

## UPDATED PRE-FEASIBILITY STUDY – LOW CAPITAL STARTER MINE FOR GROUNDHOG NORTH

### HIGHLIGHTS

- Atrum is currently finalising a revised Pre-Feasibility Study for the Groundhog North Mining Complex, which now includes a staged approach to development initially employing a low cost starter mine producing 880,000tpa ultra-high grade anthracite.

#### Starter mine economics:

- Total capital requirement of US\$142M, with 64% funded by third parties (the majority through the equipment financing arrangement with China Coal Technology and Engineering Group (“CCTEG”))
- Project NPV of US\$239M
- Project IRR of 21%, and equity IRR of 38%
- Potential major customers for Atrum’s anthracite are now requesting access to bulk samples for testing
- Following the grant of the Bulk Sample Permit, Atrum team has commenced preparations for site works

### GROUNDHOG NORTH: Activity Update

Atrum Coal NL (“Atrum” or the “Company”) (ASX: ATU) is pleased to provide an update on the Pre-Feasibility Study (“PFS”) for the Groundhog North Mining Complex (“Groundhog North Complex”; refer Figure 1), British Columbia, Canada.

The Company announced results from its initial Pre-feasibility Study on 6 May 2014 (refer to ASX announcement 6 May 2014 “A\$2.1 Billion NPV for First Stage Production at Groundhog Anthracite



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Ownership: 100%  
Ownership: 100%  
Ownership: 100%

Project”) and provided supplementary guidance on the Pre-feasibility Study on 20 October 2014 (refer to ASX announcement on 20 October 2014 “Supplementary PFS delivers A\$1.7 Billion NPV for Groundhog North”).

Over the last year the Company has been updating the PFS based on additional studies. In preparing the revised PFS, the Company has evaluated a number of small scale starter mine options that accelerate early cash flows for minimal capital cost which maximise shareholder returns. A preferred option has been identified and modelled which has been incorporated into the draft development plan for the Complex.

The Company has now started engaging with potential strategic and financial investors in relation to funding the bulk sample extraction and ultimately, subject to permitting, a small scale starter mine development.

Robert Bell, Executive Chairman commented:

*“The award of the Bulk Sample Permit and the updated PFS with the smaller, starter mine demonstrates the economic viability of the Groundhog North project and accelerates Atrum’s plans to achieving commercial production. We can now proceed with detailed discussions with potential long-term buyers of Groundhog anthracite, as well as potential strategic and financial investors. We will update the market as these discussions deliver partners that share our vision to become a world class, low cost, anthracite producer.”*

*“The supply-demand dynamic of high-grade and ultra-high grade anthracite used in metals manufacture, filtration, plastics manufacture, for briquettes and for specialty carbon products continues to be encouraging for Atrum’s near term entry to production. Global seaborne supply of anthracite has halved over the past decade, creating a structural supply shortage of anthracite.”*

Following drilling in 2014, the Company completed a JORC 2012 Coal Resource Estimate for the Groundhog North Complex (refer to ASX announcement 14 August 2015, “Resource Increase at Groundhog North” including the accompanying JORC Table 1) and identified potential mining areas that could be developed with small scale starter mines. These areas have now been investigated in more detail and added to the PFS.

## GROUNDHOG NORTH: Revised Pre-Feasibility Study

An updated PFS is being finalised at present. In the updated PFS, the Company has adopted a staged approach to development, beginning with a low capital cost underground mine, capable of producing up to 880,000tpa of saleable ultra-high-grade anthracite. The updated PFS, when finalised, will include subsequent development stages for the larger underground operations at the Groundhog North Complex. This development approach has been well-received by potential off-take investors and joint venture funding partners.

The staged approach to the development of the Groundhog North Complex importantly provides the Company with early cash flows while the larger underground operations are being developed in step with infrastructure capacity.

