



ATC FERROTUNGSTEN PROJECT

Hazelwood Resources Ltd

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Information

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Delivery of raw materials for hot commissioning and production start-up at the ATC Ferrotungsten Project

Introduction

Hazelwood Resources Ltd (ASX: HAZ) owns the controlling interest in the ATC Ferrotungsten Project, located near Haiphong in Vietnam. The project is newly constructed, with feedstock in transit to site for a planned hot commissioning and first production in the March quarter 2013. The ATC facility is the largest capacity ferrotungsten plant outside of China and its design is believed to be the most advanced in the world. Ferrotungsten is used in the production of high speed steels, tool steels and temperature-resistant alloys. There are a limited number of producers outside of China, with significant technical barriers to entry.

The ATC facility has the potential to provide a stable source of supply of ferrotungsten to specialty steelmakers located outside of China and has a design capacity of 4,000 tpa Ferrotungsten (3,000 tpa contained tungsten). ATC is a low overhead operator.

Hazelwood projects potential revenues of approximately \$140m per annum at full capacity, based on the recent price of the metal. Ferrotungsten has historically attracted a 35% premium over tungsten concentrate.

Projections based on average MB ferrotungsten price for 2012 and average reported tungsten concentrate price for 2012

ATC Financial Information	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017
Key Production Physicals					
Ferrotungsten (t)	950	2,000	2,800	3,560	3,840
Payable Metals (t)	743	1,564	2,189	2,783	3,002
Key Financial Outputs					
Revenue (USD '000)	35,558	74,826	104,752	133,180	143,645
EBITDA (USD '000)	2,968	10,149	15,626	20,827	22,742
Current Assets					
Cash (USD '000)	402	5,391	16,457	33,191	54,799
Trade Debtors (USD '000)	1,548	2,322	3,096	3,715	3,715
Inventory (USD '000)	5,885	8,827	11,769	14,123	14,123
Non-Current Assets					
ATC Plant (USD '000)	10,462	9,310	8,158	7,007	5,855
Total Assets (USD '000)	18,297	25,850	39,480	58,036	78,492

The ATC Ferrotungsten Project has several stand out characteristics including;

- ✓ Sales agency and sales financing from a credible global minor metals trading house (Wogen)
- ✓ Access to a wide network of feedstock sources; commissioning feedstock already secured
- ✓ Cost advantages compared to Chinese producers, who are burdened with restrictions and tariffs
- ✓ Low fixed & overhead costs
- ✓ Proven technology and latest generation plant design
- ✓ Good infrastructure, connected to grid power and located near the largest port in Vietnam
- ✓ Low environmental footprint and emphasis on emission controls
- ✓ Potential for future vertical integration with proposed Australian operations to increase stability and quality of supply.

