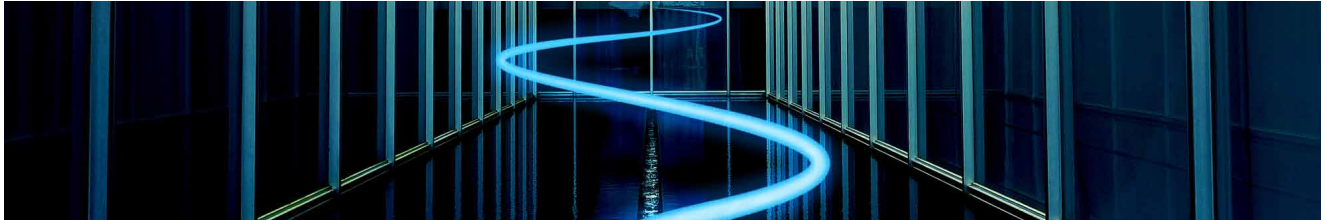


# Argus Tungsten Monthly Outlook



## Outlook

### The month ahead

Tungsten prices have stabilised after recent price falls on some destocking and profit taking. The near-term outlook is mixed, with producers in China ready to suspend production if prices fall further, while buyers are waiting to gauge market direction.

### The next 3-6 months

A resumption of the recent price rises in the next six-month period will depend on the amount of Chinese production capacity that is permanently removed from the market after environmental and "illegal" mining crackdowns are finished.

### 12 months forward

Market fundamentals and cost-curve pressure should come into play in the longer term, as the supply side of the market will have to adjust to a lower demand growth environment, particularly in China.

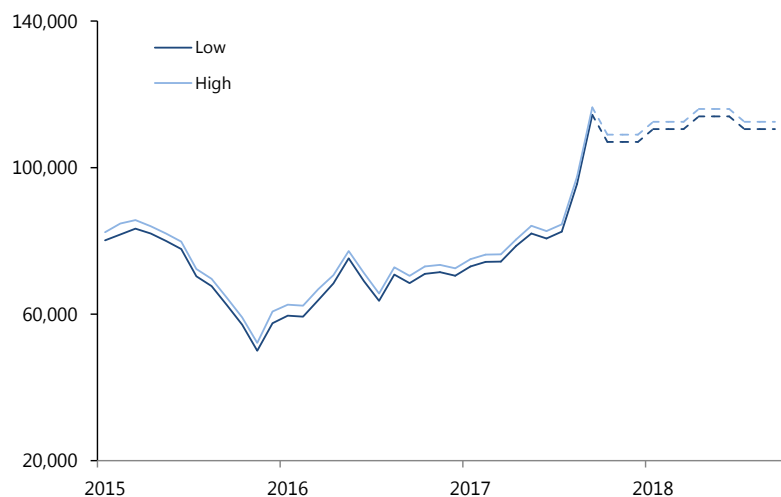
### Concentrates

After peaking in early September, tungsten concentrate prices in China have fallen steadily on destocking and profit taking by suppliers, and a lack of buying interest. But the average for September was still 20pc up on the previous month. Prices for 65pc wolframite averaged Yn114,429-116,429/t (\$17,428-17,732/t) in September, compared with Yn95,522-97,522/t (\$14,320-14,620/t) in August.

**OUTLOOK:** Steady/softening

Chinese tungsten concentrate

Yn/t



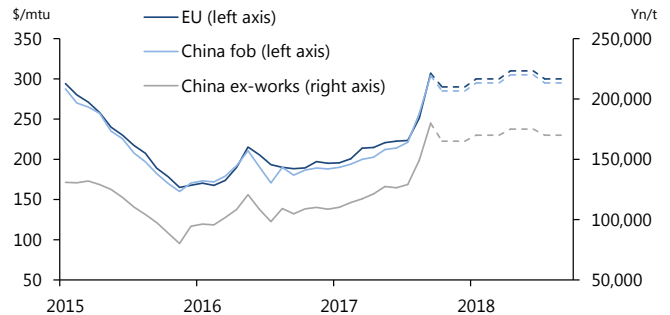
Metals  
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## International pricing series

### APT

Chinese domestic spot prices for 88.5pc grade APT averaged Yn177,375-182,375/t (\$27,015-27,775/t) in September, up from Yn146,696-151,696/t (\$21,990-22,740/t) in August. APT prices in Europe have tended to lag behind China, but averaged \$299.52-314.52/mtu in September, an increase of \$56/mtu from August, while the average China fob price was \$301.67-306.67/mtu in September.

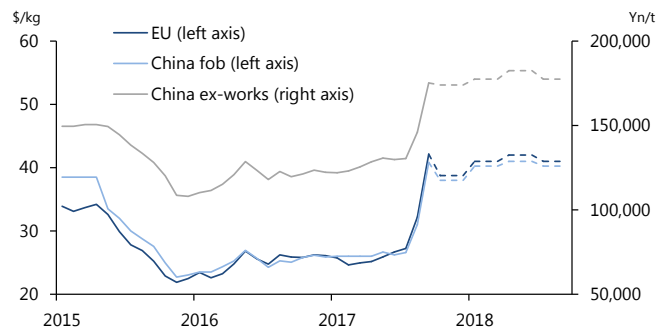
OUTLOOK: Steady/softening



### Ferro-tungsten

After lagging slightly behind other tungsten products, ferro-tungsten prices have followed the market. Domestic prices for 75pc grade alloy averaged Yn173,714-176,714/t (\$26,455-26,915/t) in September (a 20pc increase), while export prices averaged \$40.29-41.38/kg. In Europe, the monthly average for September rose by almost \$10/kg to \$41.52-42.76/kg.

