

# Atrum: Tier 1 hard coking coal quality

Global HCC markets and the Elan Project, May 2019





# Important information

## Forward Looking Statements

This presentation includes various forward looking statements which are identified by the use of forward looking words such as "may", "could", "will", "expect", "believes", "intend", "plan", "estimate", "anticipate", "continue", and "guidance", or other similar words and may include, without limitation statements regarding plans, strategies and objectives of management, anticipated production or construction commencement dates and expected costs or production outputs. Statements other than statements of historical fact may be forward looking statements. Atrum believe that it has reasonable grounds for making all statements relating to future matters attributed to it in this presentation.

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## Competent Person Statement

### Exploration Results and Coal Resources

The information in this document that relates to Exploration Results and Coal Resources is based on, and fairly represents, information and supporting documentation prepared by Mr. Brad Willis, who is a Member of the Australasian Institute of Mining and Metallurgy (#205328) and is a full-time employee of Palaris Australia Pty Ltd (Palaris).

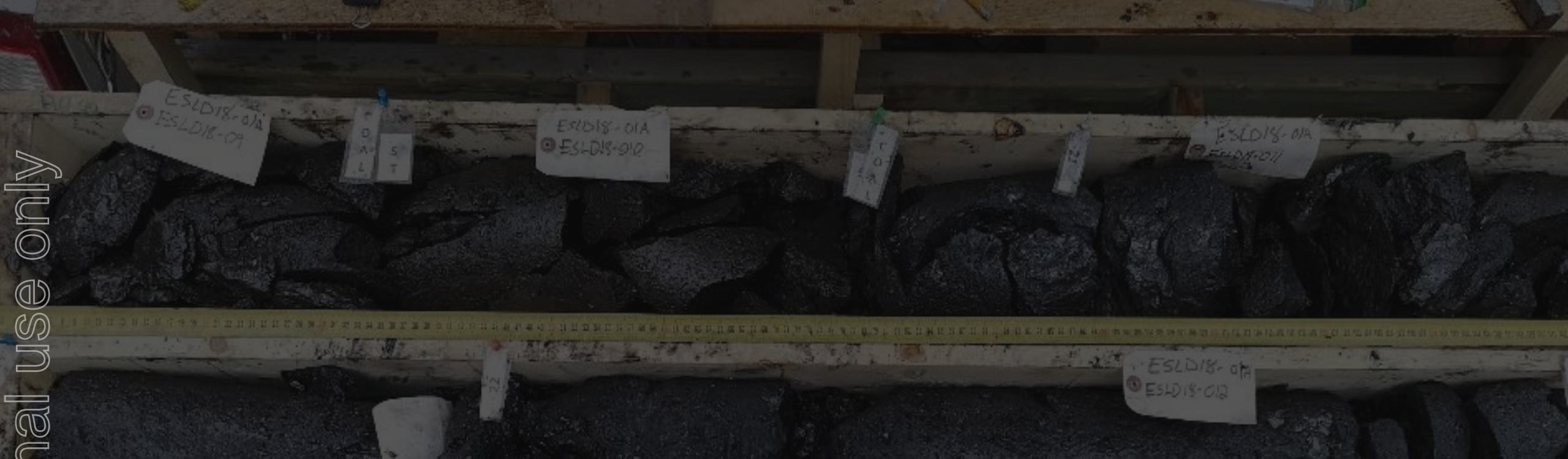
Mr. Willis has read and understands the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition). Mr. Willis is a Competent Person as defined by the JORC Code, 2012 Edition, having twenty years' experience that is relevant to the style of mineralisation and type of deposit described in this document.

Neither Mr. Willis nor Palaris have a direct or indirect financial interest in, or association with Atrum Coal, the properties and tenements reviewed in this report, apart from standard contractual arrangements for independent consulting work. In preparing this information, Palaris has been paid a fee for time expended. The present and past arrangements for services rendered to Atrum Coal do not in any way compromise the independence of Palaris with respect to this estimate. Mr. Willis has visited the Elan project area in September 2018 during the 2018 Elan South drilling program.

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

Mr. Willis consents to the inclusion in the report of the matters based on the information, in the form and context in which it appears.