The smaller, starter mine will allow the Company to:

- establish operations in the area;
- prove the logistics chain for transporting larger amounts of product;
- continue to develop long term and sustainable relationships with the Company's aboriginal partners;
- train aboriginal and local personnel to build a workforce that will support sustainable, long-term operations;
- establish customer channels;
- investigate alternative high value markets;
- increase debt funding potential for the larger underground mini-wall operations and thus provide superior shareholder returns, by leveraging greater debt servicing ratios from cash reserves;
- generate early cash flows, not just for the Company, but for local families, contractors, communities, and government; and
- build credibility with a range of key stakeholders, including parties interested in the Company's growth and value potential.

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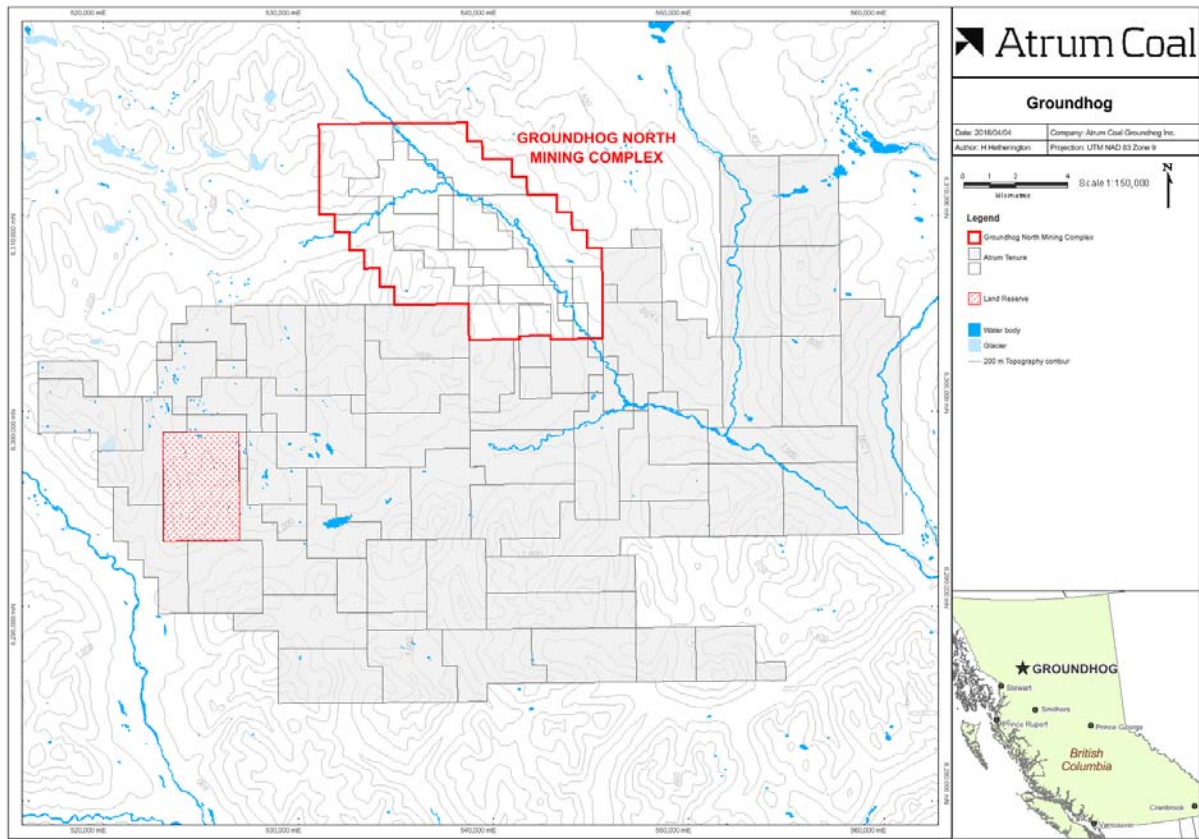


Figure 1. Location of the Groundhog North Mining Complex

The scaled down starter mine will establish access to existing road, rail and port infrastructure in the local area, minimizing capital expenditures through a staged approach. The overall Groundhog North Complex has been designed around a resource base of 1.016 Billion tonnes of anthracite (JORC 2012 – refer to Table 1 and Figure 2 below and to ASX announcement 14 August 2015, “Resource Increase at Groundhog North”).