OUTLOOK: Steady/softening



### Oxides

Domestic Chinese tungsten oxide prices have followed the price rises elsewhere in the tungsten market, with the export market following suit. Ex-works prices for 99.95pc oxide averaged Yn201,048-204,047/t in September compared with Yn170,174-173,174/t in August. Export prices for yellow/blue tungsten oxide increased by 20pc to a monthly average of \$31,667-32,667/t.

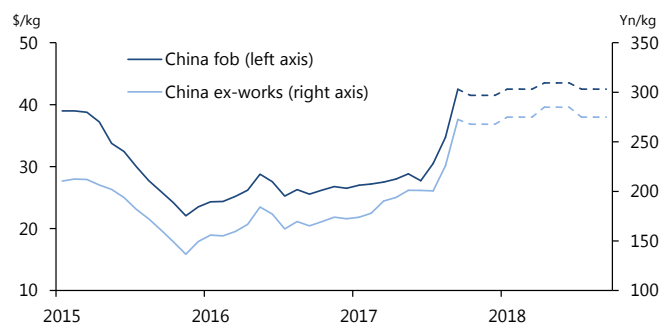
OUTLOOK: Steady/softening



### Carbide

Monthly average prices for tungsten carbide were also well ahead of August levels in September. Average prices for 99.7pc carbide increased by Yn47/kg to Yn270.10-275.10/kg in September from Yn223.48-228.37/kg in August, as producers adjusted their prices in line with feedstock costs. Export prices have followed domestic prices and averaged \$41.98-42.98/kg in September.

OUTLOOK: Steady/softening



## Price outlook

- Tungsten prices stabilise after recent drops, with producers set to suspend production if prices fall further; buyers happy to wait and see market direction
- Ormonde's Barruecopardo tungsten project on track for commissioning in 3Q18
- January-August 2017 trade in tungsten products increases strongly over 2016; Chinese exports up by 45pc, US imports ahead by 61pc

The primary tungsten material market has been subdued recently in China, with few deals concluded as buyers wait for clearer direction. There was limited spot liquidity, with large consumers receiving sufficient supply from long-term contracts, and most spot transactions coming from smaller consumers buying on an as-needed basis. But a number of concentrate suppliers are bullish about the price outlook, citing production reductions ahead of the national party congress on 18 October and regular environmental checks as supporting factors. Concentrate producers are resisting further price cuts to protect margins, with some producers set to suspend production if prices fall further, creating the potential for tight availability to lift prices in the near term.

The range for 65pc grade wolframite stabilised at Yn103,000-105,000/t (\$15,630-15,930/t) on 17 October, a seven-week low, after falling from Yn105,000-107,000/t on 12 October. Prices for 88.5pc ammonium paratungstate (APT) were unchanged at Yn160,000-163,000/t, after dropping from Yn162,000-165,000/t on 12 October. The range for 99.7pc carbide held at Yn258-262/kg, down from Yn260-265/kg on a lack of demand from cemented carbide producers. Falling domestic prices pushed the export market lower, with prices falling to \$280-290/mtu fob for APT on 12 October, down by \$5/mtu from the previous assessment, and to \$39.50-40.50/kg fob for carbide from \$40-41/kg fob previously. The export market held steady in the latest price assessment on 17 October.

Ferro-tungsten producers raised their offer prices because of tightening alloy supply caused by low capacity utilisation rates. As a result, prices for 75pc alloy moved higher to Yn175,000-178,000/t on 12 October from the previous

assessment of Yn170,000-173,000/t on 10 October. But few spot deals were concluded because of low demand, as specialty steelmakers remained well supplied by long-term contracts. The price was assessed unchanged on 17 October. Export prices dropped to \$36.50-37.50/kg fob on 12 October (remaining unchanged on the latest assessment) from \$39-40/kg fob previously, as exporters reduced their offer prices to encourage sales amid recent losses on the markets outside of China. An exporter in southern China sold material at \$39.50-40/kg before the public holiday last week, but had not concluded new business since. Enquiries from importers were increasing, but bid prices were below the range at around \$36/kg fob.

China's Ganzhou Tungsten Association (GTA) has pushed its tungsten concentrate guide price for October lower in response to rising availability and reduced demand from downstream customers. GTA has lowered its guide price for tungsten concentrate by Yn15,000/t to Yn105,000/t (\$245/mtu) for October delivery compared with September. Guide prices for intermediate product APT and tungsten carbide were reduced to Yn162,000/t and Yn262/kg, respectively from Yn180,000/t and Yn285/kg in September. GTA's guide prices were in line with the spot market and also undermined market confidence. Prices have been edging down over the past month after surging to a three-year high at the start of

**Ganzhou Tungsten Association monthly guide prices, 2016-17**

Month	Wolframite (65pc) Yn/t	APT (88.5pc) Yn/t	Tungsten carbide (99.7pc) Yn/kg
October	105,000	162,000	262
September	120,000	180,000	285
August	91,000	140,000	220
July	81,500	125,000	200
June	82,000	126,000	205
May	83,500	126,000	205
April	78,000	120,000	196
March	75,000	118,000	192
February	74,000	111,000	177
January 2017	73,000	110,000	177
December	72,000	108,000	176
November	72,000	112,000	180
October	70,000	107,000	170
September	69,000	106,000	170
August	72,000	113,000	176
July	64,000	100,000	167
June 2016	75,000	115,000	184

September, on the back of tight supply caused by production shutdowns amid anti-pollution checks since July. Destocking activity from traders who wanted to lock in profit triggered the decline, and limited buying interest from cemented carbide producers has been weighing on the market.