# Global coking coal market fundamentals

Coal for steel

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Critical to global steel production

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Direct demand linkage with no baseload  
substitute available

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Highly concentrated seaborne supply; by  
producer and production region





# The basic coal split

**COKING  
COAL**



**STEEL  
PRODUCTION**

**THERMAL  
COAL**

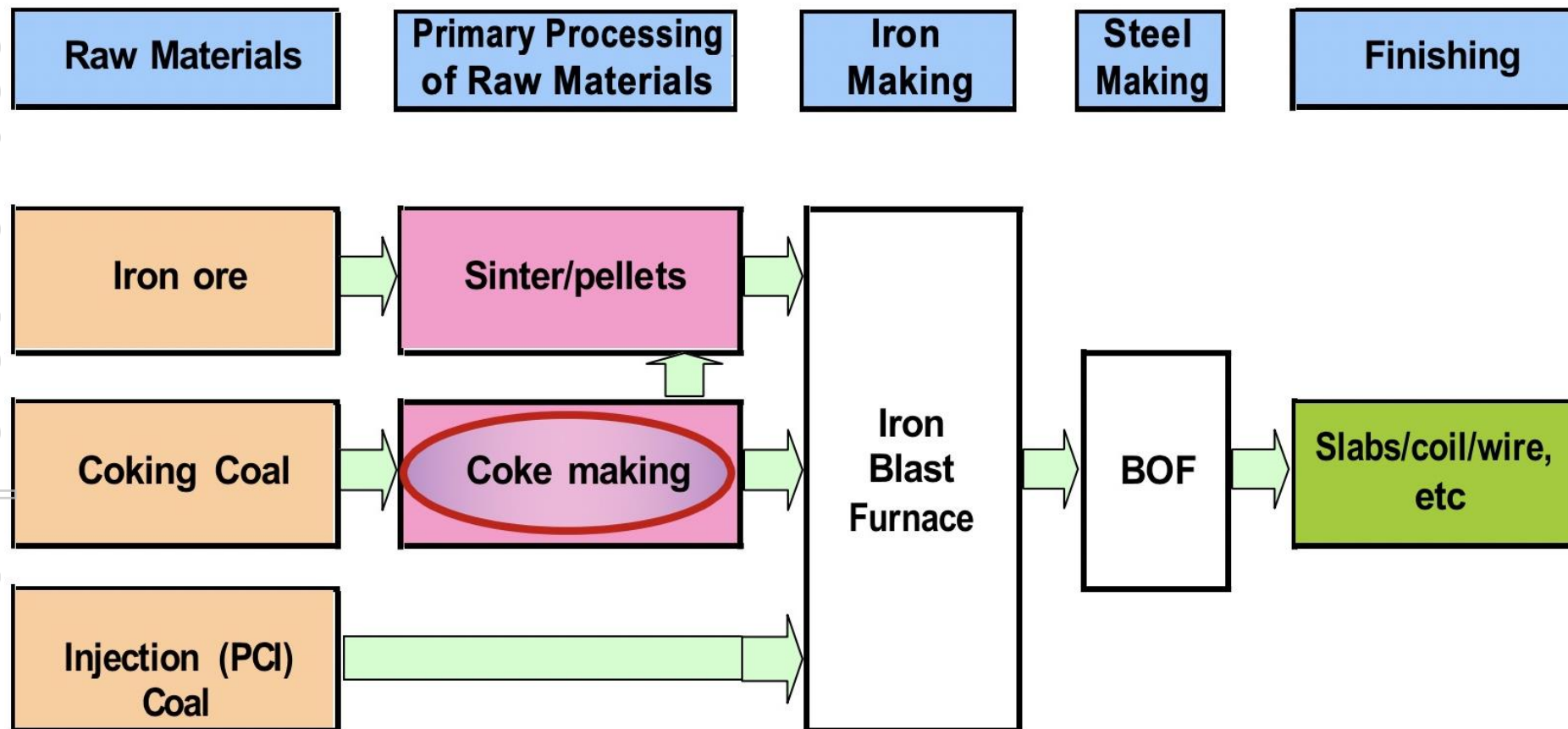


**POWER  
GENERATION**



# Coal for steel: blast furnace production route

*Iron ore + coke + PCI coal + limestone + air = pig iron*



Approx. 0.8t coking coal produces approx. 0.6t coke to produce approx. 1.0t steel via the blast furnace (pig iron) route, which produces ~75% of global steel products