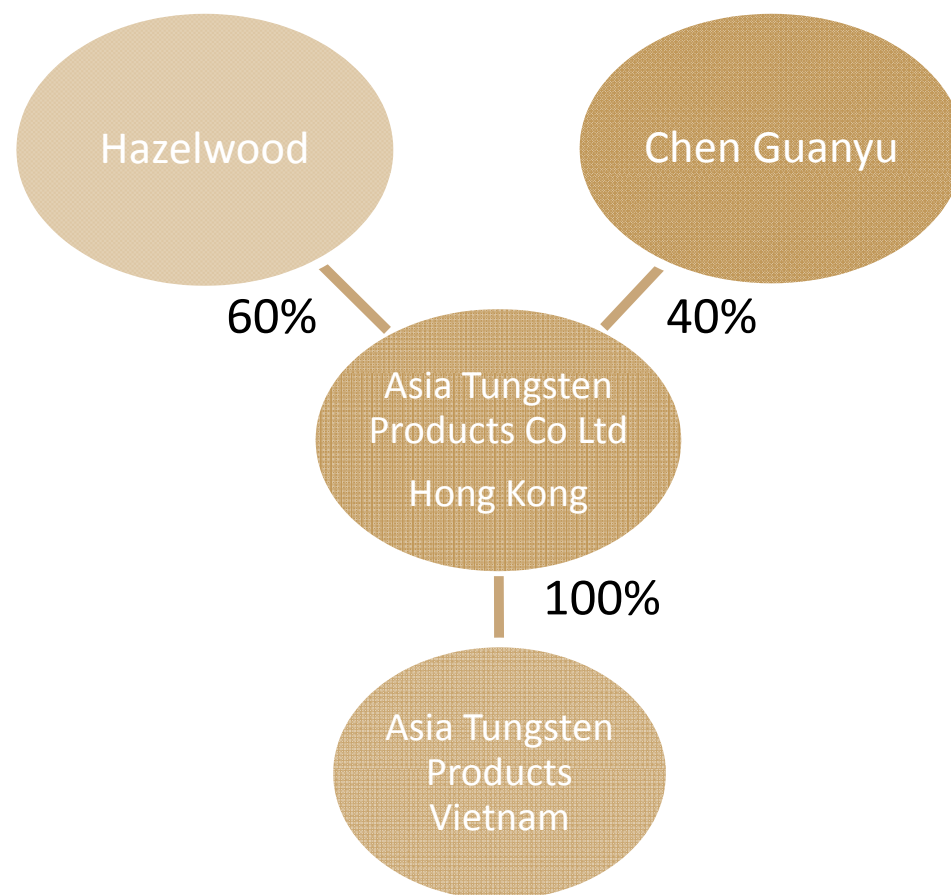
Corporate Strengths

- Project developed to high standards by Australian and Vietnam based management team
- Low overheads and efficiency of management.
- Management have significant experience in minor metals and experience in processing operations
- Legal and commercial structuring has been well planned with advice from leading firms
- Strong financial management and international Auditors
- Hazelwood is a tightly controlled ASX-listed company (strong shareholder financial support)

Hazelwood Structure

ASX code	HAZ
Ordinary shares	952 million
Options unlisted	13 million
Market cap (at 3c)	\$28 million
Top 20 shareholders	~50%

ATC Structure



Hazelwood Board & Management

Terry Butler-Blaxell	Managing Director
John Chegwidden	Director & Management
Frank Ashe	Non-executive Director
Carol New	Company Secretary
Martin McQuade	Chief Operations Officer

The project is presently operated through an Incorporated Joint Venture using an unlisted Hong Kong public company Asia Tungsten Products Co. Ltd (ATC). General terms have been agreed for the acquisition of the entire minority interest (40%) by Hazelwood. The minority Joint Venture Partner is a private party with a proven track record in the global tungsten industry and brings a team of technical personnel with previous experience in the design, construction and operation of ferrotungsten plants. Continuity of ATC management is a key condition of the proposed acquisition.

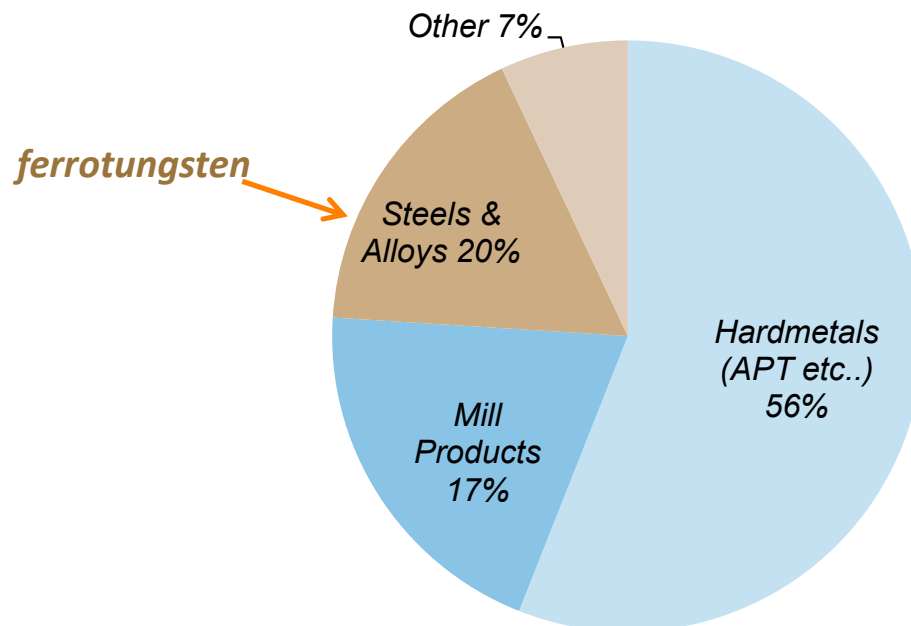
Presently global consumption of primary tungsten is approximately 80,000 tonnes of contained metal annually and growing. Scrap recycling is thought to represent up to an additional 30% beyond that figure. China currently provides around 80% of primary tungsten globally. International consumers would welcome alternative sources of supply.