Large Chinese tungsten producers have reduced their bid prices for the purchase of raw materials following a fall in spot prices, to maintain profit margins. Private-sector tungsten powder producer Zhangyuan Tungsten cut its bid price for 65pc grade wolframite (concentrate) feedstock by Yn5,000/t to Yn105,000/t for the first half of October from Yn110,000/t in the second half of September. Zhangyuan also cut its purchase price for intermediate 88.5pc APT, by Yn8,000/t to Yn162,000/t from Yn170,000/t. Jiangxi Tungsten Holding Group has lowered its sale price for 65pc concentrate by Yn13,000/t to Yn108,000/t from Yn121,000/t in September. Spot prices for tungsten concentrate, APT and tungsten carbide have all declined as a result of falling demand from cemented carbide producers. Large cemented carbide producers are well supplied by long-term contracts and smaller producers are only buying primary materials for immediate requirements.

Chinese state-owned Xiamen Tungsten lowered its purchase price for intermediate APT in line with lower guide prices from the Ganzhou Tungsten Association and large producers. The company has cut its APT bid price to Yn160,000/t, from Yn168,000/t at the end of September just before week-long national holidays. This follows concentrate and APT procurement price cuts by large private-sector tungsten powder producer Zhangyuan Tungsten. Xiamen's price cut

for APT is in line with falling spot prices. APT and concentrate suppliers are reducing offers to attract sales amid limited demand from the main consumers — specialty steel mills and cemented carbide producers.

APT prices in Europe were unchanged after falling by \$5/mtu to \$285-295/mtu on 10 October. There was further downside potential given rising availability of Chinese concentrate and falling export prices. Continued low buying interest for spot ferro-tungsten offset higher prices in China to leave the European market unchanged. Prices for 75pc grade alloy held at a six-week low of \$37-37.50/kg amid stable raw material costs, after declining on 10 October from \$38-40/kg.

China's official purchasing managers' index (PMI) for manufacturing expanded in September on improved production and new orders. China's official manufacturing PMI increased to 52.4 in September from 51.7 in August, national bureau of statistics (NBS) data show. This is the fastest pace of growth since April 2012, when the index stood at 53.3. Production was higher in September at 54.7 from 54.1 a month earlier, and new orders increased to 54.8 from 53.1. Raw material inventories increased to 48.9 from 48.3 over the same period.

In Japan, the Nikkei manufacturing PMI was at 52.9 in September, up from 52.2 in August. New export orders increased to their highest level in seven months. In South Korea, the Nikkei manufacturing PMI rose to 50.6 in September from 49.9 in August. Output increased for the first time since July 2016.

Tungsten Prices and Forecast, 2017-18					
Product	Unit	Month index October	Moving quarterly index	Moving yearly index	Forecast October 2018
Ferro-tungsten min 75% W EU	\$/kg	42.14	33.85	27.73	41.00
Ferro-tungsten min 75% W fob China	\$/kg	40.84	32.82	27.77	40.25
Ferro-tungsten min 75% W ex-works China	Yn/t	175,214	150,541	131,511	177,500
Tungsten APT EU	\$/mtu	307.02	260.54	219.26	300.00
Tungsten APT fob china	\$/mtu	304.17	260.73	213.24	295.00
Tungsten APT min 88.5% ex-works China	Yn/t	179,875	152,743	125,250	170,000
Tungsten carbide min 99.7% ex-works China	Yn/kg	272.60	233.03	196.10	275.00
Tungsten carbide powder (3-4 micron) fob China	\$/kg	42.48	35.91	29.45	42.50
Tungsten concentrates min 65% ex-works China	Yn/t	115,429	98,483	81,683	111,500
Tungsten oxide (yellow/blue) fob China	\$/t	32,417	27,741	22,727	31,500
Tungsten oxide min 99.95% ex-works China	Yn/t	202,548	174,669	144,948	200,000

## Markets

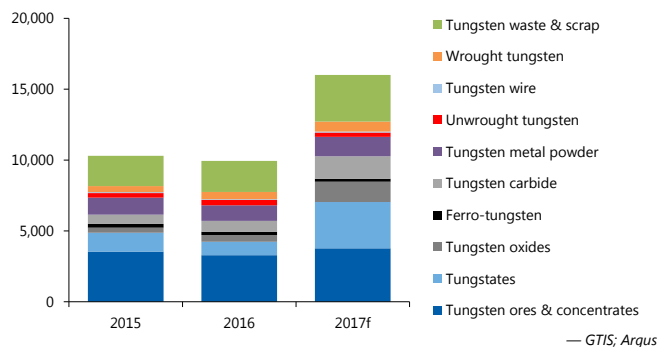
The spot market for tungsten has quietened down in recent weeks, but global consumption is set to be significantly higher this year than last, particularly if data for international trade in tungsten products is an indicator. Chinese exports of all tungsten products were up by close to 45pc in the first eight months of 2017 compared with a year ago, while two of the main tungsten-consuming regions, the US and Europe, have seen imports of tungsten rise by over 60pc and 15pc respectively. The US in particular has bounced back from 2-3 years of relatively depressed demand and US imports of tungsten carbide, which are a good indicator of demand in oil and gas drilling, have more than doubled in the year to date, while tungsten ores and intermediate products (which are then processed into tungsten metal and carbide powders) are collectively up by nearly 90pc.

Global passenger car production increased by 2.9pc on the year in January-June, data from automotive manufacturers association ACEA show. Worldwide, 39mn passenger cars were manufactured in the first six months of the year. Chinese passenger car manufacturing growth slowed, with output up by 2.2pc to 10.3mn units. The slowdown was mainly the result of a tax cut policy that will come into force at the end of this year. This resulted in slack domestic demand, the ACEA said. In Europe, passenger car manufacturing was up by 1.5pc to over 10mn units, driven by a recovery in eastern Europe and Ukraine, where it increased by 149.3pc. Manufacturing in the US was steady — rising by just 0.04pc as domestic car sales slowed — with output hitting 4.7mn units. Passenger car manufacturing in South America increased by 2.5pc to over 1mn units, with Brazil accounting for more than 82pc of this. Japanese output increased by 5.9pc to 4mn units, while manufacturing in South Korea grew by 1.2pc. Indian output was up by 9pc to almost 2mn units. Passenger car manufacturing in Thailand and Indonesia was down by 5.2pc and 3pc, respectively. Overall, Europe accounted for 25.7pc of global car manufacturing and North America 19pc, with the US accounting for 12.1pc. South America made up 2.7pc, the Middle East and Africa 2pc, and Asia-Pacific 50.6pc, with China accounting for 26pc.