# Coking coal quality directly impacts on blast furnace economics

- The coke quality and its impact on BF efficiency is directly impacted by the quality of the coking coals used to make it
- An increase in coke strength and/or reduction in coke impurities:
  - Increases BF productivity (iron output per day)
  - Decreases total coke requirements
  - Allows higher PCI usage (increased coke replacement)
- Due to its premium coking properties, **hard coking coal is not substitutable in any baseload sense**
- HCC is the majority foundation of any coke blend and, therefore, every blast furnace operation

Hard coking coal

Semi-hard coking coal

Semi-soft coking coal





# Highly concentrated global export market flows

Fig 137 Internationally traded metallurgical coal supply and demand outlook

Import Demand	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
China	709	766	771	737	733	724	728	728	720	703	690	677
Total Consumption	49	72	59	45	53	63	50	52	50	52	52	52
Total Imports <sup>(1)</sup>	0	0	0	0	0	0	0	0	0	0	0	0
Change in inventories	661	694	712	692	680	661	678	676	670	651	638	625
Apparent Domestic Production	91	98	97	99	101	95	94	103	101	101	101	100
JKT (Japan, SK and Taiwan)	38	40	46	48	48	51	55	57	60	63	65	68
India	67	66	68	65	65	67	68	67	66	65	68	67
Europe	25	26	32	36	35	33	36	39	43	45	47	48
Others	271	301	301	293	303	310	302	318	320	326	333	336
Total imports	145	169	186	186	189	173	177	185	193	192	193	200
Export Supply	56	49	37	34	43	49	51	45	38	45	50	45
Australia	30	33	29	25	25	27	30	31	31	31	31	31
United States	18	22	21	18	22	23	23	23	25	25	25	25
Canada	3	4	5	5	5	7	8	11	11	11	11	14
Russia	20	17	14	12	21	22	13	22	22	22	22	22
Mozambique	271	294	291	281	305	302	302	318	320	326	333	336
Others	3	7	12	3	-9	-6	-2	6	7	-7	-5	6
Total exports	191	148	115	88	143	190	206	185	150	150	163	145
Market balance (Change in US supply)												
HCC price												

Source: Custom Statistics, CRU, IHS, Macquarie Commodity Strategy, December 2018

By producer (2018, controlled basis, Mtpa):

**BHP** 78 Mt

**Teck** 26 Mt

 **AngloAmerican** 22 Mt

**GLENCORE** 12 Mt

Source: Macquarie Commodity Strategy, December 2018



# Current and emerging supply challenges

- Perennial wet season interruption and supply concentration risk from Queensland
- Rail and port infrastructure constraints
- Sovereign risk (eg Mozambique, Mongolia)
- Chinese domestic supply rationalisation and closures
- Sulphur content levels and BF restrictions
- Tighter, more onerous permitting requirements (globally)





# Elan Hard Coking Coal Project (100%)

A premium flagship asset

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Large, Tier 1 quality hard coking coal deposits

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Located in a premier coal production and infrastructure hub; 13km from export rail

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Open-pit focus with multi-mine development scale potential



# Key regional context

Atrum's Elan HCC Project (100%) in southern Alberta, Canada, is located approx. 30km from Teck's Elk Valley HCC complex

