasibility study.

All in all, we estimate that the incentive APT price for the selected group of projects ranges from US\$328/mtu (Barruecopardo) to US\$474/mtu (Watershed), with a production capacity-weighted average of US\$389/mtu (simple average of US\$384/mtu). Assuming an arbitrary five-year tax holiday for all projects (except for Mactung and Sisson where we have factored in the accelerated capital cost allowance), the weighted average incentive price would move to US\$376/mtu (simple average of US\$367/mtu). We note that greenfield projects (Sisson, Mactung, Watershed and to a certain extent Hemerdon) have higher incentive prices compared to brownfield projects (Sangdong, Dolphin, Barruecopardo). The main reason for this is higher capital intensity. However, given the fact that large-scale greenfield projects have recently been the main source of new mine supply (though Hemerdon is technically brownfield), we believe this should provide additional support to tungsten pricing in the longer term. We also note that the average APT price for the six months preceding Wolf's announcement on the credit approval for debt funding from ING and UniCredit (initially £55m, later increased to £75m) was about US\$440/mtu, which we believe also supports our incentive price analysis.

Exhibit 34: Incentive price calculation assuming 20% IRR

Project	Type	Stage	Annual production (kmtu)	Capex intensity (US\$/mtu in reserves)	Capex intensity (US\$/mtu of capacity)	Gross cash cost (US\$/mtu)	Net cash cost (US\$/mtu)	Incentive price (US\$/mtu)
Sisson	Greenfield OP	BFS (2013)	557 (APT)	22	935	242	164	385
Mactung	Greenfield UG	BFS (2009)	635	28	570	127	127	435
Sangdong	Brownfield UG	BFS (2012)	415 (APT)	N/A	364	185	172	347
Hemerdon	Greenfield OP	Construction	345	39	580	148	115	382
Dolphin	Brownfield OP/UG	Revised FS (2014)	295	11	322	143	143	338
Watershed	Greenfield OP	BFS (2014)	250	46	630	220	220	474
Barruecopardo	Brownfield OP	BFS (2012)	227	23	269	125	125	328
Weighted average				27	568	172	150	389

Source: Company data, Edison Investment Research. Note: Capital intensities and net cash costs are as published by the companies. Mt Carbine was not included due to the lack of public information on the project's economics. Molyhil was not included as Thor is yet to publish the updated BFS. Sangdong numbers are based on the 2012 FS.

Setting the long-term real APT price at US\$370/mtu

We use the calculated weighted average incentive price to set our long-term benchmark APT price. Assuming that not all of the proposed new mine capacity will eventually be brought into production (at least not over our forecasting horizon), we take the average incentive price for the first three quartiles, which is US\$370/mtu, and set it as our long-term benchmark APT price assumption in real (2014) terms. Assuming annual inflation of 2.0%, this would imply a nominal price of about US\$400/mtu in 2018.

Overall, we model the nominal benchmark APT price averaging US\$325/mtu in 2015 and then gradually recovering to our long-term price of US\$400/mtu in 2018. Essentially, we assume a scenario whereby tungsten prices will be forced higher to incentivise new mine supply beyond 2018. Over the next three to five years however, we expect project completion and ramp-up coupled with slower demand growth in the developed and emerging economies to keep the international tungsten market in relative balance. The main risks to our price forecast are weaker-than-expected global economic growth, stronger-than-expected scrap recycling (which is unlikely

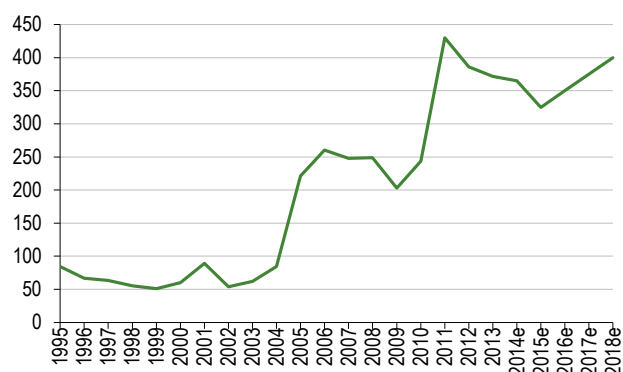
given the softer prices and increase in mine supply), as well as an increase in APT exports from China. This could make the recovery in tungsten pricing more protracted.

Exhibit 35: Benchmark APT price forecast (in nominal terms)

	2011	2012	2013	2014e	2015e	2016e	2017e	2018e
APT price (US\$/mtu)	430	386	382	365	325	350	375	400
APT price (C\$/mtu)	427	381	383	397	361	389	417	444
APT price (A\$/mtu)	416	373	387	397	361	389	417	444

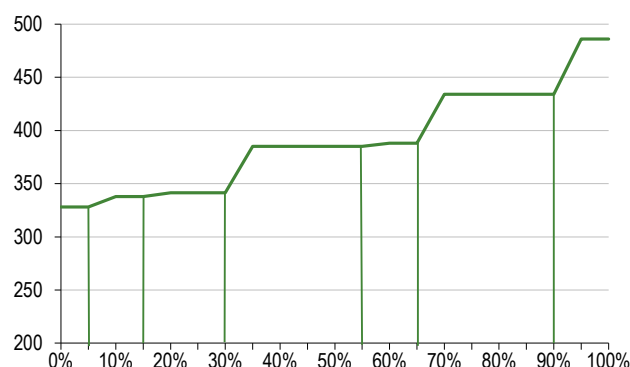
Source: Edison Investment Research

Exhibit 36: Historic APT price and forecast (US\$/mtu)



Source: Bloomberg, Edison Investment Research

Exhibit 37: Estimated incentive price curve (US\$/mtu)



Source: Edison Investment Research

Valuation: Resource multiples are not very revealing

At the equities level, the tungsten sector is relatively difficult to invest in due to the small scale of the projects (even the biggest ones barely have EBITDA exceeding US\$100-150m) and the micro-cap nature of the stocks (among the publicly traded independent miners Wolf has the largest market cap of US\$168m). Liquidity is sometimes also an issue. Nevertheless, there are a number of independent producers and advanced projects that offer good industry exposure, especially for an investor prepared to tolerate risk. Among the independent miners and near-term producers, we would highlight Almonty Industries (AII) and Wolf Minerals (WLF), while the most advanced exploration and development projects include Australian players such as Vital Metals (VML), King Island Scheelite (KIS), Carbine Tungsten (CNQ), as well as Ormonde (ORM) in Europe and Northcliff (NCF) in North America. The companies with less advanced mining projects are W Resources (WRES) and Tungsten Mining (TGN).