Table 1. Groundhog North Resources (JORC 2012)

Geological Area	Measured	Indicated	Inferred	Total
Western Domain	156	193	260	<b>609</b>
Eastern Domain	0	260	147	<b>407</b>
<b>Total</b>	<b>156</b>	<b>453</b>	<b>407</b>	<b>1,016</b>
% of total	<b>15.4%</b>	<b>44.6%</b>	<b>40.0%</b>	

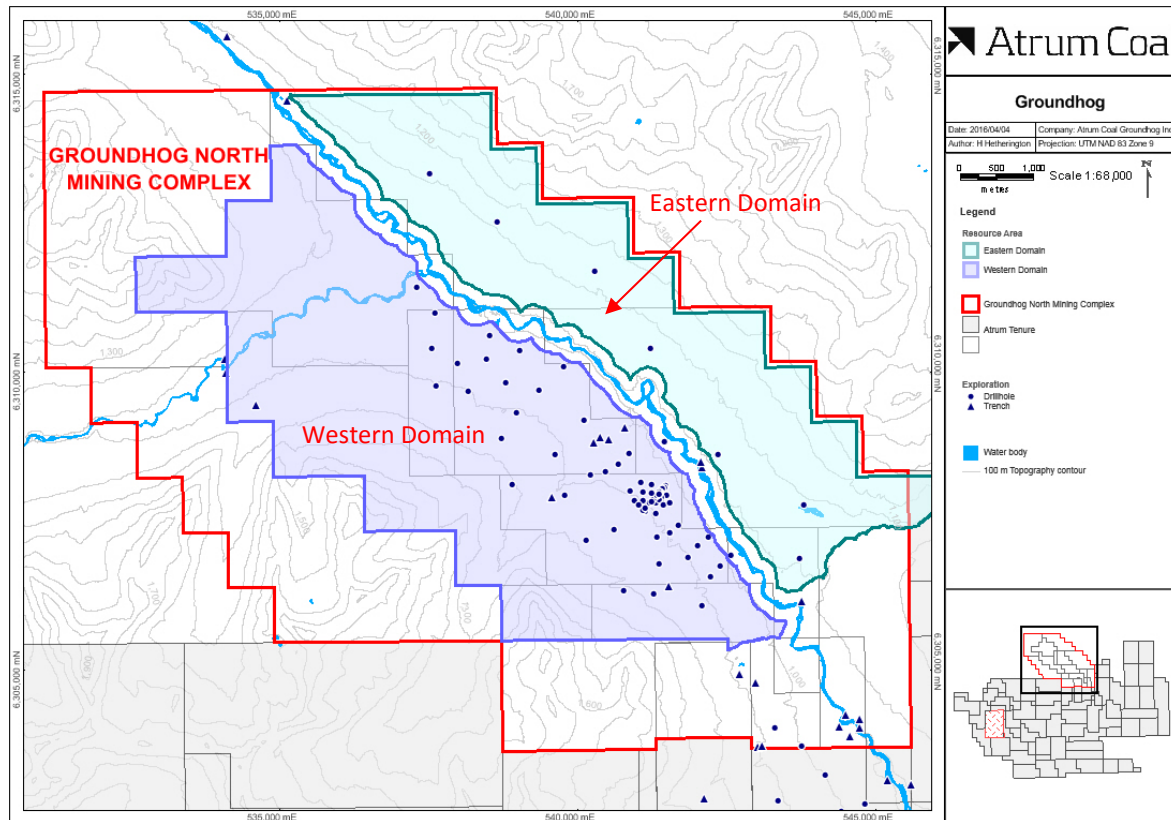


Figure 2. Groundhog North Mining Complex Geological Domains

The starter mine included in the revised PFS is located in the Western Domain of the Groundhog North Complex has estimated total capital of **US\$142M**, is capable of producing up to **880,000tpa** of saleable product. (comprising of 26% Measured resources; 32% Indicated resources; 43% Inferred resources)<sup>1</sup>.