Demand for new commercial vehicles in the EU slowed after a strong start to the year. Overall, demand grew by 4.1pc across the EU, with 1.2mn new commercial vehicles registered. European commercial vehicle manufacturing is

### US tungsten products imports, 2015-17

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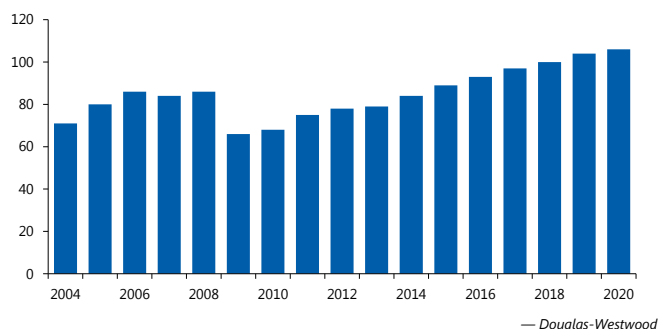
expected to remain stable in 2017, at 3.4mn units. China is expected to manufacture over 6mn commercial vehicles, and North America more than 42mn. Commercial vehicle output in Japan and South Korea is expected to fall by 1pc to 1.57mn units, but output in the Middle East and Africa is showing signs of improvement and the region is expected to manufacture around 0.6mn commercial vehicles this year, with output driven by Iran. Growth in south Asia is likely to be significant, at 5.9pc, with especially robust demand in the Philippines and Thailand. Commercial vehicle manufacturing in South America is expected to slow by 2.2pc to around 0.6mn units this year.

China's car sales rose in September for a fourth straight month on the back of firm demand for sports utility vehicles (SUVs) and environmentally friendly vehicles. Japan's automobile sales rose in September for an 11th straight month, while India's car sales rose for a third month. China's passenger car sales rose by 3pc in September to 2.34mn, according to the country's association of automobile manufacturers. The increase outpaced the 2pc rise in sales to 17.15mn in January-September. Car production rose by 3pc in September to 2.30mn. The pace of passenger car sales continued to lag the 6pc rise in the country's total automobile sales in September to 2.71mn. These were boosted by firm demand for trucks and buses.

Sustained demand for SUVs continued to prop up otherwise weak passenger car sales. Sales of these vehicles rose by 10pc in September to 970,800. But the rate of growth continued to slow and lagged the 16pc rise in sales in January-September. Sales of sedan cars rose by 4pc to 1.16mn. This

**Oil wells drilled & forecast, 2004-20**

'000s



increase contrasted with a 1pc drop in sales of these cars in the first nine months of the year. Firm demand for SUVs also countered a 25pc slump in sales of multi-purpose vehicles (MPVs) in September to 165,900.

Sales of cars with engines smaller than 1.6 litres were stable at 1.62mn. Their share of total car sales shrank to 69pc, down by 2.2 percentage points from the same month last year. Sales of China-branded cars fell by 1pc in September to 966,000. This shrank their market share of total sales to 41.2pc, down by 1.7 percentage points from a year earlier. China-branded SUVs accounted for 59.3pc of total SUV sales in September, while MPVs accounted for 80.8pc of total MPV sales.

Sales of environmentally friendly vehicles rose by 79pc in September to 78,000, amid firm demand for electric and plug-in hybrid vehicles. The increase outpaced the 38pc rise in sales in January-September to 398,000. Electric vehicle sales rose by 83pc in September to 64,000. Sales of plug-in hybrid vehicles rose by 62pc to 14,000. The sales accounted for 2.9pc of total automobile sales.

Japan's automobile sales extended their recovery, rising by 4pc in September to 495,190. Demand for minicars rose by 11pc in September and small cars by 8pc. India's car sales got a boost in September from the launch of new models and the start of the country's peak festive season. Sales rose by 7pc in September to 208,660, according to the Society of Indian Automobile Manufacturers. The increase outpaced the 4pc rise in demand in January-September. Passenger car production fell by 3pc in September to 240,890. Demand for utility vehicles continued to rise at a faster pace, with sales climbing by 26pc in September to 84,370. Taiwan's car sales fell in September for a fifth month in six. Demand fell by 6pc

to 31,375, following a 60pc surge in sales in August. The sales volatility reflected the later timing of the Chinese seventh lunar month this year compared with last year. Demand typically slows during this lunar month. Australia's automobile sales fell in September for the first time in five months amid a sharper fall in passenger car demand. Total sales fell by 2.4pc in September to 100,200. The contraction was cushioned by continuing firm sales of SUVs and light commercial vehicles.

Oil and gas drilling activity in some key US states slowed in the third quarter, but executives expect higher prices. Most indexes fell but remained positive, with the drilling and business activity index declining to seven in the third quarter from 43 in the second and 26 a year earlier, the Federal Reserve Bank of Kansas City said in its latest quarterly survey. The survey covered the Tenth Federal Reserve District, which includes Colorado, Kansas, Nebraska, Oklahoma, Wyoming, northern New Mexico and western Missouri. Respondents said the average oil price needed for drilling to be profitable was \$51/bl, with a range of \$40-75/bl, which was unchanged from the start of the year. But the average natural gas price needed was \$3.05/mn Btu, with a range of \$2-4/mn Btu. This was down from \$3.38/mn Btu in the first quarter.

