

Arq

**NCC Spring Annual Meeting
April 11/12 2019
Washington DC**

Introduction

- **Bill West**
President & Director Arq
rw.west@arq.com



Our management team



Julian A McIntyre

Chief Executive Officer & Director

- Founder and lead investor
- Successful entrepreneur and investor in the infrastructure and resources sectors
- Founder of Gateway Communications – sold to Vodafone for \$700m



Richard Campbell-Breeden

Chairman & Director

- 27 years senior executive experience at Goldman Sachs
- Former Vice Chairman of GS Investment Banking Division, Asia Ex-Japan (AEJ) & Chairman of M&A, AEJ
- Current board member of Julius Baer



Mike Treanor

MD, International Operations

- 30 years senior executive/board experience at Shell and Siemens
- Former CEO of Shell LPG, Shell Capital; Head of Global Downstream M&A
- Former CEO of the Shell Coal business



Paul Groves

Chief Operating Officer

- Over 30 years experience in Business Development for Shell, BG, Petrofac
- Managed the commercial development of Shell's \$20bn Pearl Gas to Liquids plant in Qatar
- Various degrees from the University of Oxford (previously held an academic post)



Bill West

President & Director

- 30 years senior executive experience at US coal companies
- Partner and Chairman of Millstone, an advisory and asset management firm
- Former CEO of Appalachian Energy Holdings



CK Lane

Head of Operations, US

- Over 34 years experience in the mining industry
- Former COO of James River Coal Company, managing 2,400 employees
- Distinguished alumni, Virginia Tech University
- Licensed Professional Engineer and former West Virginia Mine Foreman; former Chairman of Kentucky Coal Association



John Unsworth

Chief Scientist

- Over 40 years' experience with Shell and British Coal
- Technical Manager for Shell Global Fuels Marketing and Fuels Strategy and Alternative Fuels in Shell
- Ph.D. in Chlorophyll Chemistry
- Fellow of the Royal Society of Chemistry, London and Fellow of the Energy Institute, London



Venkat Siva

Chief Finance Officer

- Managed the investment portfolio at McIntyre Partners since 2009
- Previous corporate finance banker within Goldman Sachs' UK M&A team

Non-Executive Directors and observers



Mike Muller

Non-Executive Director

- Former Head of Global Crude Oil Trading and Supply at Shell
- Joined Vitol in July 2018



Sir Mick Davis

Non-Executive Director

- Former chief executive of Xstrata plc
- Current Chief Executive of the Conservative Party
- Experienced financier and fund raiser



Bernie Bulkin

Non-Executive Director

- Former Chief Scientist at BP
- Other BP directorships including VP Environmental Affairs and Chief Technology Officer, BP Oil
- Chaired two UK public companies
- Various senior academic and government posts in the UK and the US



Jeremy Blank

Non-Executive Director

- Partner at York Capital Management
- Previous VP in Morgan Stanley's fixed income and M&A departments



Steve Jacobs

Non-Executive Director

- 30 years senior executive / board experience
- Extensive experience across multiple industries and practice areas



Sim Mann

Non-Executive Director

- Partner and Chief Strategy Officer of Exigent Capital
- Invested over \$1 billion in distressed debt on behalf of York Capital Management
- Various other non-executive roles



Charles Meintjes

Board Observer

- Chief Commercial Officer for Peabody Energy
- executive responsibility ranges from Sales and Marketing to Emissions Technology



Brian Belke

Board Observer

- Partner at Valinor Management
- Previously Equity Research Associate at Fidelity Investments
- Currently serves as a non-executive director of NextDecade Corporation

A break-through technology with a vast market opportunity

Arq has developed and patented a technology for extracting pure micro-fine hydrocarbons from coal and coal discard – Arq Fuel™

LOW COST – <\$11/bbl when blended with fuel or crude oils

TRADEABLE – a commercially viable product that requires no change to supply infrastructure or end-user equipment