Current and near-term producers

Producers and explorers are trading on a wide range of valuation multiples, which complicates comparison in each group. Independent, publicly traded tungsten producers are scarce on the market and are somewhat different in terms of the scale and nature of the business. North American Tungsten (NTC) runs a large-scale but high-cost operation, while Almonty's Los Santos project has better profitability but smaller size. Based on last-twelve-months' EBITDA (NTC does not have consensus estimates), NTC shares trade at an EV/EBITDA of less than 1.5x. However, given the current market deterioration, the forward-looking multiple is likely to be much higher, if not negative. This compares to Almonty's FY15e and FY16e EV/EBITDA of 5.8x and 4.3x based on Edison earnings estimates. Finally, we note that Wolf Minerals, which plans to commission its Hemerdon tungsten project in H215, trades at an estimated fully funded EV of about US\$293m (based on current market cap, cash and debt to be drawn), which puts the stock on a consensus FY16e EV/EBITDA of 4.7x.

Explorers and developers

While the best approach to use with specific mining projects is an NPV, in absence of such information we compare the projects based on an EV/resource multiple. However, given that the scale and quality of the resource base is only one of a number of criteria, this approach may not be too revealing. We note that different project parameters such as opex and capex do not always favour a resource-based comparison. Still, for our selected peer group, the multiples range from US\$0.4/mtu for Northcliff, reflecting Sisson's large-scale resource base, to US\$12.7/mtu for Tungsten Mining (Kilba). At the reserves level, the situation looks slightly different, with Northcliff trading at US\$0.7/mtu and Wolf being valued at US\$58/mtu. We also believe that comparing the companies' current market valuations with the funding requirements of the respective projects might be telling. In our analysis, Northcliff (Sisson) and Vital Metals (Watershed) have the lowest market cap-to-capex ratios, while Ormonde and Carbine Tungsten have the highest. That said, in some cases strategic investors/partners (such as Todd in Northcliff's case) are expected to co-finance the development of the projects, contributing a certain share of funding and reducing the dilution.

Exhibit 38: Resource-based valuation of the selective tungsten projects

Company	Main project	Status	Attributable WO ₃ contained in reserve (mtu)	Attributable WO ₃ in resource (mtu)	Market cap (US\$m)	EV (US\$m)	EV/resource (US\$/mtu)	EV/reserve (US\$/mtu)
Wolf Minerals	Hemerdon	Construction	5,073	52,182	167.5	293.1	5.6	57.8
Ormonde Mining	Barruecopardo	Funding	2,607	7,121	29.5	27.4	3.8	10.5
Carbine Tungsten	Mt Carbine	Production/funding	2,520	6,876	34.0	33.7	4.9	13.4
Tungsten Mining*	Kilba	Exploration	-	1,350	21.2	17.2	12.7	-
King Island Scheelite	Dolphin	Funding	-	8,764	15.1	13.5	1.5	-
Northcliff Resources	Sisson	Permitting/funding	19,530	34,739	16.3	13.3	0.4	0.7
W Resources	La Parrilla	Production/exploration	-	5,764	14.8	13.7	2.4	-
Woulfe Mining	Sangdong	Late-stage exploration	-	9,353	12.2	22.6	2.4	-
Colt Resources*	Tabuaco	Exploration	-	1,548	16.6	18.1	11.7	-
Vital Metals	Watershed	Funding	2,237	4,833	5.5	7.0	1.4	3.1
Thor Mining	Molyhil	Late-stage exploration	930	1,319	5.0	5.9	4.5	6.3

Source: Company data, Edison Investment Research, Bloomberg. Note: *Tungsten Mining and Colt Resources have non-tungsten projects, which could distort valuation. Priced as of 8 December 2014.

Company profiles

Almonty Industries

Tungsten specialist with a strong track record

We believe Almonty is well positioned to replicate its success with the Los Santos tungsten project on the recently acquired Wolfram Camp Mine (WCM). WCM has the potential to become a long-life underground operation, increasing Almonty's overall tungsten production to 160-180kmtu of WO₃. While not immune to the deterioration in APT prices, Almonty's strong turnaround potential makes the stock an inexpensive play on the fundamentally attractive tungsten market.

Year end	Revenue (C\$m)	PBT* (C\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
09/13	18.3	4.7	(6.0)	0.0	N/A	N/A
09/14e	28.4	6.7	(0.8)	2.6	N/A	4.2
09/15e	49.7	7.7	1.6	0.0	41.9	N/A
09/16e	52.4	10.4	8.1	0.0	8.3	N/A

Source: Company data, Edison Investment Research forecasts. Note: *PBT and EPS are normalised. Estimates from FY14 onwards adjusted for IFRIC 20.

Strong FY14, but challenging year ahead

Almonty is set to deliver strong FY14 results, with forecast revenue of C\$28m and EBITDA adjusted for new waste mining cost accounting at Los Santos of C\$6.7m (cf headline EBITDA C\$15.2m), and record tungsten sales of 90kmtu of WO₃. We expect the full integration of WCM to increase Almonty's tungsten production to 172kmtu of WO₃ and revenue to C\$50m in FY15, but to erode its margins due to lower profitability. While the company is unlikely to reap the full benefits of the WCM acquisition in FY15 against the current backdrop of weaker tungsten prices, the anticipated reduction in waste mining costs at Los Santos should support cash flow generation. Beyond 2015, we expect the recovery in tungsten prices and cost-cutting at WCM to normalise earnings and profitability.

Long-term tungsten fundamentals intact

Roskill expects global tungsten consumption to reach 106kt of W by 2018, a 2013-18 CAGR of 2.6%. Despite the anticipated reduction in growth rates, this forecast implies incremental demand of 1.1mmtu of WO₃ equivalent. While new demand will in part be met by scrap recycling, the longer-term supply-demand fundamentals bode well for tungsten miners. Our analysis suggests an APT price above US\$350/mtu (2014 money terms) is required to incentivise new mine supply. In nominal terms, this implies a price of c US\$400/mtu in 2018e.

Outlook: Realising operational efficiencies

We believe Almonty's investment case largely rests on the company's success in turning around the WCM operation and further improving Los Santos's performance. Better visibility on the extension of mine lives at both projects, as well as cost-cutting initiatives at WCM, is crucial to increasing investors' confidence in the stock and realising upside potential, especially in the current softer tungsten price environment. Trading at an FY15e EV/EBITDA of 5.8x, we expect this multiple to fall to 4.3x in FY16 as the company streamlines WCM and increases production at Los Santos and tungsten prices recover.