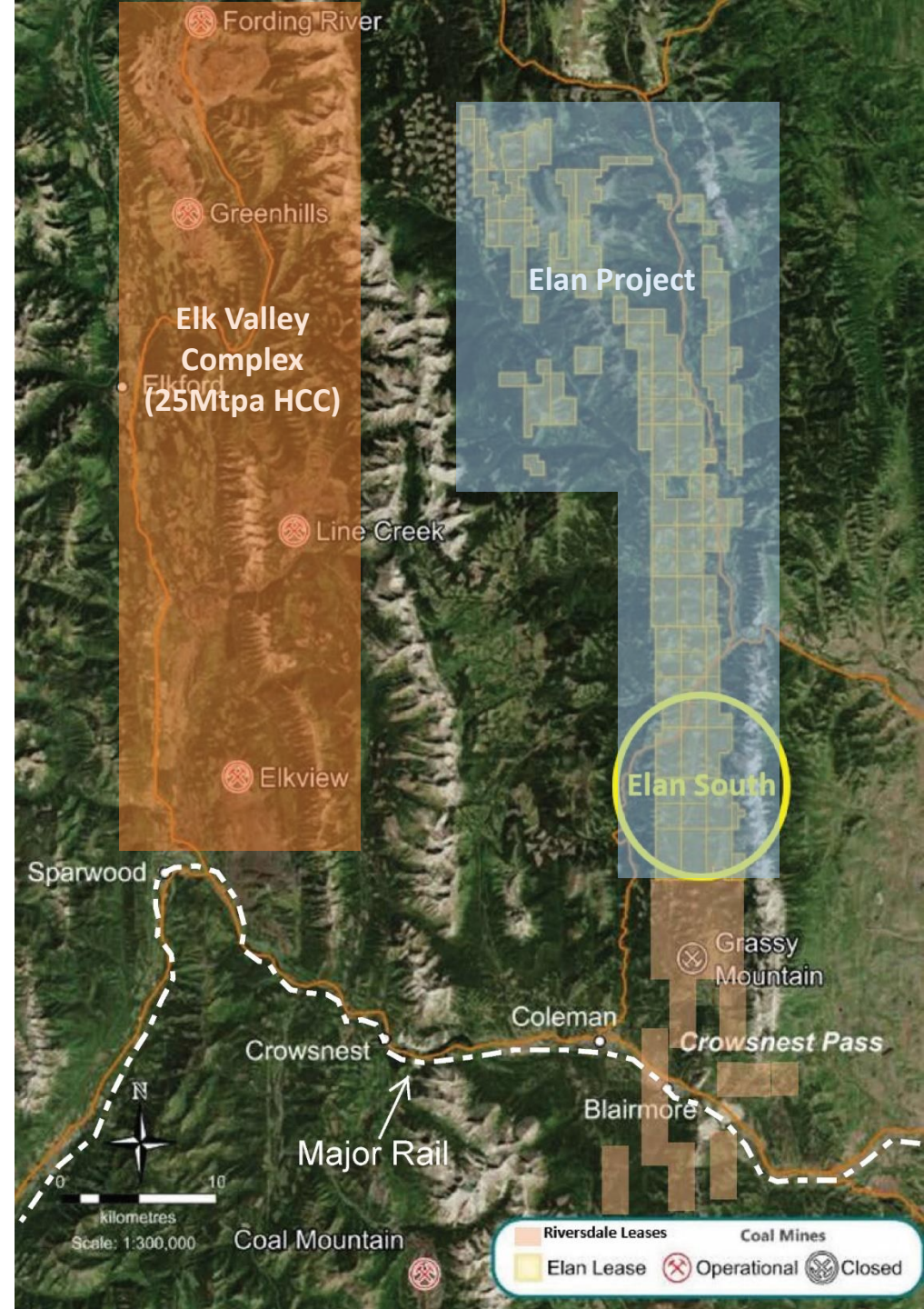
The Elk Valley mine complex is a +25Mtpa producer of premium Canadian HCC for global export markets

Elan deposition is in the same coal basin and directly correlated with the Elk Valley coal seams and settings

Elk Valley's 35 seam splits converge under the separating mountain range into effectively three seams in the Elan tenements

Recent detailed coal quality testwork has evidenced strong comparability with premium Teck products (Elan South CSR of 71)