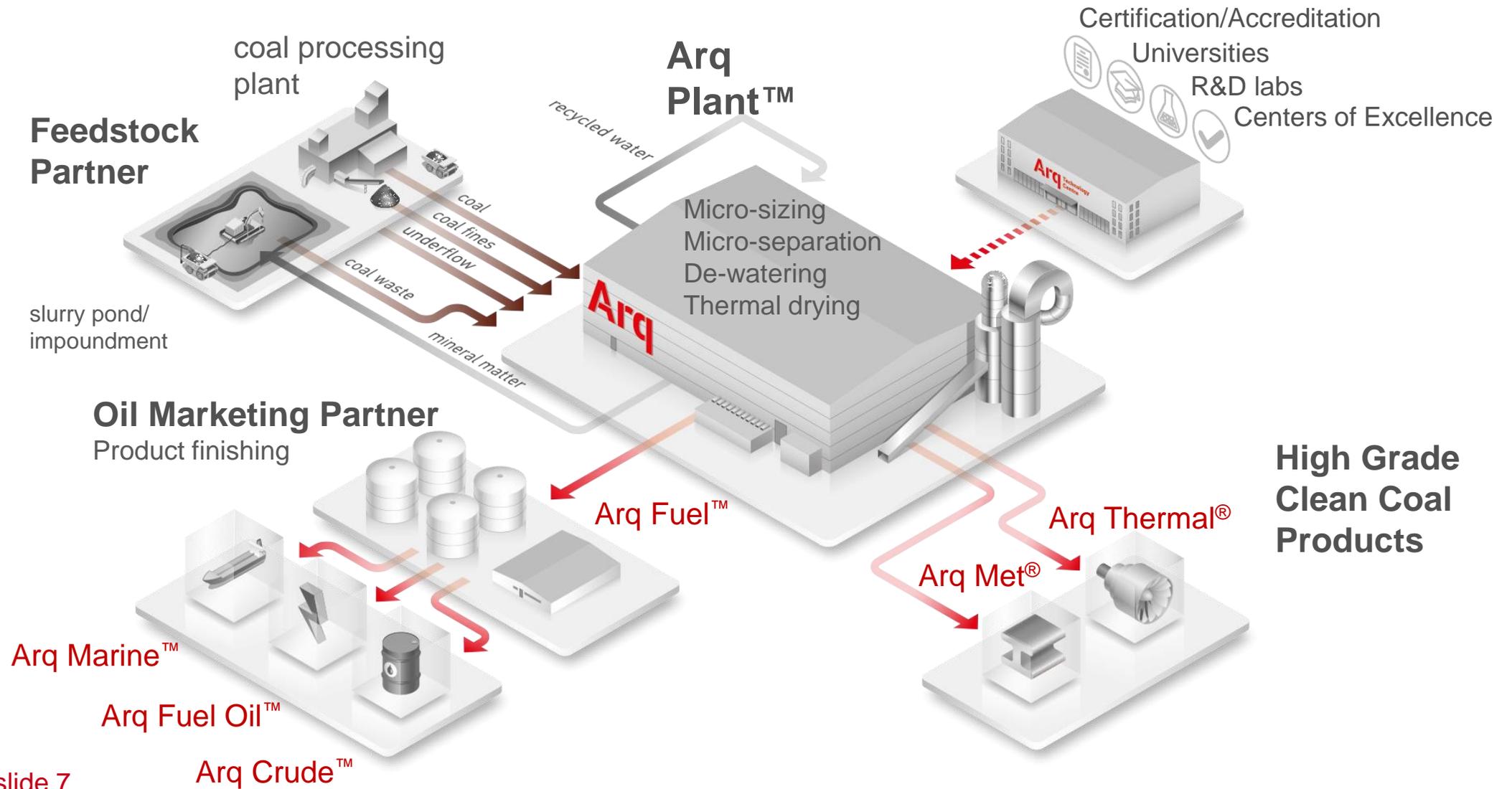
IMMEDIATE – first wet-cake product expected by mid 2019