Price **C\$0.67**
Market cap **C\$33m**

Net debt (C\$m) at June 2014	6.6
Shares in issue, m	49.1
Free float	56%
Code	All
Primary exchange	TSX-V
Secondary exchange	N/A

Share price performance



Business description

Almonty Industries is an independent tungsten producer, with two operating mines – Los Santos in Spain and Wolfram Camp in Australia – and the development-stage Valtreixal tungsten-tin project in Spain. We expect the company to produce c 90kmtu of contained WO₃ in FY14, rising to 172kmtu in FY15 as it fully consolidates WCM.

Catalysts/next events

FY14 financial results	January 2015
Updated NI 43-101 for Los Santos	H115

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

[Edison profile page](#)

Carbine Tungsten

Funded for initial production phase

Carbine Tungsten (CNQ) has received debt funding for the 'starter' phase of its Hard Rock Tungsten Project, which involves processing of low-grade stockpiles. This has been provided by a Mitsubishi Corporation subsidiary under an MOU providing offtake agreements. Significant resources with upside potential support an open-pit development in the next phase.

Year end	Revenue (A\$m)	PBT* (A\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
06/13	0.0	(6.3)	(1.8)	0.0	N/A	N/A
06/14	0.0	(4.3)	(0.7)	0.0	N/A	N/A
06/15e	N/A	N/A	N/A	N/A	N/A	N/A
06/16e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

Stockpile Project fully permitted

CNQ has a 100% interest in the Mt Carbine tungsten project, located 120km north-west of Cairns in north Queensland. In early October 2014, it received notification of a US\$15m secured loan (subject to finalisation of documentation) from Mitsubishi Corporation Rtm Japan (RtMJ) to fund the initial phase, the Hard Rock Stockpile Project, by mining and processing an indicated low-grade stockpile resource of 12mt at 0.07% WO₃. This project is fully permitted for near-term production with a planned processing rate of up to 3Mtpa. The funding is provided for in an MOU between CNQ and RtMJ, originally signed in February 2013 and extended in February 2014. Under the terms of the MOU, RtMJ has exclusive offtake agreements for 80% and 50% of tungsten product from the stockpiles and the reopened open pit respectively.

Upgrading ore improves cost ratio

The low-grade stockpile is part of a total JORC 2012 compliant resource, which also includes indicated and inferred Main Zone hard rock resources of 47.3Mt at 0.13% WO₃, at a lower cut-off of 0.05% WO₃ and a top cut of 4% WO₃. The resource is beneath and adjacent to the Mt Carbine open-cut mine, which operated from 1974 to 1987. There is additional exploration potential at the Iron Duke prospect, which lies in the open-pit envelope, and at Petersen's Lodes, c 1-2km south-east of Mt Carbine. Although the mined grades are relatively low, pre-concentration significantly upgrades the ore. This was carried out previously when the mine was open. Since then, there have been major advances in ore sorting technology. Trials using a state-of-the-art transmission X-ray sorter have provided a conservative upgrade of more than six times the bulk sample grade.

Outlook: Progression towards production

Construction of the plant for the Stockpile Project is planned to commence during H115. The securing of approvals and permitting for open-pit mining will be a major focus for CY15. Iron Duke mineralisation lies in the planned open-cut envelope, but is not included in current resources. Drilling is planned during this period to establish the resource before the start of open-cut mining.

Price **A\$0.14**
Market cap **A\$42m**

Net cash (A\$m) at 30 September 2014	1.0
Shares in issue, m	296.7
Free float	73.4%
Code	CNQ
Primary exchange	ASX
Secondary exchange	N/A

Share price performance



Business description

Carbine Tungsten (CNQ) is developing the Mt Carbine tungsten project in North Queensland. It has just received funding for an initial operation based on the treatment of low-grade stockpiles. Later on, it will redevelop the former open pit, based on a significant resource inventory and further exploration potential.

Catalysts/next events

Commissioning of low-grade S/P processing	Q4 CY15
Open pit mining establishment	Q3 CY16

Analysts

Peter Chilton	+61 (0)2 9258 1161
Andrey Litvin	+44 (0)20 3077 5755

mining@edisongroup.com

King Island Scheelite

Initiatives lift capital efficiency

King Island Scheelite (KIS) completed a revised feasibility study for its high-grade Dolphin tungsten project in mid-2014. This forms the basis of a development plan that envisages a final decision to proceed in the March quarter 2015 and potential first production in mid-2016. Elements of the project include competitive operating and capital costs, and a relatively long life.

Year end	Revenue (A\$m)	PBT* (A\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
06/13	0.0	(1.2)	(1.2)	0.0	N/A	N/A
06/14	0.0	(2.1)	(1.5)	0.0	N/A	N/A
06/15e	N/A	N/A	N/A	N/A	N/A	N/A
06/16e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

New development plan enhances the project

KIS has 100% ownership of tenements comprising the Dolphin resource and former mine on King Island, Tasmania. Dolphin has a measured and indicated resource of 13.5Mt at 0.68% WO₃, which includes a measured 2.7Mt at 0.17% WO₃ in tailings and an indicated 1.93Mt at 0.55% WO₃ for an initial four- to five-year open-pit operation. A new development plan has replaced earlier concepts with a potential increase in life-of-mine production, lower mining and processing costs and a significant reduction in development and capital cost. Some savings can be attributed to metallurgical test work, which confirmed the benefits of introducing a gravity circuit ahead of a simplified flotation circuit. Further project de-risking includes dewatering the open-pit void, further open-pit resource delineation and further metallurgical test work. A final decision to reopen the mine is expected during the March quarter 2015 with potential first production in June 2016.

Competitive capital and operating costs

The current development plan envisages production of c 190,000mtu and 340,000mtu of WO₃ pa from the open-pit and underground mining phases respectively. A mine life of at least 13 years is anticipated, with a nine-year underground operation to follow the open-pit operation. KIS has estimated a capital cost of A\$60m to commence an open-pit operation, which includes A\$7m for the mobile mining fleet and A\$34.3m for the processing plant. KIS proposes to use cash flow from open-pit activities to fund the development of the underground mine. The company estimates a direct cash cost in years one to four of A\$107/mtu and A\$139/mtu in years five to 13, both excluding G&A and royalty.