The main demand centres/sectors to the tungsten industry are **Hardmetals**, **Mill Products** and **Steels & Alloys**.

The **Hardmetals** sector is the largest sector of the tungsten industry, where the final product is in the form of tungsten carbides that are used in cutting tools and wear resistant materials. An intermediate chemical product in the production process for hardmetals is Ammonium Paratungstate (APT), whose price is often quoted as a reference price for tungsten.

Mill Products, such as tungsten wires, electrodes and tungsten metal products also follow a chemical path to production that involves APT. The Mill Products and Hardmetals sectors together have been the focus of substantial investment in downstream processing and the dominant producers tend to be vertically integrated all the way downstream to consumer products.

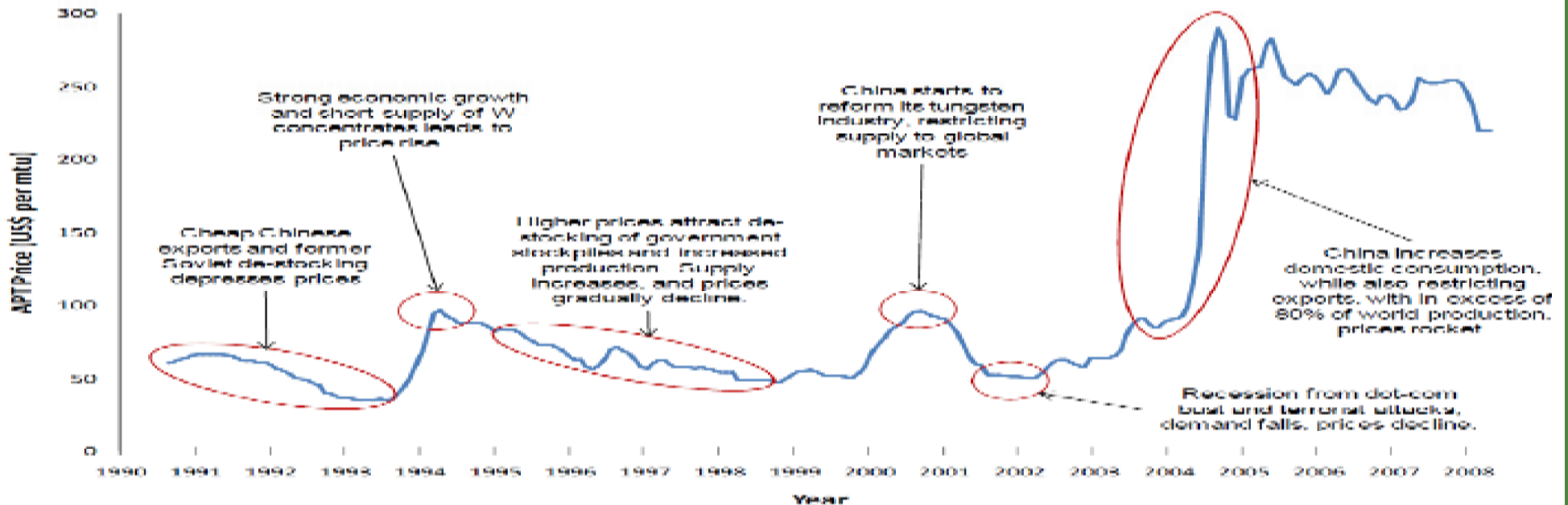
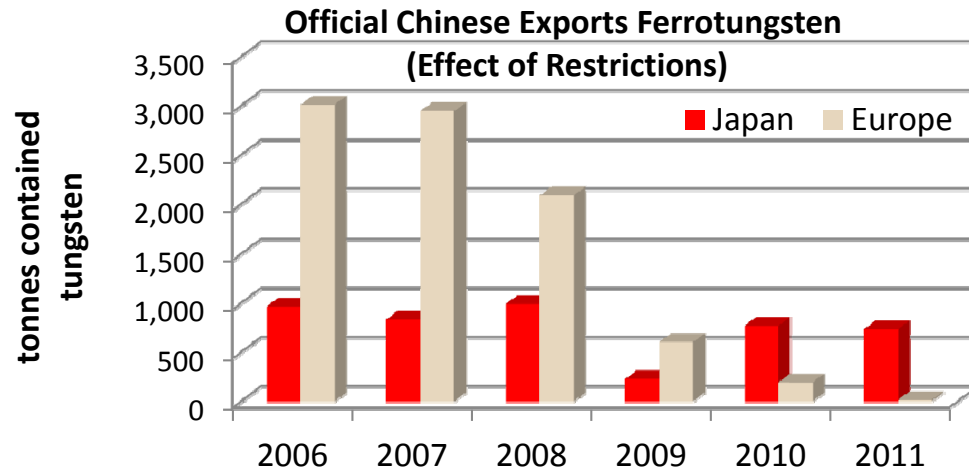
High Speed Steels, Tool Steels and Temperature Resistant Alloys follow a different production path, via the steelmaking industry. The production of these specialty steels commonly involves the use of **ferrotungsten (FeW)** as an alloying additive. In contrast to the Hardmetals and Mill Products, which involve chemical processing, ferrotungsten is produced via a pyrometallurgical process.