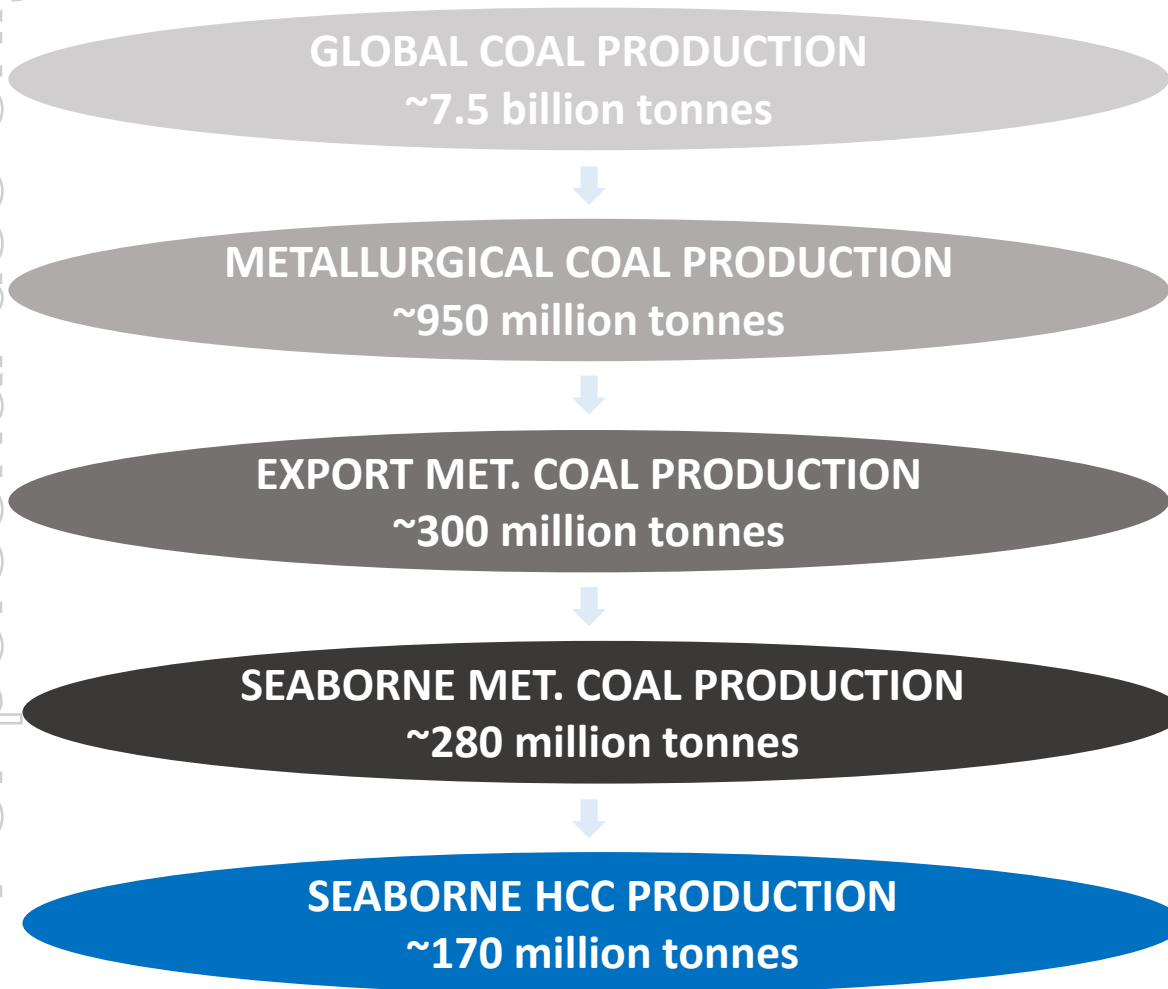
Premium mid-vol Canadian HCC is a global Tier 1 product that is highly valued by steelmakers, particularly in high-growth Asia & India





# Elk Valley is approx. 15% of the seaborne HCC market

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The Elk Valley complex is the Bowen Basin (Queensland) equivalent in Canada.

With annual hard coking coal production of approx. 25Mtpa, Teck's Elk Valley complex represents approx. 15% of the global seaborne HCC market





# Excellent Elan South clean coal quality results

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- Historical data indicates that other areas of the Elan project has potential to be even higher quality than the data shown from 2018 testing, as coal rank increases northward into low volatile hard coking coal
- Full product specification for Elan South HCC will be established after the 2019 field program and associated coal quality testing
- Current average data<sup>1</sup> shows:
  - **General:** Ash 7% (ad) - likely spec 8.5% +/- 1%; V.M. 26% (ad); Sulphur 0.65% (ad); Phosphorus 0.050% (ad)
  - **Coking:** CSR 71; FSI (CSN) 7.5; Fluidity 160 ddpm; RoMax 1.13%; Reactives 68%; JIS DI30 94
- Moveable Wall Oven Tests confirm that the Elan South coal will exert very low wall pressure and the resultant coke shrinks away from the oven wall (thus not creating any problems with coke oven walls or pushing the coke out of the oven)