On future oil and gas prices, respondents saw modest increases, to \$52/bl WTI, \$55/bl, \$58/bl and \$65/bl in six months, one year, two years and five years, respectively. Expected Henry Hub gas prices for the same timeline were at \$3.01/mn Btu, \$3.11/mn Btu, \$3.30/mn Btu and \$3.73/mn Btu. The survey asked firms how they expected the oil rig count to change over the next six months compared with current levels — 75pc of respondents expected the count to remain close to current levels, with slightly more than a fifth expecting an increase, and only a few predicting a fall. A majority of respondents expected US production to increase to an average of 9.9mn b/d by the end of 2018.

The US rig count fell for a second week in October as more onshore producers detailed the impact Hurricane Harvey had on their operations. The total fell by eight to 928, according to weekly data from Baker Hughes. Independent oil and natural gas producer Apache lowered its third and fourth-quarter output guidance for North America partly because Harvey had disrupted operations. It now expects output of 206,000-208,000 b/d of oil equivalent (boe/d) in the third quarter, compared with 208,000-214,000 boe/d given earlier. Fourth-quarter output was adjusted to 218,000-224,000 boe/d from 225,000-237,000 boe/d forecast previously.

## Supply

Nearer-term supply of tungsten appears to have eased following the tightness in the market caused by the round of government environmental inspections and crackdowns on “illegal” mining in China. Destocking activity from traders wanting to lock in profits triggered the upturn in supply, and limited buying interest from downstream producers and processors has been weighing on the market. A number of concentrate suppliers are bullish about the price outlook in the medium term, citing production reductions ahead of the national party congress on 18 October and regular environmental checks as supporting factors. It is not clear whether production shutdowns will be permanent or temporary.

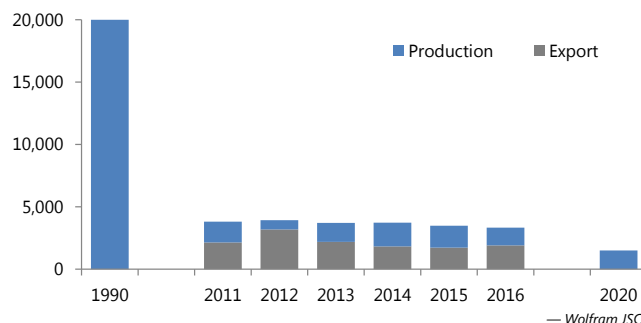
European policy on securing supply of metals for manufacturing is encouraging investment in new mining projects, delegates were told at the Minor Metals Trade Association (MMTA) conference From Mine to Market in Dresden, Germany organised with research network GKZ. EU initiatives including the critical raw materials (CRMs) list to foster sustainable supply from European resources and Horizon 2020, which has set a target of 20pc of EU GDP to come from industry by 2020 from 8-9pc in 2008, provide funding to facilitate the launch of new mining activity.

The European Commission revised the CRM list last month, adding nine new raw materials including bismuth, hafnium, scandium and vanadium to expand the list to 27. Chromium and magnesite were deemed no longer critical and removed from the list. The EU imports 100pc of the antimony, bismuth, magnesium, niobium, tantalum and rare earths that it consumes, and large amounts of the other materials on the list. Many of the imports come from China, which accounts for 87pc of global antimony production, 82pc of bismuth output, 85pc of gallium, 87pc of magnesium production and 84pc of tungsten output.

There are a number of new mining projects in Europe targeting the production of metals that are on the list. European Metals is developing the Cinovec lithium and tin project in the Czech Republic with potential tungsten, niobium and tantalum by-product. In tungsten, the Drakelands project in the UK began operations in late 2015, while Portugal and Spain have projects in development, as well as some producing operations. None of these projects have been directly funded by the initiatives mentioned above, but the regula-

Russian tungsten production, 1990-2020

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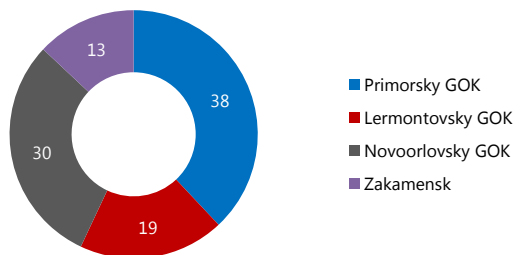


tory environment and attitude towards the mining sector appears to be changing.

In the company’s annual report for the financial year ending 30 June 2017, Wolf Minerals announced a loss of over £43.5mn (\$57mn), up from £37mn in the previous year. The company operates the Drakelands mine and processing plant in Devon, UK and has put into place a “turnaround plan” after having to extend borrowing to cover the losses. In August 2017, Wolf received an additional £5mn bridging loan and reported that talks were under way about securing a further loan of £10mn to cover the three months from December 2017 (the company has already received £45mn through the bridge loan). The company said that the mining project is now dependent on Wolf receiving additional funding, successfully ramping up production to capacity and rescheduling fixed debt repayments.

The processing plant at Drakelands was developed through an Engineering Procurement Construction (EPC) contract with GR Engineering Services (GRES). Run time and recovery were identified as the fundamental areas for further performance improvements during the year, but recovering fine tungsten in the ore and generated in circuit, along with downstream processing of recovered fines, remain key challenges. An operating turnaround plan has been developed, centred on three trial periods in June, August and October 2017, initially targeting baseline production improvements from the current processing plant, followed by specific equipment changes. The first trial period in June provided encouraging production results through improved operating procedures and process control. The operating turnaround plan is on schedule, with further changes to come targeting

### Russian tungsten output by producer, 2016



— Wolfram JSC

availability and recoveries in the dense media separation and gravity fines circuits and availability and throughput in the refinery. The processing plant treated 1,918,170t of ore during the year at an average tungsten grade of 0.22pc WO<sub>3</sub> and produced 112,270mtu of tungsten in concentrate and 194t of tin in concentrate.