Consumption of tungsten by end-use

The strategic importance of tungsten has led the Chinese government to impose restrictions (refer graph below) on its production and export. In 2004/5, the Chinese limited exports so as to give priority to its own internal uses. This has created the opportunity for non Chinese tungsten production. Several measures have been implemented by China to restrict the flow of material including;

- Export Tariffs (20% on Ferrotungsten) since 2008
- Restriction on the issue of new mining permits
- Restrictions on new ferroalloy projects
- Barriers to foreign investment in tungsten mines
- Restrictions on exports of tungsten concentrates
- Abolishment of VAT rebates for exporters



Outside of China, the main consumers of ferrotungsten are specialty steelmakers located in Europe and Japan.

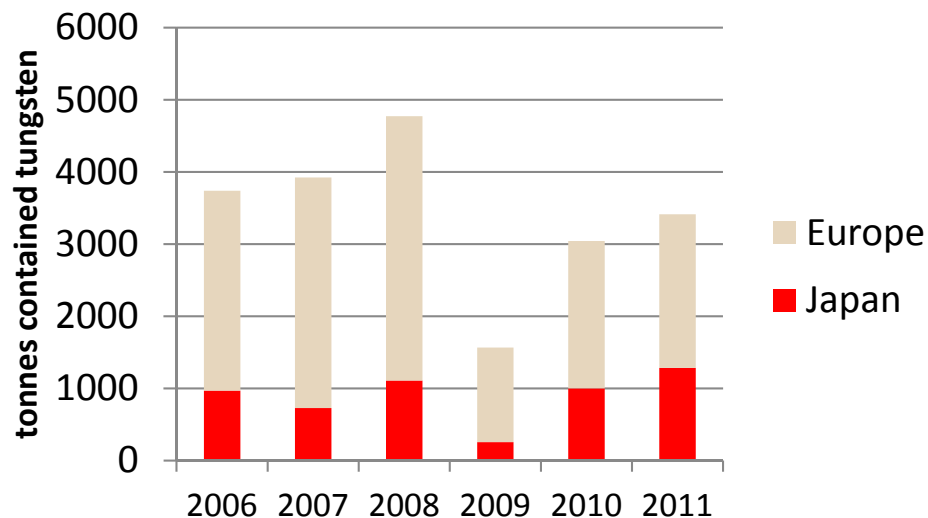
Prior to GFC, the total consumption of FeW in Europe and Japan was approximately 5,000 tonnes of contained tungsten (equivalent to approximately 6,500 tonnes of physical ferrotungsten product). The quantity of demand for ferrotungsten has shown a good recovery post-2009.

Chinese restrictions have reduced the amount of ferrotungsten available for export.

Outside of China there are limited sources of ferrotungsten.