SCALABLE – plans to establish 60 plants within 10 years, producing an equivalent of >1 million barrels per day

CREDIBLE – established marketing and supply partners (Peabody, Vitol)

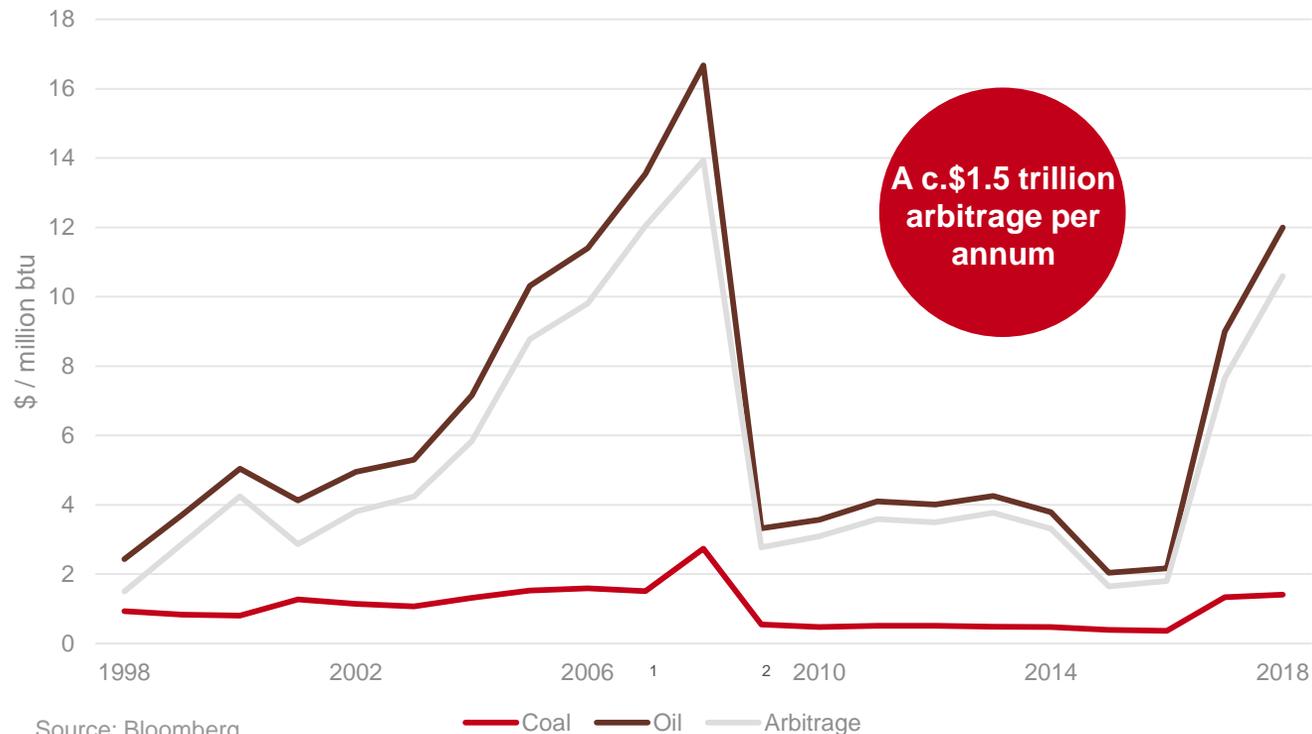
PROFITABLE – the end product value significantly out weights the operational cost

Arq Technology - partners to the energy and mining industries



The greatest financial opportunity in today's energy market

The price of energy - Oil vs Coal (\$/million BTU)



Source: Bloomberg

— Coal — Oil — Arbitrage

- Energy derived from oil has been **valued at 3-9x** that of coal
- Previous industry attempts to purify coal **expensive and environmentally damaging**
- Arq's technology uses an **ultra-low cost** mechanical process