The initial small mine allows the Company to prove the mining concept in the region, and generate cash so that further mines can leverage cash flows, maximising shareholder returns. Not only is it forecast for the starter mine to return **US\$239M NPV** (real, WACC 7.6%, post-tax Project NPV), this mine is expected to provide investors with a lower risk entry into a rising anthracite market. The

<sup>1</sup> Calculated by Nick Gordon of Gordon Geotechniques Pty Ltd in accordance with the JORC 2012 Code (Refer Table 1, and ASX announcements dated: 14 August 2015 and 16 October 2014)

forecast cash cost<sup>2</sup> of this small scale mine is **US\$96/t FOB**. Based on equity capital of **US\$51M** (see Table 3, Table 4 and Table 5 below for material assumptions) the equity IRR is **38%**.

**Table 2. Pre-Feasibility Economic Assessment (starter mine)**

Groundhog North Mining Complex: Starter Mine: Financial Analysis (US\$)	
	Starter Mine
<b>Mine Life</b>	28 years
<b>Saleable product (maximum)</b>	880ktpa
<b>Equity Capital</b>	\$51M
<b>Total Capital</b>	\$142M
<b>Operating Cost (avg. FOB cash incl. royalties)</b>	\$96/t
<b>Price (avg. FOB, Table 5 estimating 50% lump)</b>	\$156/t
<b>Project NPV (post tax; WACC 7.6% real)</b>	\$239M
<b>Equity NPV (post tax; CAPM 10.0% real)</b>	\$179M
<b>Project IRR (post tax)</b>	21%
<b>Equity IRR (post tax)</b>	38%

From the small scale starter mine, numerous development paths can be selected from a staged ramp-up to a 1.6Mtpa continuous miner operation through to a larger mini-wall operation as noted in previous PFS releases (refer ASX announcement 6 May 2014 "A\$2.1 Billion NPV for First Stage Production at Groundhog Anthracite Project" and ASX announcement on 20 October 2014 "Supplementary PFS delivers A\$1.7 Billion NPV for Groundhog North"). The Company is updating the economic modelling of these options at present, and will release these results in the coming weeks.

The low capital start-up mine can be a stand-alone operation, established with a relatively low equity contribution of US\$51M as shown in Table 2, with approximately US\$15M funded for infrastructure development from third parties and the remainder from the existing CCTEG equipment finance facility (refer Atrum Coal ASX release 5 May 2015, "Atrum Signs US\$100 Million Equipment Finance and Supply Agreement").

<sup>2</sup> Refer to Table 2. Pre-Feasibility Economic Assessment; Table 3. Capital Expenditure Estimates; Table 5. Operating Cost Estimates

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**Table 3. Capital Expenditure estimates (starter mine)**

Groundhog North Mining Complex:	
Starter Mine: Capital Expenditure Estimate (US\$)	
Mining Equipment & Construction	\$72.7M
CHPP & Loadout	\$12.3M
Surface Infrastructure & Water Mgmt.	\$6.9M
Power Supply (gen sets – could be reduced through rental option)	\$12.6M
Offsite Infrastructure (Road/Rail/Port – potentially via Atrum Infrastructure and Logistics Pty Ltd)	\$32.5M
Feasibility Studies & Permitting	\$5.0M
<b>Total Capital Expenditure</b>	<b>\$142.0M</b>

Consistent with previous PFS press releases and presentations (refer to ASX announcements 6 May 2014 “A\$2.1 Billion NPV for First Stage Production at Groundhog Anthracite Project” and “Supplementary PFS delivers A\$1.7 Billion NPV for Groundhog North”), it is envisaged that Atrum Infrastructure and Logistics Pty Ltd will fund much of the off-site infrastructure associated with the both the initial starter mine and subsequent infrastructure build-outs for larger operations at Groundhog.