Outlook: Project finalisation and funding

The results of a 2,000m drilling programme, designed to validate the historical data on which the current development plan is based, are expected to be available in late January 2015. The results of further metallurgical testing are also expected to be complete around the same time. KIS will require additional funds to bring the Dolphin project into production. Funding measures that will be considered include equity and debt raisings, joint venturing and tungsten offtake arrangements.

Price **A\$0.12**
Market cap **A\$18m**

Net cash (A\$m) at 30 September 2014	2.1
Shares in issue, m	152.1
Free float	56.3%
Code	KIS
Primary exchange	ASX
Secondary exchange	N/A

Share price performance



Business description

King Island Scheelite (KIS) is planning to bring the Dolphin tungsten project, on King Island, Tasmania, back into production. The project has high-grade resources sufficient for a c 13-year life (open pit, then underground operation). Subject to funding, first production could be in mid-2016.

Catalysts/next events

Final decision on mine reopening	Q1 CY15
First production	June 2016

Analysts

Peter Chilton	+61 (0)2 9258 1161
Andrey Litvin	+44 (0)20 3077 5755

mining@edisongroup.com

North American Tungsten

Weaker tungsten price is a major risk

North American Tungsten's key asset is the producing Cantung tungsten mine in Yukon, Canada. The project has a long history of mining and due to its relatively high cost positioning is essentially a market-balancing capacity. However, the recent mine life extension and management's focus on cost reduction are sending some positive signals to investors. The high-grade greenfield Mactung project provides growth optionality.

Year end	Revenue (C\$m)	PBT* (C\$m)	EPS* (C\$)	DPS (C\$)	P/E (x)	Yield (%)
09/12	107.5	(9.8)	(0.04)	0.0	N/A	N/A
09/13	79.8	(13.3)	(0.06)	0.0	N/A	N/A
09/14e	N/A	N/A	N/A	N/A	N/A	N/A
09/15e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

Mine life extension and operational turnaround

In the nine months to June, NTC produced and sold 211kmtu and 204kmtu of WO₃ in concentrate respectively. The company reported revenue of C\$66.0m and headline EBITDA of C\$7.6m, which implies a total cash cost of C\$287/mtu compared to a realised price of C\$316/mtu. The cash cost of sales came in at C\$272/mtu. While not the lowest cost producer, management is undertaking steps to reduce costs, which is crucial in the current weak tungsten price environment. To this end, the company is implementing an improvement programme, increasing the milling rate from 1,100tpd in FY13 to 1,350tpd. This should reduce unit fixed costs. The met recovery is also expected to increase. In September 2014, the company announced the extension of Cantung's mine life to at least 2017 by upgrading the project's compliant mineral reserve to 1.8Mt at 0.81% WO₃.

Mactung is an organic growth opportunity

Mactung is a high-grade (1.2% WO₃ in reserves) greenfield underground tungsten development in Yukon, Canada. Based on the FS completed in 2009, the project is capable of producing on average 635kmtu of WO₃ in concentrate per year over 12 years at an average C1 cash cost of c C\$141/mtu. The project's capital cost was estimated at C\$402m, which implies capex intensity of C\$633/mtu of capacity or C\$31/mtu contained in reserves. In September 2014, NTC announced that the project received environmental approval from the federal and Yukon authorities.

Weaker tungsten pricing is a major risk

The success of the currently implemented optimisation programme is crucial to keeping NTC afloat against the backdrop of weaker tungsten prices. At the same time, despite the slower demand growth and improved availability of the material, it does not seem that the tungsten market is now prepared to lose some 300kmtu pa in concentrate supply. This suggests that tungsten prices could find support around Cantung's all-in cash cost. Still, the company's relatively high cost positioning and balance sheet gearing make it highly sensitive to changes in the APT price, putting pressure on the financial performance.

Price **C\$0.04**
Market cap **C\$10m**

Net debt (C\$m) at June 2014	46.6
Shares in issue, m	238.1
Free float, %	70.5
Code	NTC
Primary exchange	TSX
Secondary exchange	N/A

Share price performance



Business description

North American Tungsten owns the producing Cantung tungsten mine and the greenfield tungsten Mactung project. Being one of the largest operating tungsten mines outside China, Cantung is capable of delivering up to 300kmtu of WO₃ in concentrate. Mactung is an underground development, which could potentially produce some 630kmtu pa of WO₃ in concentrate.

Catalysts/next events

FY14 financial results	January 2015
------------------------	--------------

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

Northcliff Resources

A long-term play on the sector

Sisson is a large-scale, long-life greenfield tungsten development in New Brunswick, Canada. Having completed the FS in 2013, Northcliff is now working towards obtaining the EIA in H115. This will pave the way for securing project finance and beginning construction by end-2015, with first commercial production achievable in 2018. With Sisson offering both scale and long-term security of supply, we view Northcliff as an attractive play in the tungsten sector for those taking a three- to four-year view.

Year end	Revenue (C\$m)	PBT* (C\$m)	EPS* (C\$)	DPS (c)	P/E (x)	Yield (%)
10/12	0.0	(14.2)	(0.20)	0.0	N/A	N/A
10/13	0.0	(10.6)	(0.14)	0.0	N/A	N/A
10/14e	N/A	N/A	N/A	N/A	N/A	N/A
10/15e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

Large-scale project with long mine life

Sisson is expected to produce an average 557kmtu of WO₃ in APT and 4.1Mlb of Moly in concentrate pa over a 27-year mine life. Production rates for the first five years of operation are expected to exceed the average, thanks to higher grades. Average LoM recoveries are 76% for tungsten (81% in first five years) and 82% for Moly. The project's key advantage is its large-scale mineral resource base (334Mt in proven and probable reserve at 0.07% WO₃, with 22mmtu of contained WO₃), which makes Sisson one of the largest undeveloped tungsten resources in the world. Importantly, the strip ratio is low at 1.0 t:t, which helps keep the gross C1 APT cash cost at C\$269/mtu, or C\$182/mtu after Moly credits (at C\$12/lb). The project's development capital cost is estimated at C\$579m, which translates into a capex intensity of only US\$22 per mtu contained in reserves.

Supportive strategic investor

In October 2013, Northcliff announced it was bringing Todd, a large New Zealand industrial conglomerate, on board as a strategic investor. At the initial stage, Todd acquired a 15% interest in Northcliff by way of a private placement, paying C\$5m. In addition, the group agreed to acquire a direct 11.5% interest in the Sisson project by paying C\$14m, with an option to buy an additional 10% for C\$20m. In October 2014, Northcliff announced that Todd completed the 11.5% investment by injecting C\$14m in the project. This implies Todd's effective interest in the project of 25%.