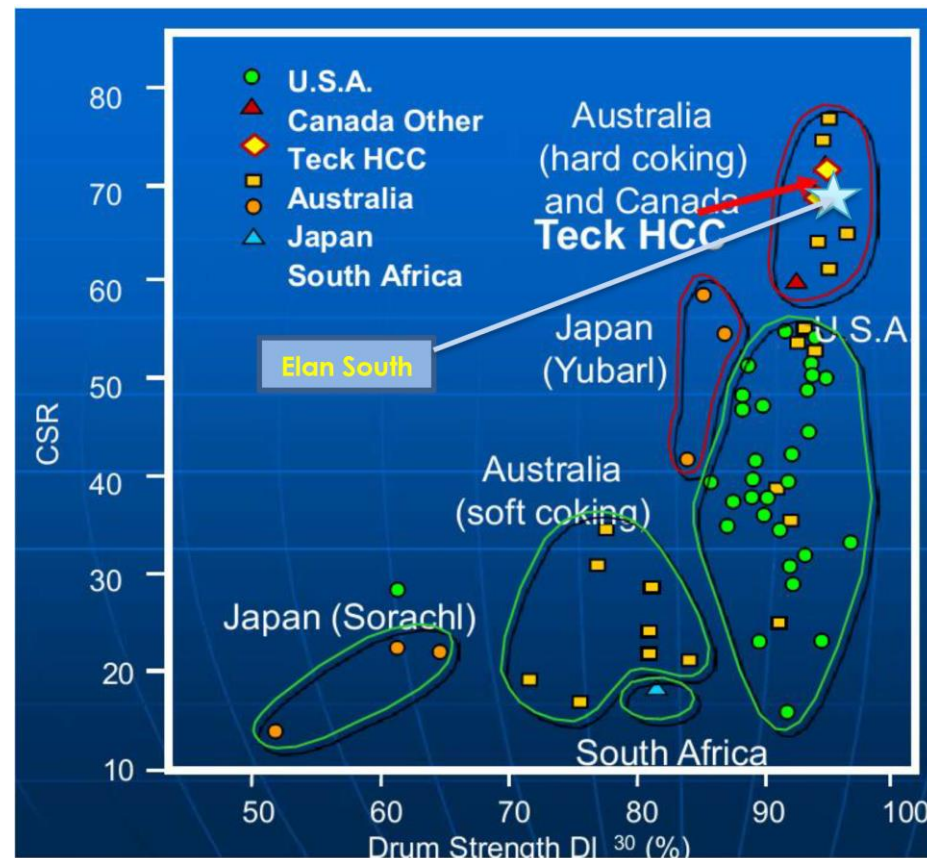


# Tier 1 hard coking coal quality

	Elan South <sup>1</sup> (Atrum)	Grassy Mount. (Riversdale)	Platts Aust. HCC 64	Elk Valley (Teck Premium) <sup>4</sup>	IHS Aust. Prime HCC
CSR	<b>71<sup>2</sup></b>	65	64	(EST 65 – 70)	71
Coal Rank RoMax (%)	<b>1.13</b>	1.2	-	1.07 – 1.17	1.15 – 1.55
Yield (%)	<b>&gt; 65</b>	55	-		-
Volatile Matter (%)	<b>26</b>	23.5	25 – 26	24.5 – 26.5	26 max
Total Moisture (%)	<b>&lt; 10</b>	10	9 – 10	< 10	10 max
Sulfur (%)	<b>0.65</b>	0.5	0.5 – 0.7	0.65 – 0.70	0.7 max
Phosphorus (%)	<b>0.05<sup>3</sup></b>	0.04	0.05	0.075	0.05
Fluidity (ddpm)	<b>160</b>	150	1,500 – 1,700	200 – 500	100 min

***Elan South is a high quality mid-volatile hard coking coal, classified in the top tier of globally traded coking coals***

1. Elan South data based on test work programs conducted in 2014 & 2018
2. Results from 2018 carbonisation test work (see recent Atrum ASX release)
3. South area (2018 samples) shows 0.060 – 0.085% while North area (2014 samples) shows 0.010 – 0.020%
4. Properties other than CSR are from NI 43-101 Technical Report on Coal Resources and Reserves of the Fording River Operations (2011)