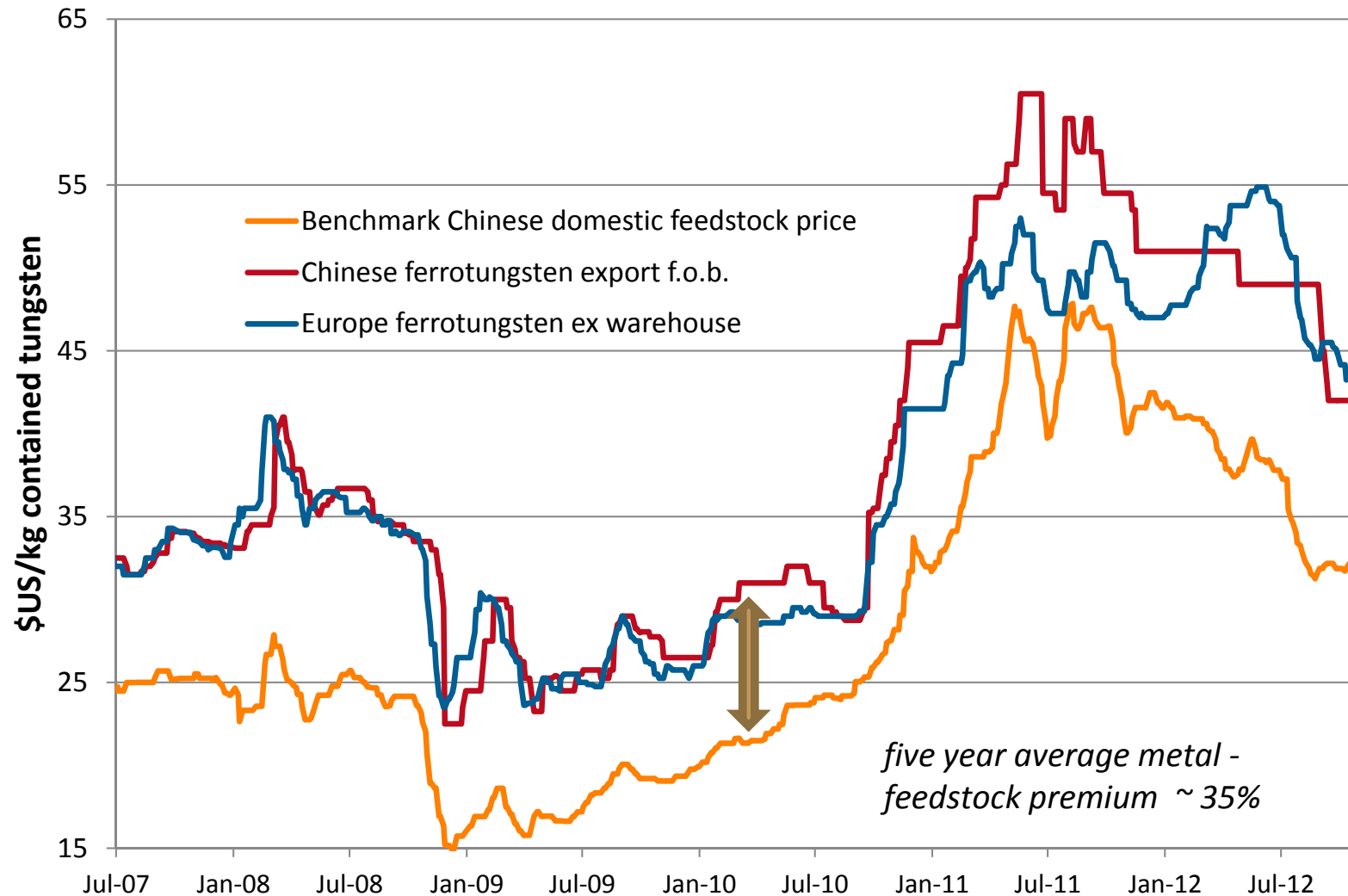
Independent projections by market analysis firm *cru* suggest a 5.7% pa growth in the quantity demand for ferrotungsten globally. Given the restrictions imposed on tungsten and ferrotungsten by the Chinese government, it seems imperative that non-China consumers take steps to secure alternate sources of supply.

Ferrotungsten Imports (Europe/Japan)



ATC has ferrotungsten production capacity of up to 3,000 tonnes per annum of contained tungsten to sell into the non-China market.

Ferrotungsten is quoted on Metal Bulletin and Metal Pages. The metal is priced in terms of kilograms of contained tungsten, with the standard specification taken to be metal with 75% tungsten content. Over the past five years, ferrotungsten has on average achieved a 35% premium relative to tungsten concentrate. Chinese exporters, who have to pay a 20% export tariff, have suffered significant erosion to their export sales margins.