EIA decision in H115, followed by funding

Having delivered encouraging FS results, the company is focusing on finalising the project's environmental approval by mid-2015. This will pave the way for arranging funding and starting construction, with first commercial production planned in 2018. While near-term tungsten market fundamentals remain difficult, especially for a project of Sisson's scale, we view Northcliff as an attractive investment opportunity for those who are looking to capitalise on the sector's positive long-term outlook. Apart from the robust project economics, we believe Sisson's strong point is a large resource base, which offers both scale and long-term security of supply.

Price **C\$0.2**
Market cap **C\$18m**

Net cash (C\$m) at July 2014	5.3
Shares in issue, m	91.3
Free float	77%
Code	NCF
Primary exchange	TSX-V
Secondary exchange	N/A

Share price performance



Business description

Northcliff Resources is a mineral development company advancing a greenfield Sisson tungsten project in New Brunswick, Canada. With 334Mt at 0.07% WO₃ in reserves, Sisson is one of the largest undeveloped tungsten deposits. Having completed the FS in 2013, the company is now working through the Environmental Impact Assessment (EIA), which is expected to be completed by mid-2015.

Catalysts/next events

Project permitting	H115
Final investment decision/project finance	H215

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

Ormonde Mining

Permitting is a major step forward

The recently received mining concession is the major milestone that significantly de-risks the Barruecopardo tungsten project. The company's focus now shifts to securing funding to bring the project into production. Despite the current deterioration in the tungsten price, the project's strong economics, reasonable scale and a relatively long life make Ormonde an attractive investment proposition.

Year end	Revenue (€m)	PBT* (€m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/12	0.0	(1.2)	(0.3)	0.0	N/A	N/A
12/13	0.0	(1.4)	(0.3)	0.0	N/A	N/A
12/14e	N/A	N/A	N/A	N/A	N/A	N/A
12/15e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

Permitting significantly de-risks the project

We understand that the recently received mining concession is the final permit that is required to bring the Barruecopardo project into production. The award of this permit follows on from the granting of the Environmental Impact Declaration in February 2014 and essentially concludes a rather protracted four-year permitting process. With an offtake from Noble Group in place (signed in March 2014), the focus now shifts to securing a funding package to advance the project to the construction and then production stages. In January 2014, Ormonde appointed Swedbank as an organiser of the potential bond funding of €50m.

Supportive project economics are key

We believe that Barruecopardo's attractive economics, relatively long life and reasonable scale are the key advantages of the project. Based on the BFS (2012), the project is expected to produce an average 227kmtu of WO₃ in concentrate per year for at least nine years at a direct operating cost of US\$125/mtu (€100/mtu). Even at the current APT price of US\$320/mtu and a 25% discount for concentrate, this would imply a hefty C1 EBITDA margin of 48%. The BFS estimated the project capital cost at €49m (this excludes refundable capex VAT of €9m and working capital), which implied a capex intensity of c US\$270/mtu. The project's strong economics are underpinned by the high-grade nature of its resource base, with a mining inventory of 8.7Mt at 0.30% WO₃. The overall compliant resource is 27.4Mt grading 0.26% WO₃ and could potentially support the mine life extension.

High chances of success, despite weak market

Noting an EV/resource multiple of US\$3.8/mtu, we do not consider this valuation metric as very representative of the company's potential, given Barruecopardo's relatively advanced stage. While the current tungsten market conditions are not supportive of arranging project finance, manageable capex (Ormonde estimates the gross funding requirement at US\$88m vs current market cap of US\$30m and cash of US\$2m) coupled with robust project economics significantly increase chances of success. Against this backdrop, the risk of dilution looks tolerable.

Price 4.0p
Market cap £19m

Net cash (€m) at June 2014	1.6
Shares in issue, m	472.5
Free float	97%
Code	ORM
Primary exchange	AIM
Secondary exchange	ESM

Share price performance



Business description

Ormonde Mining is advancing a past-producing tungsten mine in western Spain, with a JORC-compliant mineral resource of 27Mt at 0.26% WO₃. The Barruecopardo tungsten project has a mining licence and an offtake agreement in place.

Catalysts/next events

Project funding	H115
-----------------	------

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

Tungsten Mining

Infill drilling in advance of feasibility study

Tungsten Mining (TGN) has a JORC-2012 compliant resource at its wholly-owned Kilba project in WA. The status of this resource is expected to be upgraded after analysis of results from the recent infill drilling programme. The next stage will be a feasibility study for the development of the project, which will build on the preliminary work of an earlier scoping study.

Year end	Revenue (A\$m)	PBT* (A\$m)	EPS* (A\$)	DPS (c)	P/E (x)	Yield (%)
06/13	0.0	(4.9)	(0.08)	0.0	N/A	N/A
06/14	0.0	(3.1)	(0.03)	0.0	N/A	N/A
06/15e	N/A	N/A	N/A	N/A	N/A	N/A
06/16e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

JORC-2012 compliant resource and scoping study

TGN's JORC-2012 compliant inferred and indicated resource is 5Mt at 0.27% WO₃ comprising indicated resources of 1.3Mt at 0.30% WO₃ and inferred resources of 3.7Mt at 0.26% WO₃. These resources are present in Zones 8 and 11 at its 100%-owned Kilba project, located in the Gascoyne region of Western Australia. The resource is based on a 0.10% WO₃ cut-off grade. This resource was announced in May 2013. The company subsequently compiled a scoping study, which was released to the market in October 2013. Further analysis indicated that the mineralisation was coarse grained and would be expected to respond well to Dense Media Separation, which would allow a gravity-based upgrading of the mineralisation before treatment. As the findings of the scoping study were drawn partly from inferred resources that comprise around 70% of the resources, they were preliminary in nature.

Infill drilling to upgrade resource status

Following a A\$4.6m capital raising during the June 2014 quarter, reverse circulation drilling commenced in early August, aimed at upgrading the confidence level of the Kilba resource in support of detailed feasibility studies and project development, and collecting samples for metallurgical testing. The initial focus was on high-grade shoots in Zone 8 and 11. This drilling indicated continuity of mineralisation in Zone 11 and broader mineralisation in Zone 8. Work has commenced on preparing the scope of work for formal feasibility studies.