**Seaborne coking coal product parameters**

Source: Teck Resources, January 2019



# A potential multi-mine development

Large landholding (approx. 230km<sup>2</sup>) proximate to Teck's Elk Valley

Over 40km of delineated coal strike extent

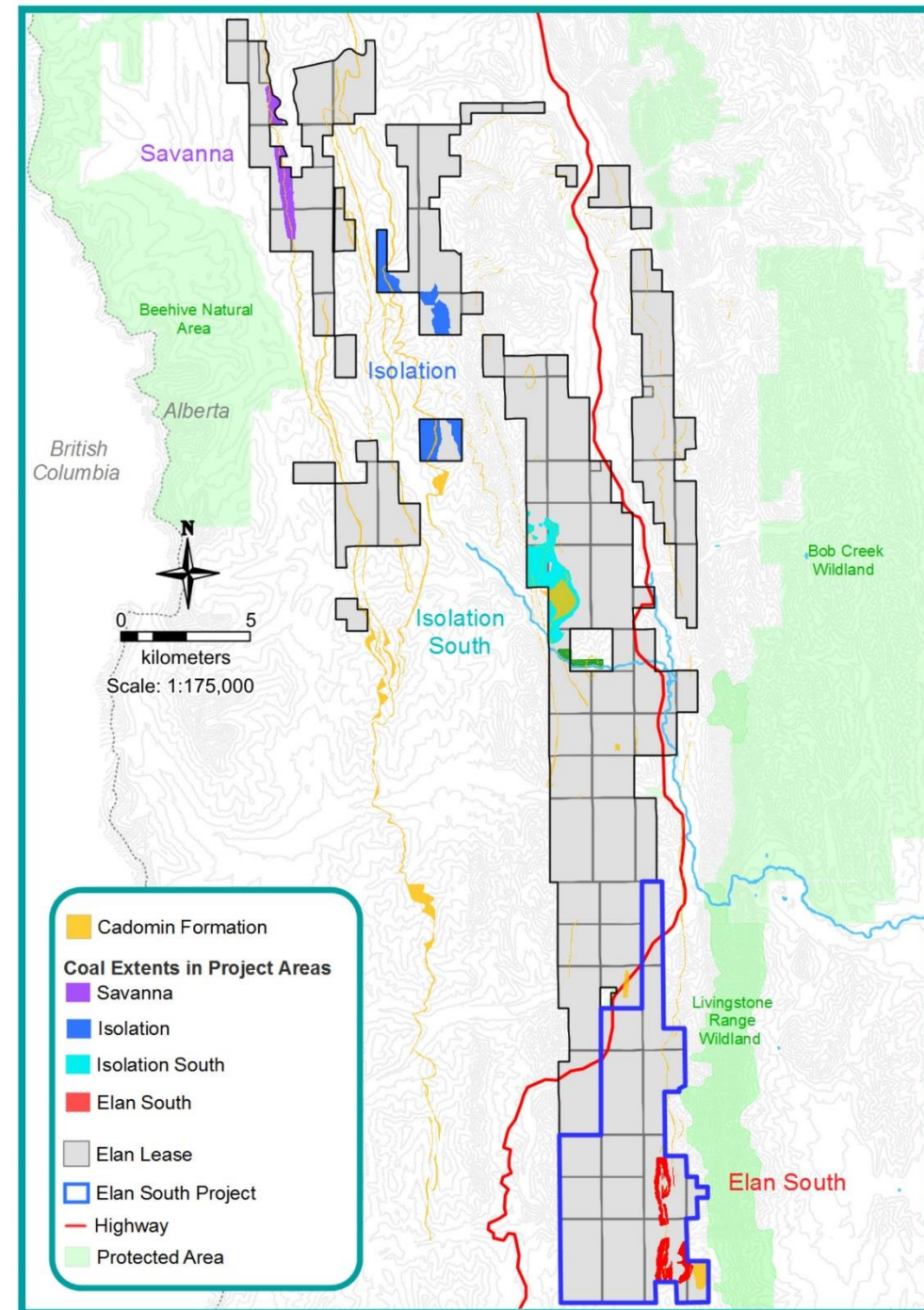
Indicated / Inferred Resources totalling 97Mt at Elan South and 201Mt at Elan North1 – with targeted substantial further growth