**Table 4. Operating Cost estimates (starter mine)**

Groundhog North Mining Complex:	
Starter Mine: Operating Costs (US\$/t)	
Mining (\$/ROMt)	\$30.14
Processing (\$/ROMt)	\$6.76
Yield (primary)	62.5%
<b>Ex-mine cash cost (\$/t saleable)</b>	<b>\$59.03</b>
Transport (\$/t saleable)	\$23.37
Royalties (\$/t saleable)	\$1.35
Admin & O/H (\$/t saleable)	\$12.21
<b>FOB Cash Cost (\$/t saleable)</b>	<b>\$95.97</b>

Forecast operating costs of the starter mine are competitive with other anthracite exporters, and well below current available pricing for high-grade anthracite, subsequently producing strong average EBITDA margins. The continuous miner operation will use modern roof-bolt methods for improved strata control, and a modified pillar extraction method for maximum resource utilisation. Run-of-mine coal will be transported by conveyor to a small, modular coal handling and preparation plant, for beneficiation into primary, low ash lump and fine products. Product yields

from the Duke E seam can reach up to 85%, but the financial analysis of the starter mine uses conservative 62.5% yield estimates. Transport from the mine will be via road and rail to export ports in Stewart and Prince Rupert. Administration and overhead charges account for sales and distribution, as well as work teams growing the broader Atrum business, including the advancement of other mines at Groundhog and Panorama, and Atrum Infrastructure and Logistics Pty Ltd.

## Anthracite Market and Pricing

The Company has updated the “Anthracite Market” section of the PFS and provides the following update:

Global anthracite markets remain undersupplied, and market prices for anthracite are strong. Current prices for imported anthracite are approximately US\$150/t for lumps and US\$100/t for fines (basis 5% volatile matter; 12% ash), see Table 4 and Figure 4.

The Company is utilising conservative long-term average anthracite prices as its benchmark for long-term pricing forecasts in all PFS modelling, as shown in Table 5.

**Table 5. Anthracite and Coking Coal Prices used in PFS**

	<b>Current Prices (May 2016)</b>	<b>Historical Prices (5-year average)</b>	<b>PFS prices (long-term average)</b>
<b>Anthracite Lump (CFR<sup>3</sup> Northern Europe)</b>	US\$150/t	US\$190/t	<b>US\$189/t</b>
<b>Anthracite Fines (CFR Northern Europe)</b>	US\$100/t	US\$135/t	<b>US\$128/t</b>
<b>Hard Coking Coal (FOB<sup>4</sup> Queensland)</b>	US\$95/t	US\$170/t	N.A.

Source: Resource-Net

The premium in anthracite pricing has remained throughout the coking coal cycle and as metallurgical coals increase in price due to supply/demand imbalances, anthracite has maintained and in some cases, improved its relative price position. With the growth in specialty markets (see below), anthracite is enjoying increased demand, leading larger metallurgical coal companies, steel mills, traders and carbon suppliers to look for emerging supply sources in a tight market. With the award of the Bulk Sample Permit, Atrum’s Groundhog resource has been enjoying significant

<sup>3</sup> CFR means Cost and Freight whereby the seller bears the cost of transporting the product to the named destination port (Incoterms 2010, International Chamber of Commerce)

<sup>4</sup> FOB means Free On Board whereby the seller bears the cost of delivering the product across the ship’s rail at the named loading port (Incoterms 2010, International Chamber of Commerce)

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interest from potential customers and off-takers, including for speciality anthracite (see following pages).