Outlook: Resource model update, feasibility study

The completion of the infill drill programme will allow an update of the JORC mineral resource to be completed by late CY14. An initial pre-feasibility level study (PFS) is proposed to provide greater definition to metallurgical and process design requirements before the more detailed engineering and project development work of the feasibility study. At an EV/resource of US\$12.7/mtu, we believe some positive expectations regarding Kilba's resource extension potential and economics might have already been built into TGN's share price.

Price **A\$0.12**
Market cap **A\$26m**

Net cash (A\$m) at 30 September 2014	3.3
Shares in issue, m	212.65
Free float	60.1%
Code	TGN
Primary exchange	ASX
Secondary exchange	N/A

Share price performance



Business description

Tungsten Mining (TGN) has 100% of the Kilba tungsten project in the Gascoyne region of WA. A feasibility study is planned following an infill drilling programme that will lead to an upgrade to the existing JORC-2012 resource status to indicated or better. TGN has additional exploration projects at Loves Find, Whiskey Pool and Lake Seabrook.

Catalysts/next events

Mineral resource update	December 2014
Exploration starts at priority Kilba and Loves Find targets	Mid-CY15

Analysts

Peter Chilton	+61 (0)2 9258 1161
Andrey Litvin	+44 (0)20 3077 5755

mining@edisongroup.com

Vital Metals

Offtaker could assist with financing

Vital Metals (VML) has a 70% interest in the Watershed tungsten project, which is now ready for immediate development, subject to finance. JOGMEC's potential transfer of its 30% stake to a Japanese company that would provide offtake agreements and possible assistance in securing project finance delivers the pathway for the development of the project.

Year end	Revenue (A\$m)	PBT* (A\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
06/13	0.0	(1.4)	(0.6)	0.0	N/A	N/A
06/14	0.0	(1.4)	(0.6)	0.0	N/A	N/A
06/15e	N/A	N/A	N/A	N/A	N/A	N/A
06/16e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

DFS complete, all necessary approvals in place

VML has just completed the definitive feasibility study (DFS) for its Watershed tungsten project (VML 70%), which is located in north Queensland, 115km north-west of Cairns. Watershed has mining reserves of 21.3Mt of ore at 0.15% WO₃, at a cut-off of 0.05% WO₃, which would be mined and processed at an operating rate of 2.5Mtpa to produce an average of 2,500tpa WO₃ (but higher in the first three years due to higher scheduled grades). The project is now ready for immediate development, subject to finance, with all necessary approvals in place. Site works could commence early in 2015, with first ore processing by the end of 2016 and initial concentrate sales in early 2017. The life of operations would be 10 years, with exploration potential to increase the life beyond this.

Competitive C1 cash costs

The pre-production capital estimate for the project is A\$172m. Based on open-pit mining at a waste to ore ratio of 3:1 and an average 73.6% WO₃ metallurgical recovery, the DFS estimated an average C1 cash cost of US\$206/mtu and an all-in cash production cost of c US\$220/mtu (including royalties). The APT price forecast used in the DFS of US\$455/mtu calls for a payback of 2.6 years. However, the spot APT price is around US\$320/mtu.

Outlook: Offtake partner and financing assistance

VML's JV partner in the Watershed project, with a 30% interest, is JOGMEC (Japan Oil, Gas and Metals National Corporation). This was earned by contributing A\$5.4m towards the DFS. Under a 2011 earn-in agreement, JOGMEC has the right to transfer its stake to a Japanese company that would have an offtake interest and responsibility for arranging its share of project finance. JOGMEC has now finalised its DFS review and has progressed to formal discussions with potential Japanese partners interested in acquiring its interest in the project. If a transfer occurs, VML expects the Japanese partner to provide assistance in securing project finance.

Price **A\$0.02**
Market cap **A\$5m**

Net cash (A\$m) at 30 September 2014	0.2
Shares in issue, m	261.75
Free float	54.0%
Code	VML
Primary exchange	ASX
Secondary exchange	N/A

Share price performance



Business description

Vital Metals (VML) has 70% of the Watershed tungsten project in North Queensland. It has all the necessary approvals in place for development, with potential first sales by 2017. JOGMEC's transfer of its 30% stake to a Japanese offtaker may provide the mechanism for financing the project.

Catalysts/next events

Project finance	H1 CY15
Mine development (subject to finance)	Mid-CY15

Analysts

Peter Chilton	+61 (0)2 9258 1161
Andrey Litvin	+44 (0)20 3077 5755

mining@edisongroup.com

Wolf Minerals

Production in H215

The fully permitted and funded Hemerdon project is the most advanced near-term tungsten producer outside China. With first production slated for H215, the project will reach its full capacity of 345kmtu of WO₃ in 2016 and should therefore be able to capitalise on still supportive tungsten market conditions. At a consensus 2016e EV/EBITDA of 4.7x, Wolf's valuation may not be fully reflective of the project's operational upside potential and positive long-term tungsten fundamentals.

Year end	Revenue (A\$m)	PBT* (A\$m)	EPS* (A\$)	DPS (c)	P/E (x)	Yield (%)
06/13	0.0	(5.3)	(0.03)	0.0	N/A	N/A
06/14	0.0	(3.7)	(0.01)	0.0	N/A	N/A
06/15e	0.0	(12.1)	(0.01)	N/A	N/A	N/A
06/16e	108.0	33.3	0.03	N/A	8.2	N/A

Source: Company data, Bloomberg consensus. Note: *PBT and EPS are normalised.

Emerging tungsten producer

With first production scheduled for H215, Hemerdon will deliver 345kmtu pa WO₃ in concentrate, making it one of the largest tungsten operations outside China. The project is underpinned by the compliant proven and probable reserve of 26.7Mt grading 0.19% WO₃ (M&I resource of 117Mt at 0.14% WO₃), which supports a life of mine in excess of 10 years and is expected to have a low direct operating cost of c US\$115/mtu (after tin credits; gross C1 cash cost of US\$148/mtu). This compares to the indicative WO₃ concentrate price of US\$255/mtu (Edison estimate based on the spot APT and a 20% discount for concentrate). The project's capital cost is estimated at c US\$200m, an implied capex intensity of US\$580/mtu (excluding tin). The company has tungsten offtake in place with GTP and WBH.

Fully funded and on track for production in H215

Hemerdon is a permitted and fully funded tungsten project, which sets it apart from the majority of sector competition. Having raised A\$182m in equity and secured A\$140m (£75m) in project finance, Wolf has enough funds to bring the Hemerdon project into production. In addition to the repayment of the US\$75m bridge loan with RCF, these funds are expected to cover the project's development capex. According to Wolf, the project is more than 60% complete, with 96% of equipment delivered; concrete works and the mine waste facility are 84% and 44% complete.