Hazelwood and ATC have a Sales Agency Agreement with Wogen Resources Limited for the worldwide distribution of ferrotungsten from the ATC Ferrotungsten Project. Wogen will distribute the product to its existing network of customers in the specialty steelmaking sector.

Wogen is an established and reputable trader with more than 40 years of experience in the minor metals and is bound by the codes of conduct as a member of the Minor Metals Traders' Association (MMTA).



Under the terms of the Agreement;

- **Five year term; renewable for a further term**
- **Quotation Price is London Metal Bulletin - in warehouse Rotterdam**
- **Payment is 80% on documentation ex-Haiphong, Vietnam; balance on receipt of payment from customer**
- **Sales factoring finance provided by Wogen**

The target markets, and principal sales territories, are in Europe and Japan.

With few sources of ferrotungsten outside of China, the Wogen – ATC relationship can achieve a strong market position in its chosen sales territories.

Hazelwood Resources Ltd

Vietnam is an established destination for a plethora of foreign direct investment in manufacturing based enterprises and is an emerging growth story in south-east Asia.

Significant infrastructure projects are in progress throughout the country including port upgrades, industrial land releases and power generation projects.

The ATC Ferrotungsten Project is situated in an established industrial region with the necessary factors for a long operational lifespan.

- Located near Haiphong, which is the largest port in Vietnam.
- 50 year Investment License and land lease in an industrial estate
- Licensed for import of raw materials and export of finished products.
- Statutory approvals in-place.
- Access to container port facilities by sealed road network.
- Connected to grid power and power supply agreement executed.
- Local catchment area for production workforce; light industrial area

ATC Ferrotungsten Project



The ATC Ferrotungsten Project is the largest capacity ferrotungsten plant outside of China and its design is believed to be the most advanced in the world. The furnace has a production capacity of approximately 4,000 tonnes per annum of FeW (approximately 3,000 tonnes of contained tungsten).

Newly constructed in 2011, for a total construction cost of approximately \$11m (a significant capital cost advantage compared to western world projects), the ATC Ferrotungsten Project represents a capital-efficient entry into ferroalloy production. Local construction contractors were utilised with supervision and quality control provided by ATC and Hazelwood owners' teams. The facilities have been built to exceed local building standards.

The main furnace hall contains a tilting electric arc furnace, materials handling systems and control centre. Attendant facilities include a three storey administration building, messing and ablutions buildings, an on-site laboratory, slag processing facility, water storage ponds and landscaped grounds featuring a tennis court and pagoda.

The processing plant is based on the latest generation ferrotungsten plant design, proven at operations in China. The design and installation was completed by the same team of engineers who were responsible for successful ferrotungsten plants in China. A number of improvements have been made to power control systems, materials handling systems and emissions control. All electrical and mechanical systems have been commissioned (cold commissioning) and the facilities are being prepared for hot commissioning and first production.



The production of ferrotungsten is a smelting process that requires experienced operators, and specialised equipment. ATC is fortunate to have both, having employed a team of experienced operators and with new, latest generation design equipment.

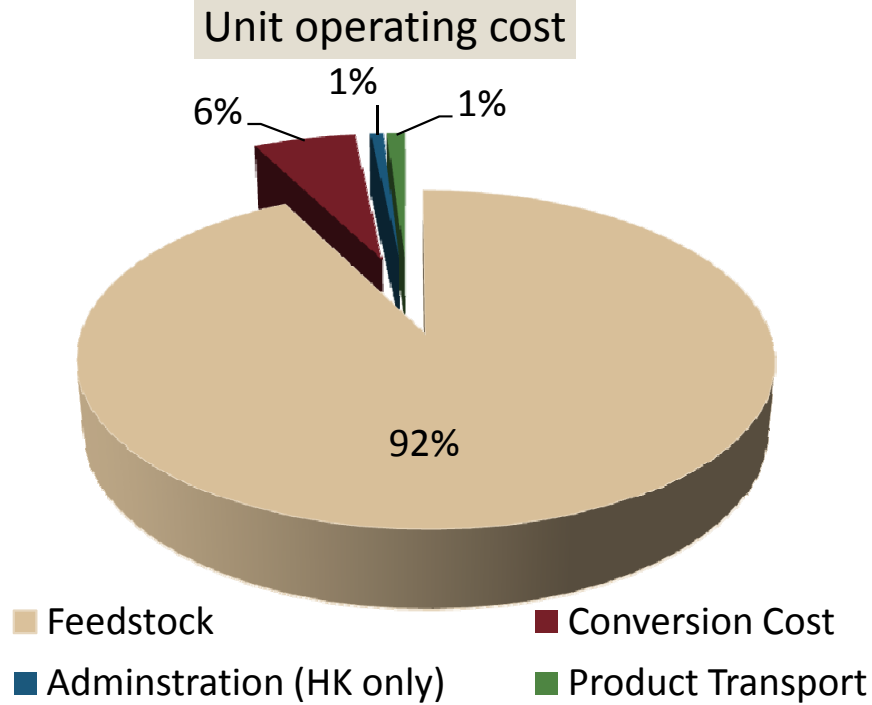
Raw materials required for the process include;