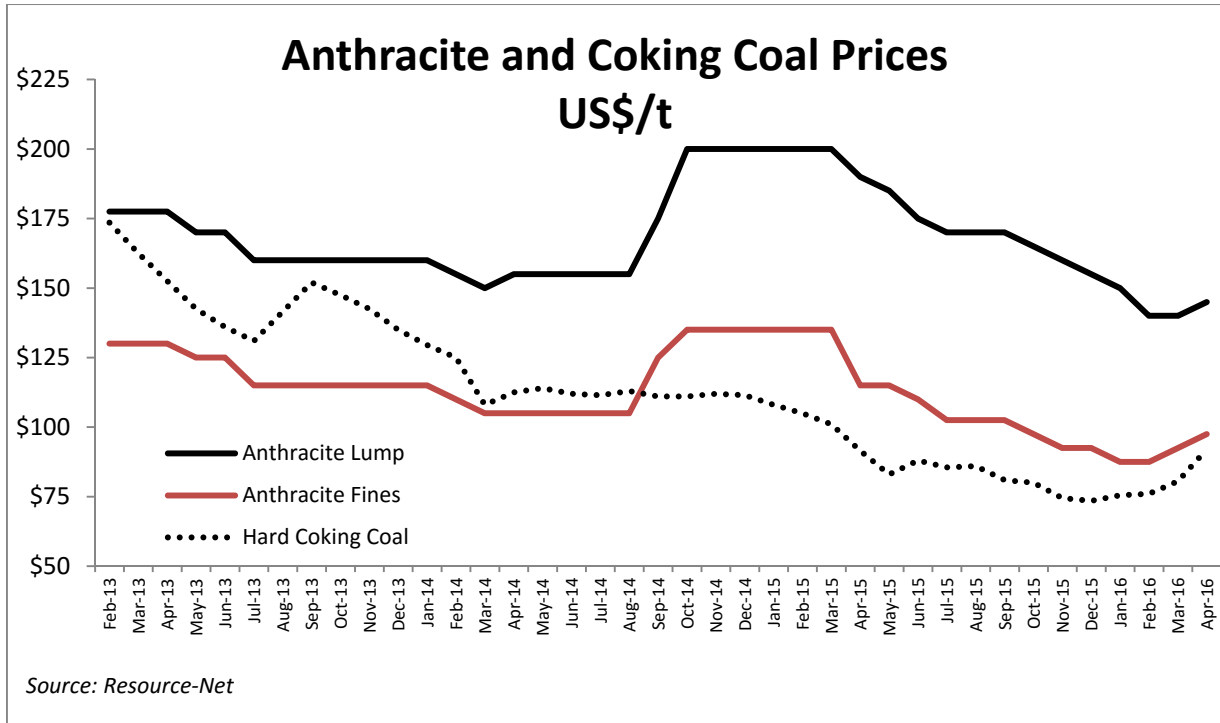
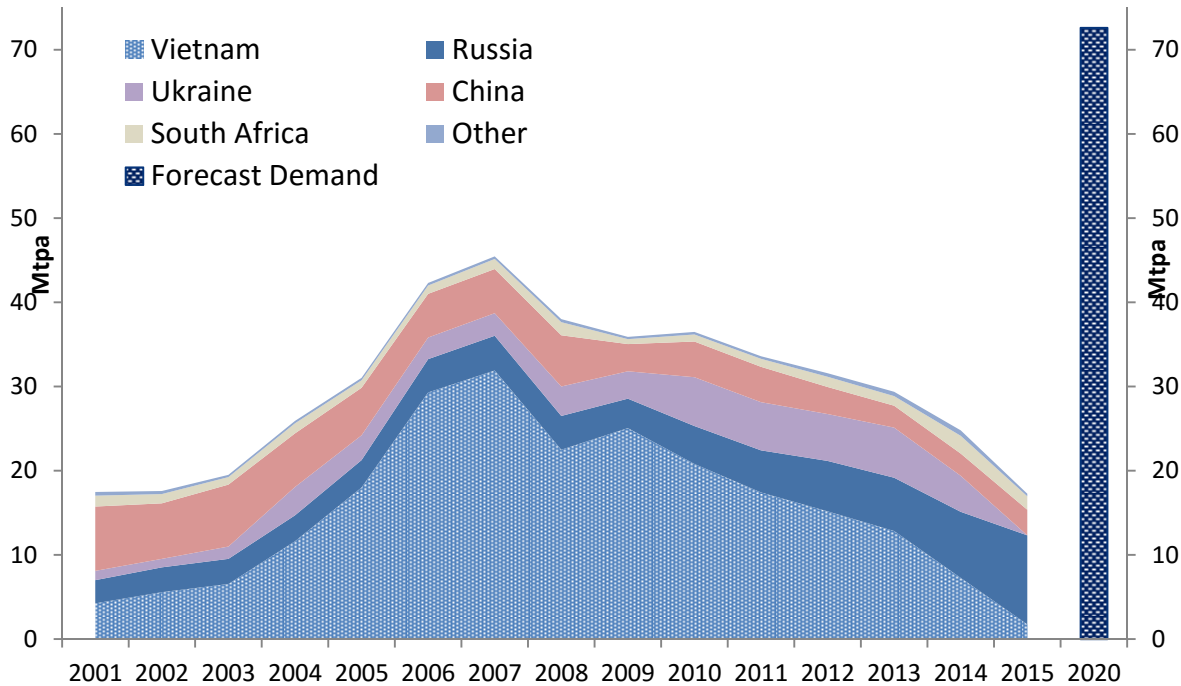