Construction at Ormonde Mining's Barruecopardo tungsten mine in Spain is making good progress and is on track for commissioning in 2018, according to the company. Half-year results showed a net loss of €132,000 (\$155,000) in the six months to June, with sales of €375,000. The company anticipates mine commissioning in the third quarter of 2018, and reports that much of the necessary equipment is now being manufactured, with more on order, while on the ground construction of the workshop, offices and other infrastructure is under way. A number of construction contracts have been awarded, including for dams and civil works, with main dam construction work under way. The increase in tungsten prices since the beginning of the year prompted the company to advance the Barruecopardo mine into an accelerated construction and implementation phase. Ormonde expects the supply and demand fundamentals to remain supportive "due to steady growth in global industrial demand; a clampdown on Chinese mines on environmental grounds and enforcement of production quotas; and scarcity of tungsten concentrates from mining operations outside of China".

European mine developer W Resources highlighted the significant recovery in tungsten prices in 2017 in its interim financial statement for the six months ended 30 June 2017. The company added that a continued shortage of tungsten concentrate bodes well for the remainder of the year and that development towards production in 2018 at La Parrilla

% remains a key objective. W Resources has completed a JORC resource upgrade and announced its maiden JORC reserves, and key contracts have been awarded for the jig, mill and crusher, which are expected to be delivered ahead of schedule. Significant progress has been made on financing for the next development phase (T2) at the La Parrilla mine. According to the company, the mine is expected to be developed and expanded over the next 12 months to mine 2mn t/yr of run-of-mine ore to produce approximately 2,700 t/yr of tungsten concentrate and 500 t/yr of tin concentrate.

Thor Mining, the AIM and ASX-listed exploration and development company, highlighted that it has been developing a focus on projects with potential for near-term production at modest cost in its annual results statement. These projects include the Molyhil tungsten project in Australia and the Pilot Mountain tungsten project in the US. The company considers the Molyhil project to be development ready, while the Pilot Mountain project is at the resource/pre-feasibility stage. Molyhil has the reserves to deliver a six-year mine life with potential for expansion, at a production rate of 1,300 t/yr of tungsten, according to a 2015 feasibility study. The company completed a successful drilling programme at Pilot Mountain and is confident that the improvement in tungsten prices will allow it to secure finance for Molyhil.

Tungsten Mining, which is listed on the ASX, is due to raise A\$13.5mn (\$10.6mn) through a non-renounceable entitlement offer, to complete pilot plant testwork at its Mt Mulgine tungsten project in Western Australia. The company said that the funds raised by the offer would also go towards geotechnical and sterilisation drilling, detailed engineering and other components, to secure and meet milestone payments on long-lead items and other equipment, as well as to undertake preliminary earthworks and mining activities, and for general working capital. Tungsten Mining was granted environmental approval for its Mt Mulgine project in August, with the company hoping to start tungsten concentrate production in 2018. Earlier in the year, Tungsten Mining bought a "near-new" processing plant from Pilbara Minerals that was decommissioned when Pilbara suspended the Tabba Tabba tantalum project. The plant has a nameplate capacity of 30 t/h, with the possibility to increase throughput through optimisation of the existing plant or the addition of modules. According to the company, the decision to purchase the modular processing plant has allowed the firm to accelerate project development activities.



Project tracker							
Company	Project	Start-up*	Progress	Capex \$mn	Resource mn t	Capacity W t/yr	Notes
Premier African Minerals	RHA, Zimbabwe	2015	Operating	13	4.4	na	First shipment of wolframite concentrate from RHA to Durban in early June
W Resources	La Parrilla (mine), Spain	2016	Upgrading	11	29.8	1,300	Targeting the restart of production in the second half of 2017 following the installation of new crushing equipment
Almonty Industries	Wolfram Camp, Australia	2017	Upgrading	na	2.8	750	Restart of the mine will depend on a sustained improvement in the forecast for APT prices
Ormonde Mining	Barruecopardo, Spain	2018	Construction	65	27.4	1,800	Mine commissioning expected in 3Q 2018
Almonty Industries	Valtrexial, Spain	2018	NI 43-101 filed October 2014	na	19.2	na	Almonty now owns 100pc of the project. Necessary permits expected to be received in 2017
Almonty Industries	Sangdong, South Korea	2018	DFS completed (updated in 2014 and 2016)	64	61.1	3,500	Construction planned to start as soon as funding is finalised. Construction commissioning scheduled for 1Q 2018
Vital Metals	Watershed, Australia	2018+	DFS completed, fully permitted	75	49.2	2,000	Vital focussing on gold exploration while Watershed project delayed
Carbine Tungsten	Mt Carbine, Australia	2018+	Feasibility study completed, permitting in place	55	61.0	1,300	Mitsubishi approved \$15mn funding in Oct 14. Loan terms agreed in Mar 2015.
Tungsten Mining	Mt Mulgine, Australia	2018+	Feasibility study in progress	tba	72.2	800	Metallurgical testwork, development activities and feasibility progressing
King Island	Dolphin, Australia	2018+	Updating DFS	60	8.3	2,000	Considering a 'start-up option' to produce smaller quantity of lower grade concentrates
Thor Mining	Molyhil, Australia	2018+	Updated DFS completed	56	4.7	1,250	Follow up drilling planned for 2017. Finance and offtake discussions ongoing
Northcliff Resources	Sisson, Canada	2018+	DFS completed	579	334.0	4,400	Final tranche of funding (\$4mn) advanced by Todd. Environmental impact assessment (EIA) approved by New Brunswick govt
Happy Creek Minerals	Fox, Canada	2019+	NI 43-101 resource estimate completed	na	0.8	na	NI 43-101 resource estimate completed January 2017
Blackheath Resources	Covas, Portugal	2018+	Drilling and resource definition	na	na	na	Maiden resources estimate reported. Other properties include Borralha, Bejanca, Vale das Gatas, Adoria
Plymouth Minerals	Morille, Spain	2018+	Drilling and resource definition	na	na	na	First phase drilling programme completed
Colt Resources	Tabuaco, Portugal	2018+	PEA completed September 2013	108	2.7	1,200	Resource update due 2Q15, BFS due 4Q15
W Resources	Regua, Portugal	2019+	Strategic review completed	50-60	5.5	680	Stopping methods to be tested in early 2017. Mining licence and production scheduled for 2019
Largo Resources	Northern Dancer, Canada	2019+	PEA complete	645	223.4	6,500	Environmental permitting and initial offtake joint venture discussions under way
Silver Predator	Springer, US	2019+	Permitting largely in place	30	1.8	1,150	Seeking joint-venture partner
Tungsten Mining	Kilba, Australia	2019+	Feasibility study (on hold)	35	5.0	1,200	Completed successful infill drilling programme in December 2014
Tungsten Mining	Big Hill	2019+	DFS (on hold)	80	11.5	na	Metallurgical testwork conducted on samples from the deposit
Northwest Territories	Mactung, Canada	2019+	PFS completed 2009, environmental approval received 2014	400	44.9	7,000	Leasehold acquired by Northwest Territories government. Project for sale for development
Thor Mining	Pilot Mountain, US	2019+	Drilling programme to confirm tier 1 targets	na	6.8	na	Three stage development plan announced. New drilling programme scheduled for February 2017
Venture Minerals	Mt Lindsay, Australia	2019+	BFS completed, mining lease granted Jul 14	200	45.0	1,500	Project delayed due to financing issues
Newcrest Mining	O'Callaghans, Australia	2020+		500	59.4	3,800	No recent updates - possibly for sale