Operational upside may not be fully priced in

We estimate that Wolf trades at a fully funded EV of c US\$293m (based on current market cap, cash and debt to be spent on the project), which puts the stock on a consensus 2016e EV/EBITDA of 4.7x. While the current weakness in the APT price is likely to continue putting pressure on consensus earnings estimates and the share price, we believe the company's valuation may not fully reflect the project's operational upside (higher plant availability, recovery rates and longer life), as well as stronger mid- to long-term tungsten market fundamentals.

Price **A\$0.25**
Market cap **A\$202m**

Net cash (A\$m) at June 2014	102.8
Shares in issue, m	807.8
Free float	18%
Code	WLF/WLFE
Primary exchange	ASX
Secondary exchange	AIM

Share price performance



Business description

Wolf Minerals owns the Hemerdon tungsten and tin project in the UK. The project is set to become one of the largest non-Chinese tungsten producers, delivering c 345,000mtu of WO₃ (3,450tpa WO₃) in concentrate. First production is scheduled for H215. The project is fully permitted and funded.

Catalysts/next events

First production	Mid-2015
------------------	----------

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

Woulfe Mining

Reassessing Sangdong's potential

Following the change in management, Woulfe Mining decided to undertake additional work at its Sangdong tungsten-molybdenum project in South Korea. This has resulted in an updated compliant resource estimate for the project, with a revised feasibility study expected by end 2014. The IMC deal is still on the cards and would significantly de-risk the project.

Year end	Revenue (C\$m)	PBT* (C\$m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
06/13	0.0	(3.7)	(1.3)	0.0	N/A	N/A
06/14	0.0	(2.2)	(0.2)	0.0	N/A	N/A
06/15e	N/A	N/A	N/A	N/A	N/A	N/A
06/16e	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company data. Note: *PBT and EPS are normalised.

Updated resource estimate for Sangdong

In August 2014, Woulfe completed a closely spaced drill programme at Sangdong, which resulted in a revised mineral resource estimate for the project. The recent campaign added 11,340m of resource definition drilling to the data available for the 2012 FS. The company has also undertaken an important geotechnical study. Based on the additional data, the company provided an updated NI 43-101 resource estimate that came in at 15.1Mt grading 0.62% WO₃ (with a cut-off grade of 0.4% WO₃), with 3.8Mt at 0.56% WO₃ in the M&I category. This compares to the previous resource estimate of 35.8Mt grading 0.44% WO₃ at a 0.15% WO₃ cut-off.

Revised feasibility study due by end 2014

The updated mineral resource estimate and geotechnical work will feed into a revised feasibility study on the project, which is expected to be completed by the end of 2014. According to the company, the new mining plan will be significantly different to that adopted in the 2012 feasibility study as it will utilise a more selective mining approach. Just to recap, the 2012 feasibility study was based on a mineral reserve of 12.5Mt at 0.43% WO₃ and envisaged the project producing up to 417kmtu of WO₃ in APT pa at a gross direct cash cost of c US\$178/mtu. The overall pre-production capital cost was estimated at US\$151m, with an additional US\$58m in maintenance capex.

IMC deal would significantly de-risk the project

In February 2012, Woulfe announced a landmark deal with IMC, part of Berkshire Hathaway and a major producer of tooling equipment and tungsten consumer, according to which IMC agreed to co-finance the Sangdong project and provide an offtake for the majority of the APT product. The project was expected to be split into the upstream Sangdong mine and the downstream APT plant. The mine was to be 75% owned by Woulfe, while the plant was agreed to be 55% controlled by IMC. The conclusion of the deal was subject to the completion of due diligence by IMC (announced in September 2012), the receipt of the relevant regulatory approvals and other conditions. Despite the project setbacks, the IMC deal is still on the agenda and would significantly de-risk the project.

Price

C\$0.04

Market cap

C\$15m

Net debt (C\$m) at September 2014	12.4
Shares in issue, m	364.3
Free float	67%
Code	WOF
Primary exchange	CSVE
Secondary exchange	024

Share price performance



Business description

Woulfe Mining is developing mineral resources in South Korea. Its flagship project is the Sangdong tungsten-molybdenum past producing underground project, with an updated NI 43-101 resource of 11.3Mt at 0.64% WO₃. It also owns the Muguk gold deposit.

Catalysts/next events

Updated Sangdong feasibility study	End-2014
------------------------------------	----------

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

W Resources

From tungsten tailings to the open pit

Having successfully commissioned the La Parrilla tungsten tailings project, W Resources' focus is gradually shifting to the larger-scale La Parrilla tungsten open-pit mine, which is expected to be developed in phases using existing infrastructure. The retreatment operation is in ramp-up mode and the company is currently implementing measures to reduce costs and increase revenues. The high-grade Régua tungsten deposit in Portugal represents an additional development opportunity.

Year end	Revenue (£m)	PBT* (£m)	EPS* (p)	DPS (p)	P/E (x)	Yield (%)
12/12	0.0	(0.3)	(0.01)	0.0	N/A	N/A
12/13	0.0	(0.3)	(0.01)	0.0	N/A	N/A
12/14e	1.2	(0.3)	(0.01)	N/A	N/A	N/A
12/15e	4.9	0.4	0.01	N/A	60.0	N/A

Source: Company data, Edison estimates. Note: *PBT and EPS are normalised.

La Parrilla tailings: Enhancing project economics

The company's La Parrilla tungsten tailings project shipped 39 tonnes of tungsten concentrate in October, generating revenue in excess of €470,000 and bringing the overall year to date sales to 66t. September production reached 21t of WO₃, with a target run rate of 25t of WO₃ achieved in October. In its latest operations update, WRES announced that new feed systems and modifications to the concentration plant were installed and should allow the production rate and recoveries to improve. On top of this, the company continues to investigate the potential for tin concentrate production, with tungsten samples sent to the independent suppliers of electrostatic separators to test for the separation of cassiterite. Finally, the company is waiting for the Spanish electricity supplier, Iberdrola, to connect the project to the power grid, with all the required on-site infrastructure already in place.

Staged development of the La Parrilla mine

The large-scale La Parrilla tungsten project (47Mt in resource at 0.09% WO₃) is expected to be advanced on a phased basis. Following the completion of Stage 1 (tailings), the company is looking to fast track the mine development (Stage 2) near the current pit using the existing tailings infrastructure. The third and final stage should see the open-pit mine producing 2,300tpa (230kmtu) of WO₃ in concentrate. WRES plans to complete the Stage 2 definition work, including the mine plan, processing, infrastructure, and operating and capital costing, in Q115.