- Tungsten feedstock (concentrate)
- Coke
- Ferrosilicon
- Scrap Iron

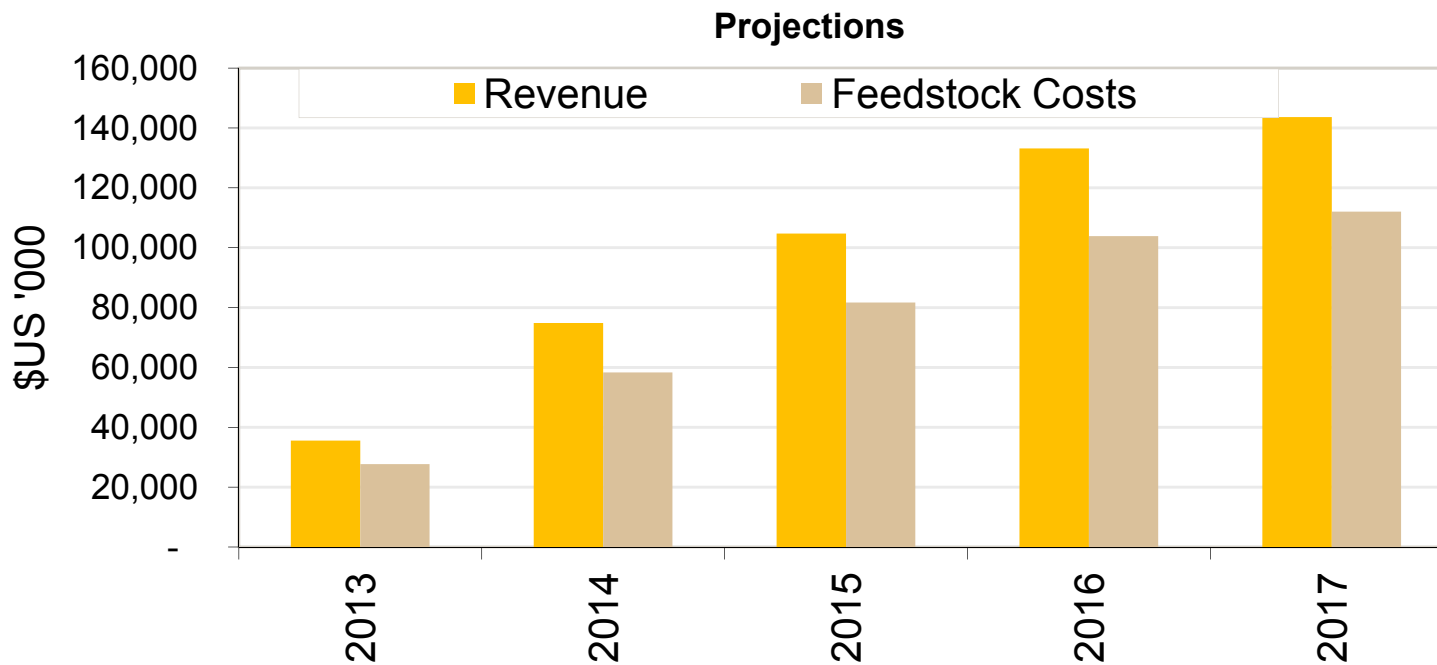
The process involves a mixed carbothermic and silicothermic reduction of tungsten concentrate and during the process, core temperatures in the furnace exceed 3,200°C. The method of extraction of the ferrotungsten metal is different to the production methods used for other types of ferroalloys, and the ATC personnel have prior experience with the process, having operated production facilities in China.