\* Based on company announcements/data

## Trade

In the first eight months of 2017, Chinese exports of tungsten increased by over 40pc compared with the same period in 2016, according to official customs statistics. Shipments of most tungsten products were significantly up on last year, with only exports of unwrought tungsten down on the year before. The rise in Chinese tungsten exports has been led by intermediate products such as tungstates and oxides, while shipments of more processed products such as tungsten carbides and metal powders have increased but at a slower rate. Ferro-tungsten exports picked up in August and were 12pc ahead on the year when compared with the same period in 2016. Overall shipments of tungsten from China increased to 17,560t W in January-August 2017, from 12,450t W in the same period of 2016. Assuming a similar growth rate for the year as a whole would take Chinese tungsten exports to 28,520t W in 2017 from 20,168t W in 2016.

US demand for tungsten continues to forge ahead in 2017 and imports of tungsten have grown to feed that growth, although this growth slowed a little in August. Total imports of tungsten products were 9,721t W in the first eight months of 2017, an increase of 61pc compared with the same period in 2016, according to data from GTIS. The US imported 2,493t W of tungsten concentrate, up from 2,168t W a year earlier, while imports of tungstates increased by 242pc to 1,655t W from 485t W over the same period. US imports of tungsten oxides were up to 818t W, 204pc higher than in January-August 2016, but imports of ferro-tungsten fell by 11pc to 148t W. Tungsten carbide imports, which are a good indicator of demand in the oil and gas drilling industry, as well as automotive applications, rose sharply to 1,052t W, compared with only 510t W in the same period a year before. US imports of tungsten metal products (powder, wrought and unwrought, and wire) were collectively up by 20pc to 1,603t W, while waste and scrap imports, the second-largest category in terms of volume in 2017, increased by 50pc to 1,952t W.

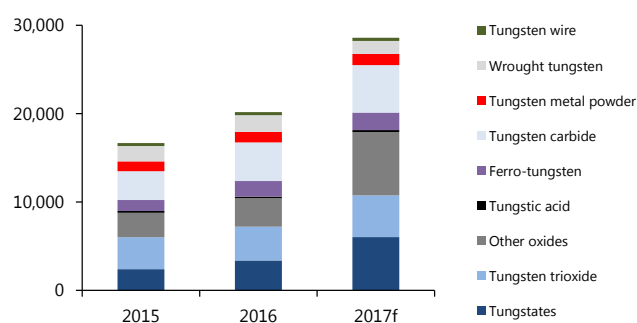
China's tungstate exports led the way in terms of growth in the first eight months of 2017, rising by 78pc compared with 2016. Exports in August were 640t with an export value of \$12.4mn and a unit value of \$19,415/t, while for January-August 2017 the figures were 5,237t, \$96.9mn and \$18,510/t respectively. Chinese tungstate exports have mostly been split between the Netherlands, with 2,752t (53pc of Chinese exports), the US with 1,021t (19pc), and Japan with 981t (19pc).

Exports of tungsten oxides, hydroxides and trioxides, and tungstic acid have grown strongly compared with last year. Total shipments increased to 8,857t in January-August 2017, a 67pc increase compared with 5,315t in 2016. Shipments of tungsten oxides and hydroxides in August were 484t, with a total value of \$10.6mn and a unit value of \$21,996/t, while exports of tungsten trioxides were 728t, with a total value of \$16.0mn and a unit value of \$21,926/t. The year-to-date combined total value of all tungsten oxide exports was \$176.9mn and the average unit price was \$20,676/t. The main destination countries were South Korea with 3,122t (36pc of the total), followed by the Netherlands with 1,902t (22pc), and Japan with 1,883t (22pc).