High-grade Régua deposit adds optionality

W Resources has started a drilling and metallurgical campaign at the Régua tungsten deposit in Portugal, looking to upgrade the current compliant resource of 4.5Mt at 0.31% WO₃ in H115. According to WRES, Régua's mineralisation is open on all flanks, as well as at depth. A trial mining licence on the project was granted in June 2014. Given the high-grade nature of the deposit, Régua could represent an attractive development opportunity, especially given the current environment of lower tungsten prices. Overall, following the recently announced Bergen funding package, our unrisks valuation of WRES is 1.7p/share on a diluted basis.

Price 0.41p
Market cap £10m

Net cash (£m) at 30 June 2014	0.4
Shares in issue, m	2,377
Free float	53%
Code	WRES
Primary exchange	AIM
Secondary exchange	N/A

Share price performance



Business description

W Resources (WRES) is an AIM-listed tungsten exploration and production company. Its flagship asset is the La Parrilla tailings and mine project in south-west Spain. The high-grade Régua tungsten deposit in Portugal is currently under exploration and could potentially represent an attractive development option. WRES has a global compliant tungsten resource of 52.4Mt at 0.11% WO₃.

Catalysts/next events

La Parrilla development update	Q115
Régua resource update	H115

Analysts

Andrey Litvin	+44 (0)20 3077 5755
Peter Chilton	+61 (0)2 9258 1161

mining@edisongroup.com

[Edison profile page](#)

Edison, the investment intelligence firm, is the future of investor interaction with corporates. Our team of over 100 analysts and investment professionals work with leading companies, fund managers and investment banks worldwide to support their capital markets activity. We provide services to more than 400 retained corporate and investor clients from our offices in London, New York, Frankfurt, Sydney and Wellington. Edison is authorised and regulated by the Financial Conduct Authority (www.fsa.gov.uk/register/firmBasicDetails.do?sid=181584). Edison Investment Research (NZ) Limited (Edison NZ) is the New Zealand subsidiary of Edison. Edison NZ is registered on the New Zealand Financial Service Providers Register (FSP number 247505) and is registered to provide wholesale and/or generic financial adviser services only. Edison Investment Research Inc (Edison US) is the US subsidiary of Edison and is regulated by the Securities and Exchange Commission. Edison Investment Research Limited (Edison Aus) [46085869] is the Australian subsidiary of Edison and is not regulated by the Australian Securities and Investment Commission. Edison Germany is a branch entity of Edison Investment Research Limited [4794244]. www.edisongroup.com

DISCLAIMER

Copyright 2014 Edison Investment Research Limited. All rights reserved. This report has been prepared and issued by Edison for publication globally. All information used in the publication of this report has been compiled from publicly available sources that are believed to be reliable, however we do not guarantee the accuracy or completeness of this report. Opinions contained in this report represent those of the research department of Edison at the time of publication. The securities described in the Investment Research may not be eligible for sale in all jurisdictions or to certain categories of investors. This research is issued in Australia by Edison Aus and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act. The Investment Research is distributed in the United States by Edison US to major US institutional investors only. Edison US is registered as an investment adviser with the Securities and Exchange Commission. Edison US relies upon the "publishers' exclusion" from the definition of investment adviser under Section 202(a)(11) of the Investment Advisers Act of 1940 and corresponding state securities laws. As such, Edison does not offer or provide personalised advice. We publish information about companies in which we believe our readers may be interested and this information reflects our sincere opinions. The information that we provide or that is derived from our website is not intended to be, and should not be construed in any manner whatsoever as, personalised advice. Also, our website and the information provided by us should not be construed by any subscriber or prospective subscriber as Edison's solicitation to effect, or attempt to effect, any transaction in a security. The research in this document is intended for New Zealand resident professional financial advisers or brokers (for use in their roles as financial advisers or brokers) and habitual investors who are "wholesale clients" for the purpose of the Financial Advisers Act 2008 (FAA) (as described in sections 5(c) (1)(a), (b) and (c) of the FAA). This is not a solicitation or inducement to buy, sell, subscribe, or underwrite any securities mentioned or in the topic of this document. This document is provided for information purposes only and should not be construed as an offer or solicitation for investment in any securities mentioned or in the topic of this document. A marketing communication under FCA rules, this document has not been prepared in accordance with the legal requirements designed to promote the independence of investment research and is not subject to any prohibition on dealing ahead of the dissemination of investment research. Edison has a restrictive policy relating to personal dealing. Edison Group does not conduct any investment business and, accordingly, does not itself hold any positions in the securities mentioned in this report. However, the respective directors, officers, employees and contractors of Edison may have a position in any or related securities mentioned in this report. Edison or its affiliates may perform services or solicit business from any of the companies mentioned in this report. The value of securities mentioned in this report can fall as well as rise and are subject to large and sudden swings. In addition it may be difficult or not possible to buy, sell or obtain accurate information about the value of securities mentioned in this report. Past performance is not necessarily a guide to future performance. Forward-looking information or statements in this report contain information that is based on assumptions, forecasts of future results, estimates of amounts not yet determinable, and therefore involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of their subject matter to be materially different from current expectations. For the purpose of the FAA, the content of this report is of a general nature, is intended as a source of general information only and is not intended to constitute a recommendation or opinion in relation to acquiring or disposing (including refraining from acquiring or disposing) of securities. The distribution of this document is not a "personalised service" and, to the extent that it contains any financial advice, is intended only as a "class service" provided by Edison within the meaning of the FAA (ie without taking into account the particular financial situation or goals of any person). As such, it should not be relied upon in making an investment decision. To the maximum extent permitted by law, Edison, its affiliates and contractors, and their respective directors, officers and employees will not be liable for any loss or damage arising as a result of reliance being placed on any of the information contained in this report and do not guarantee the returns on investments in the products discussed in this publication. FTSE International Limited ("FTSE") © FTSE 2014. "FTSE®" is a trade mark of the London Stock Exchange Group companies and is used by FTSE International Limited under license. All rights in the FTSE indices and/or FTSE ratings vest in FTSE and/or its licensors. Neither FTSE nor its licensors accept any liability for any errors or omissions in the FTSE indices and/or FTSE ratings or underlying data. No further distribution of FTSE Data is permitted without FTSE's express written consent.