The product is a ferrotungsten master alloy of nominal 75% tungsten content, although there a wide range of specifications that can be produced. The product is crushed to suit product size specifications and packaged in either drums or bulka bags for shipping in sea containers via the nearby port facilities in Haiphong.





Feedstock accounts for approx 90% of the operating cost



One tonne of ferrotungsten product requires approximately 1.5 tonnes of tungsten feedstock.

Tungsten concentrate (feedstock) is a sought after commodity that is in short supply globally. Feedstock for commissioning and first production has been ordered and is in transit to the ATC site.

ATC has adopted as policy the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals.

Initially, most of the feedstock for ATC will be purchased on the spot market through an extensive network of traders (including **WOGEN**) and producers. The concentrate originates from sources located in Russia, Africa, South America, Mongolia and North America. Hazelwood's present joint venture partner in ATC previously held roles with China's largest hardmetals producer and has more than 25 years' experience in the procurement of tungsten raw materials.

Local Vietnamese production of tungsten concentrate has increased significantly in recent years, and a significant proportion of ATC's feedstock can be sourced from the local market. Numerous site visits have been undertaken and negotiations are in progress. Hazelwood also has secured a concentrate supply agreement with a North American based supplier that has its own mine and processing facilities.



Wolframite feedstock – shipping photos



Scheelite feedstock – North American supplier

Terry Butler-Blaxell Managing Director, Hazelwood

Mr Butler-Blaxell has 20 years' experience in the resources sector in commodities including gold, industrial minerals, vanadium, base metals, nickel, tungsten, magnetite iron ore and titanomagnetite, and has directed the economic evaluation of numerous projects. He has significant experience in financial modelling and valuation, project and company transactions, due diligence reviews, and minor metals markets.

John Chegwiddden Director & management, Hazelwood & ATC

Mr Chegwiddden has over 20 years experience as an accountant, including providing advice in management, accounting and taxation, and consulting to manufacturing, mining, primary production and earthmoving operations. Mr Chegwiddden has a strong knowledge of the mining and resources sector in Australia, with key competencies in exploration, materials processing, marketing and financial management in relation to junior mining companies. More recently he has consulted to a number of listed companies and negotiated with capital financiers for junior exploration companies.

Martin McQuade Chief Operations Officer, Hazelwood

Mr McQuade has more than 30 years experience in the mineral processing industry including pyrometallurgical and extractive processes. He has held roles that range from operations management, project economic analysis, strategy development, to study and project management. Mr McQuade has broad experience across a range of minerals including nickel, tin, tantalum, magnesia, tungsten and gold.

Dr Jake Zhu Senior Pyrometallurgist, Hazelwood

Mr Zhu has more than 20 years' experience in pyro-metallurgical operations including ferroalloy smelting and production, iron production, tin and copper concentrate smelting and converting. He has worked for Ausmelt, BHP Billiton, Xstrata and Nyrstar in a range of operations, which included a number of overseas locations including China, and South Africa.

Chen Guanyu (George Chen) President, ATC

George Chen presently holds a 40% interest in the ATC Joint Venture. Mr Chen is a qualified mechanical engineer and has more than 20 years' experience in the global tungsten industry, having previously held senior executive roles with China's largest hardmetals producer, XTC where he was also involved in the procurement and trade of tungsten materials. George has significant experience operating in Vietnam and was a founder of the Youngsun ferrotungsten operations. Mr Chen has assembled a team of experienced ferrotungsten personnel and support staff from the Chinese tungsten industry.

Wei Jian Cao Chief Engineer, ATC

Mr Wei is an electrical engineer with more than 25 years experience. Specific ferrotungsten experience was gained during his employment at Jiangxi Tungsten Group in the areas of design, installation and commissioning. Jiangxi Tungsten Group is one of the largest tungsten producers in China.

Yen Ngyuen Principal Project Engineer, Hazelwood

Ms Nguyen is a mechanical engineer with more than 20 years experience in major project development and project delivery in the Western Australian mining industry. She has worked with BHP Billiton, WMC, and major engineering houses and has provided senior project support for the construction of the Vietnamese facility.

Xu Ling Chen Operations Superintendent ATC

Mr Xu is an experienced process engineer with more than 30 years' experience in metallurgical operations. Having previously operated ferrotungsten furnaces at Jinling Ferroalloys Group in China, Mr Xu was one of the pioneers in adapting Russian technology to the Chinese ferrotungsten industry.

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