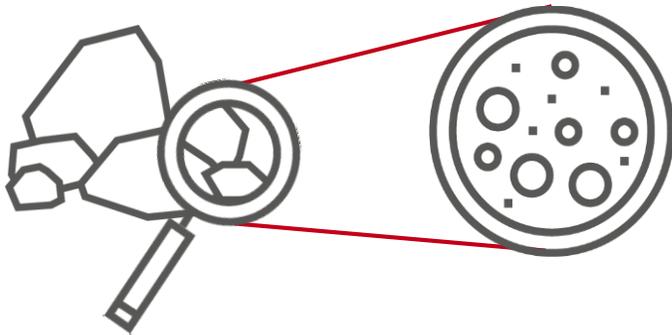
50 billion tonnes of coal refuse across the globe - equivalent to almost 120 billion barrels of oil

Over 1 billion tonnes of coal refuse is created each year - equivalent to throwing away c.7 million boepd

The challenge...

How can we extract the hydrocarbons from coal in a cost effective way?

Coal is an agglomeration of different materials

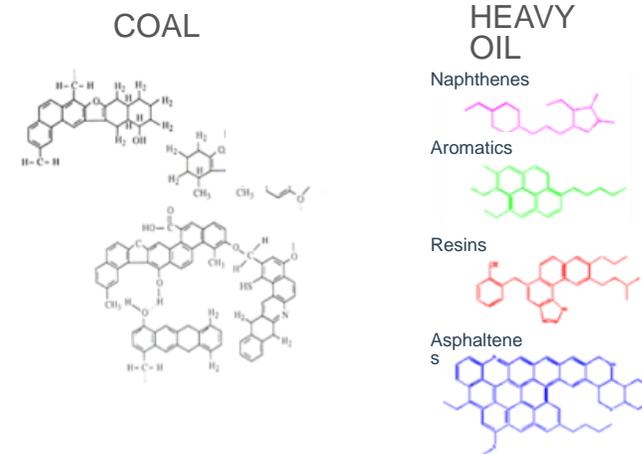


DIRT (MINERAL MATTER)

HYDROCARBON

MOISTURE

... however, the hydrocarbon chains are similar in coal and heavy oil



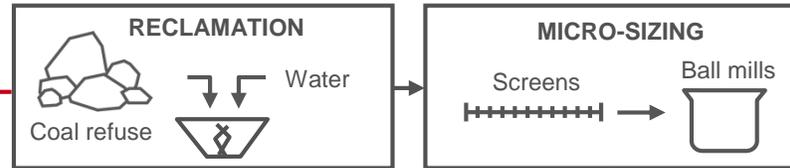
Arq

Turning coal waste
into valuable fuel

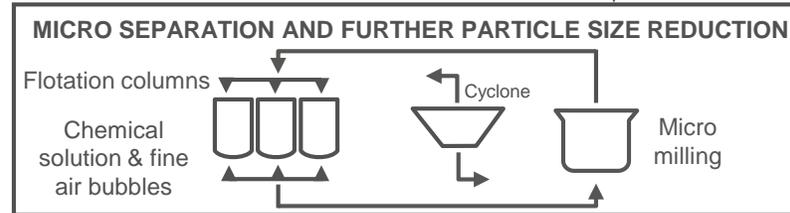
Modular design of Arq Plant™



1 RECLAMATION



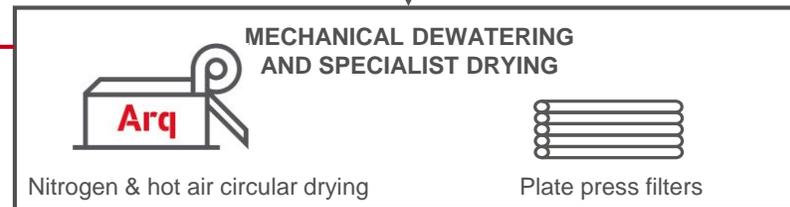
2 MICRO-SIZING



3 MICRO SEPARATION



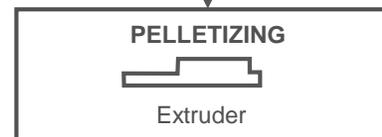
4 DE-WATERING



5a BLENDING



Arq Fuel Oil, Arq Marine and Arq Crude



Arq Met and Arq Thermal coal replacement products

5b PELLETIZING



Arq Fuel™ - a large and valuable market

Arq's Technology™ produces an almost pure micro-fine powder (Arq Fuel) that can be blended into oil products