Chinese tungsten carbide exports are also well ahead of 2016 levels, with shipments to the US increasing by over 300pc. In the first eight months of 2017, carbide exports rose by 23pc to 3,887t from 3,160t a year earlier and the total export value was \$111.1mn. Shipments in August were 389t with a total value of \$11.9mn and a unit value of \$30,637/t. The main importing countries in 2017 have been Japan with 999t (26pc of the total), followed by South Korea with 891t (23pc), the US with 783t (20pc), and Germany with 725t (19pc).

Exports of ferro-tungsten recovered further in August and were ahead of 2016 levels at 1,496t in January-August 2017, while total exports revenues were \$30.2mn with a unit value of \$20,191/t. Shipments were 245t in August, with export revenues of \$5.5mn and a unit value of \$22,418/t. The main destinations for shipments were the Netherlands (41pc of the total) and Japan (35pc).

### Chinese tungsten products exports, 2015-17 t W



## Trade

Chinese tungsten trade							
	August		Year-to-date		2016	2017f	±% 17/16
	Volumes t	Revenues \$	Volumes t	Revenues \$	Volumes t	Volumes t	
<b>Tungsten ores &amp; concentrate imports</b>	<b>563</b>	<b>3,691,230</b>	<b>1,943</b>	<b>13,776,137</b>	<b>4,343</b>	<b>2,681</b>	<b>-38</b>
Mongolia	337	2,023,464	428	2,566,044	1,102	995	-10
Myanmar	63	244,641	267	1,105,740	332	321	-3
Philippines	0	0	29	157,903	0	50	-
Russia	81	778,704	470	4,345,572	1,259	550	-56
Rwanda	20	181,140	511	4,234,414	837	722	-14
<b>Tungstate exports</b>	<b>640</b>	<b>12,425,820</b>	<b>5,237</b>	<b>96,936,496</b>	<b>4,740</b>	<b>8,436</b>	<b>78</b>
Japan	93	1,761,116	981	18,288,615	792	1,388	75
Netherlands	420	8,181,904	2,752	50,650,831	2,865	4,432	55
US	56	1,218,108	1,021	19,158,242	502	2,390	376
Vietnam	26	472,323	76	1,209,721	122	154	26
<b>Tungstic acid exports</b>	<b>17</b>	<b>370,877</b>	<b>206</b>	<b>4,234,200</b>	<b>223</b>	<b>214</b>	<b>-4</b>
Japan	0	0	20	273,589	12	60	400
South Korea	0	0	0	0	1	0	-100
Turkey	0	0	140	2,951,176	192	140	-27
US	17	370,877	34	758,768	17	34	102
<b>Tungsten trioxide exports</b>	<b>728</b>	<b>15,961,985</b>	<b>4,167</b>	<b>86,041,794</b>	<b>4,821</b>	<b>5,951</b>	<b>23</b>
Japan	201	4,346,066	1,373	28,207,317	1,919	1,905	-1
Netherlands	40	899,533	602	12,200,484	384	714	86
South Korea	324	7,084,824	1,299	27,440,127	2,103	2,045	-3
US	2	43,761	120	2,184,913	20	341	1,590
<b>Tungsten oxide/hydroxide exports</b>	<b>484</b>	<b>10,646,056</b>	<b>4,484</b>	<b>90,826,973</b>	<b>4,085</b>	<b>9,046</b>	<b>121</b>
Japan	90	2,000,336	510	10,590,939	443	806	82
Netherlands	100	2,202,323	1,300	27,081,207	1,160	1,885	62
South Korea	154	3,341,690	1,823	36,032,806	1,803	4,860	170
US	0	0	436	8,577,936	0	654	-
<b>Ferro-tungsten exports</b>	<b>245</b>	<b>5,492,373</b>	<b>1,496</b>	<b>30,206,039</b>	<b>2,349</b>	<b>2,637</b>	<b>12</b>
Japan	34	839,468	518	10,622,801	397	1,277	222
Netherlands	142	3,099,009	619	12,366,955	1,357	1,031	-24
Taiwan	0	0	30	543,250	149	47	-68
<b>Tungsten carbide exports</b>	<b>389</b>	<b>11,917,725</b>	<b>3,887</b>	<b>111,148,100</b>	<b>4,601</b>	<b>5,653</b>	<b>23</b>
Germany	36	1,168,095	725	20,097,384	1,235	1,078	-13
Japan	119	3,631,072	999	29,292,743	1,250	1,483	19
South Korea	118	3,346,414	891	24,509,942	1,241	1,213	-2
US	41	1,303,414	783	22,547,404	357	1,490	317
<b>Tungsten metal powder exports</b>	<b>82</b>	<b>2,608,884</b>	<b>717</b>	<b>21,167,598</b>	<b>1,192</b>	<b>1,268</b>	<b>6</b>
Japan	24	754,122	168	4,721,828	286	322	12
Taiwan	1	39,732	3	90,060	7	5	-25
UK	0	0	25	659,304	31	37	19
US	45	1,409,962	359	10,882,288	640	602	-6
<b>Wrought tungsten exports</b>	<b>126</b>	<b>6,599,974</b>	<b>1,033</b>	<b>46,481,055</b>	<b>1,887</b>	<b>1,469</b>	<b>-22</b>
Japan	46	1,761,429	358	13,254,916	512	515	0
Taiwan	7	515,411	49	3,889,504	81	68	2
UK	2	13,921	90	2,360,329	145	98	-32
US	34	1,536,579	289	10,981,464	692	446	-36
<b>Tungsten wire exports</b>	<b>29</b>	<b>2,579,233</b>	<b>245</b>	<b>22,134,138</b>	<b>345</b>	<b>364</b>	<b>5</b>
India	8	464,796	76	4,251,058	101	111	10
Japan	3	288,987	37	3,079,744	43	64	49
Poland	1	185,439	21	2,579,780	35	30	-14
South Korea	8	457,903	44	2,704,900	65	60	-9

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