**Clear potential for multiple, large Tier 1 HCC developments**

Large undrilled or underdrilled areas

Combined Exploration Target Range for Elan of 210Mt to 900Mt<sup>1</sup>

The Exploration Target potential quantities and grades are conceptual in nature and there has been insufficient exploration to date to define a mineral resource. It is not certain that further exploration will result in the determination of a Mineral Resource under the "Australian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves, the JORC Code" (JORC 2012). The Exploration Target is not being reported as part of any Mineral Resource or Ore Reserve. Elan South ETR is 70 – 320Mt and Elan North ETR is 140 – 580Mt.

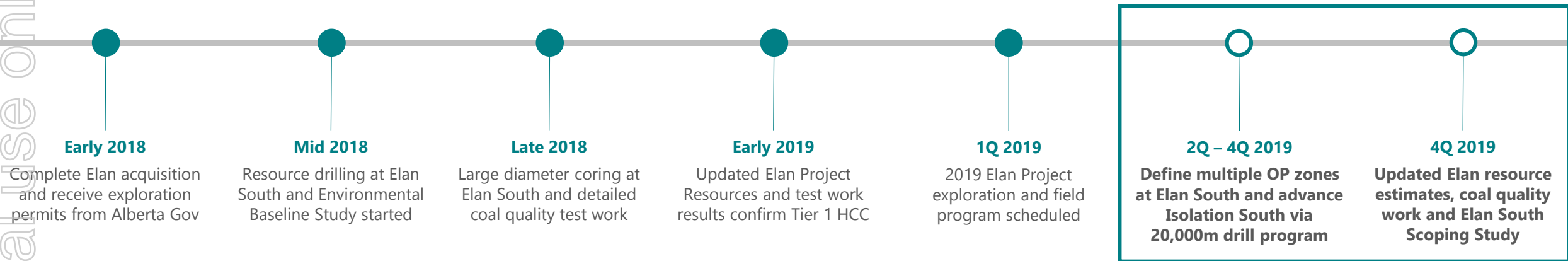






# Accelerated 2019 field program

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## Dual area strategy to rapidly advance multiple, large Tier 1 HCC developments across the Elan Project

### Elan South

- Increase scale of current 97Mt resource base
- Upgrade JORC classification
- Extensive coal quality testing for HCC product development
- Full-scope environmental analysis for EIA preparation
- Scoping Study completion in 4Q 2019

### Isolation South

- Increase scale of current 120Mt resource base
- Upgrade JORC classification
- Detailed coal quality testwork
- Preliminary development analysis





## Elan is a rare opportunity

- + Shallow seams
- + Large-scale deposition with multi-mine development scale potential
- + Tier 1 quality HCC
- + First-class mining jurisdiction (and a new conservative government in Alberta)
- + Proximate to critical export rail infrastructure with surplus capacity

**= A globally scarce asset (holding substantial value)**





## Appendix: Further Details





# Preliminary/partial individual clean coal results for Elan South<sup>1</sup>

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Hole ID	Composite ID	Lab Yield %	Moist (IM) %	Ash %	Vol %	F.C. %	TS%	FSI
ESLD18-01A	COMP-01	82.1	0.5	7.6	23.4	68.6	0.65	5.0
ESLD18-01A	COMP-02	93.4	0.6	5.9	23.8	69.8	0.63	5.5
ESLD18-01A	COMP-03	92.7	0.5	5.4	24.9	69.1	0.70	7.0
ESLD18-01B	COMP-04	54.2	0.6	9.4	24.5	65.5	0.70	5.5
ESLD18-01B	COMP-05	96.4	0.6	5.0	26.3	68.2	0.73	7.5
ESLD18-01B	COMP-06	85.4	0.6	6.2	25.1	68.1	0.71	7.0
ESLD18-02A	COMP-08	80.3	0.6	6.4	25.9	67.1	0.68	8.5
ESLD18-02A	COMP-09	88.0	0.7	5.1	26.6	67.6	0.65	8.0

Notes: Clean coal was washed at CF1.45



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