Why Arq Fuel™ works

- Disperses uniformly in multiple oil products
- Requires no changes in supply infrastructure or end-user equipment
- Is 99% pure hydrocarbon
- Identical combustion characteristics as RFO

Arq Fuel™ specifications

- <1% Sulphur content
- <10µm particle diameter
- <1% Ash content
- <2% moisture content

Valuable to blenders, refiners and end-users

- A low Sulphur alternative
- Consistent combustion performance
- Can be produced at scale and at low cost

Crude Oil (>4 billion tpa market)

- when blended with crude oil, 30%-60% of Arq Fuel converts to distillates during atmospheric and vacuum distillation
- Further processing can create **valuable additional product** – a major breakthrough

Residual Fuel Oil

(>400 million tpa market)

- RFO market divided between the boiler and marine markets
- Arq Fuel™:
 - provides the same combustion performance as RFO at a **significantly reduced cost**
 - Arq Fuel meets the **major product specifications** as a blending component

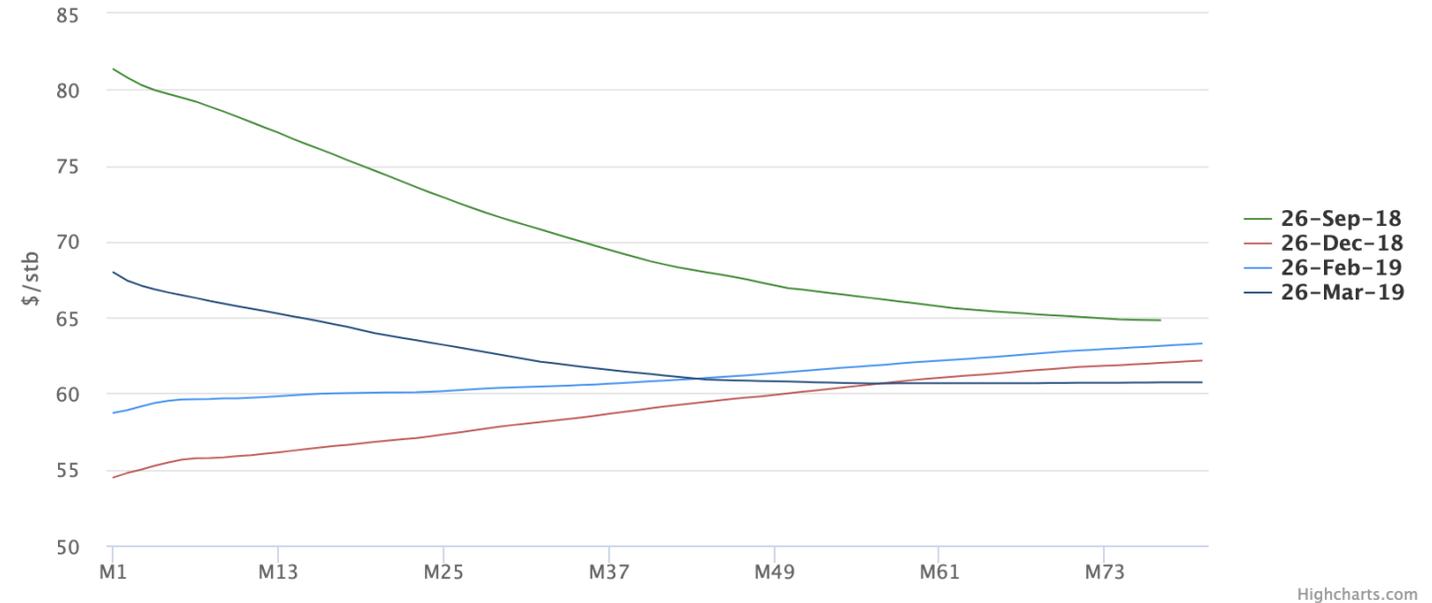
A supportive underlying market

Despite recent price volatility, the fundamentals of Arq's markets are strong

- Relative scarcity of heavier oil products (Arq Fuel) has **increased its value**
- Long term business plan modelled on **\$60/bbl Brent flat** (aligned to 5yr forward price)
- Arq Fuel can be priced at a **30% discount** from the low sulphur RFO price (Vitol)
- **Corbin**: business plan assumes **initial pricing of \$240/tonne**, based on a LSFO price of \$343/tonne

Brent Futures Curve

Source: Intercontinental Exchange, ERCE Estimates



Arq Fuel is valued at c.\$340/tonne at current spot LSFO prices (\$480/tonne) applying an initial 30% discount

Pelletized coal products - Arq Met® and Arq Thermal® testwork

Used in specific industrial processes



Thermal	Typical Coal	Arq
Total Moisture	10%	<2%
Mineral Matter	12-30%	<5%
Volatile Matter	10-40%	Targeted
Sulphur	0.5-5%	<0.8%
Heating Value	8,400 - 12,500	>14,000

Product benefits

Increased:

- combustion efficiency
- energy density
- boiler efficiency

Reduced:

- slagging and fouling
- corrosion and erosion
- ash disposal
- ash carbon content
- consumption costs
- mill downtime