Figure 4. Historical Anthracite and Coking Coal Prices

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## Seaborne Anthracite Supply & Demand



Source: Wood Mackenzie and Resource-Net

Figure 5. Global anthracite exports and 2020 demand forecast

### Speciality Anthracite Markets

Anthracite is not only used as a sinter feed and coke replacement in blast furnaces. Speciality markets include water filtration, electric arc furnaces, chemical production, plastics manufacture and the conversion of anthracite into synthetic graphite for electric vehicle batteries. According to recent research by Market/Markets and TechSci Research<sup>5</sup>, the worldwide air filtration market is growing at 7.4% CAGR, and is forecast to grow from US\$14.5b in 2015 to US\$20.6B in 2020. Anthracite is used as one of the filter media in this market. Further, according to a 2014 report "Global Media Based Water Filters Market Forecast and Opportunities 2019"<sup>6</sup> the worldwide market for water filtration media is expected to exceed US\$12b by 2018. Again, anthracite is a filtration media used in this market. Speciality anthracite markets are being investigated by the Company in some detail as, although volumes are small, pricing is typically much higher than in the steel sector and this can substantially increase the forecast returns of the smaller scale starter mine.

<sup>5</sup> Source: TechSci Research together with Markets and Markets

<sup>6</sup> Source: PR Newswire

## Bulk Sample Operations Update

With the recent award of the Bulk Sample Permit (refer to ASX announcement 9 May 2016 "Atrum Coal receives Bulk Sample Permit for Groundhog North Mining Complex"), the Company is preparing for site operations to extract bulk samples for potential customers, primarily in Japan and Korea, although since the award of the permit, there has been strong interest from other carbon users for samples of Groundhog anthracite. The award of the Bulk Sample Permit and upcoming commencement of onsite activities represent a major milestone and phase change as the Company transitions from exploration to mining.

As part of the award of the Bulk Sample Permits, the Company is able to establish ground based site access to Groundhog, which has not been possible previously. The ground based access will aid in:

- reducing onsite costs;
- facilitating significant project equipment mobilisation; and
- establishing the production supply chain to the market place and customers

Initial construction, which includes ground based access to Groundhog North is planned to commence during the 2016 construction season, with bulk sample mining activities planned to immediately follow. Atrum will also be working with Aboriginal Groups and local communities in planning for participation in site construction and mining activities.

The Company has been preparing a development plan that outlines how anthracite mined under the Bulk Sample Permit will be transported offsite for processing and distribution to potential long-term customers in North America, Europe and Asia. Establishing the transportation route will allow Atrum to demonstrate its capability to develop a reliable and sustainable supply chain from the world's largest high grade / ultra-high grade anthracite deposit to Atrum's customers. Since the award of the Permit, the Company has fielded numerous enquiries from anthracite users around the world seeking samples for test purposes.

During this next phase of the project Atrum will evaluate the potential to supply Groundhog anthracite to specialty users in high-value markets, such as filtration media and activated carbon. The Company is also investigating the supply of upgraded anthracite products to industrial smelters, to users of calcined anthracite and to the rapidly growing markets for synthetic graphite. While the Company has maintained conservative pricing assumptions in all economic analyses, these high-value markets represent a genuine opportunity to achieve materially higher margins for custom washed and custom sized fractions of ultra-high grade anthracite.

## Competent Person Statement

This announcement relates to information in the ASX announcement made by the Company on 14 August 2015: "Atrum Coal Increases Groundhog North Resource" and available at [www.asx.com.au](http://www.asx.com.au) ("August Announcement").

The Company confirms that it is not aware of any new information or data that materially affects the August Announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the August

Announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the August Announcement.

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