Arq.com – slide 14

Arq Met			Arq Thermal		
Source Material	Feedstock	Upgraded	Source Material	Feedstock	Upgraded
Total Moisture %	20.0%	1.7%	Total Moisture %	35.3%	2.0%
Mineral Matter dry (%)	23.5%	4.5%	Mineral Matter dry (%)	56.6%	5.0%
Calorific value GAR (btu/lb)	9,225	14,800	Calorific value GAR (btu/lb)	5,765	14,200
Sulphur dry (%)	1.0	0.7	Sulphur dry (%)	0.7	0.9
FSI	1	8	FSI	0	5

10% - 25% increase in energy density with lower delivery transportation costs and reduced associated CO₂ production

NCC opportunities and benefits

Arq's technology provides various material benefits

- **Economic:**
 - Valuable new markets and cash flow from converting coal into oil products
 - Recovering high quality, low cost hydrocarbons from underflow
 - Additional production with no capital expenditures
- **Environmental:**
 - Reduced tailings management expenses and legal and environmental liabilities
 - Existing waste used as feedstock reducing volumes into tailings impoundments with a profitable path to restoration
 - Lowers lifecycle Green House Gas (GHG) emissions
 - Reduced Sulphur levels when blended into oil products

Arq.com – slide 15

Key opportunity: Tailings Management

- Coal industry disposes of **ALL** washed coal <2mm in size
- Management incurs **extensive costs**
- Globally there are **over 50 billion tonnes** of coal refuse - equivalent to almost 120 billion barrels of oil
- **Over 1 billion tonnes** of additional refuse is created each year - equivalent to throwing away c.7 million boepd



A partnership approach

- Peabody as a feedstock partner offers a pathway to scale and a credible template for other deals.
- Both Peabody and Vitol have made an initial \$10 million equity investment in Arq as a show of confidence



- Vitol to exclusively distribute Arq Fuel™ globally
 - **blend Arq Fuel™** into fuel and crude oil
 - **sell Arq Fuel™** as a low-cost blending component
 - **engage with customers** for initial sales of Arq Fuel™
- Arq Fuel™ will be independently certified by Vitol



Arq helps Peabody:

- expand existing efforts in resource efficiency
- improve the economics of existing resources
- Identify mine sites where Arq technology can be used

Peabody offers Arq:

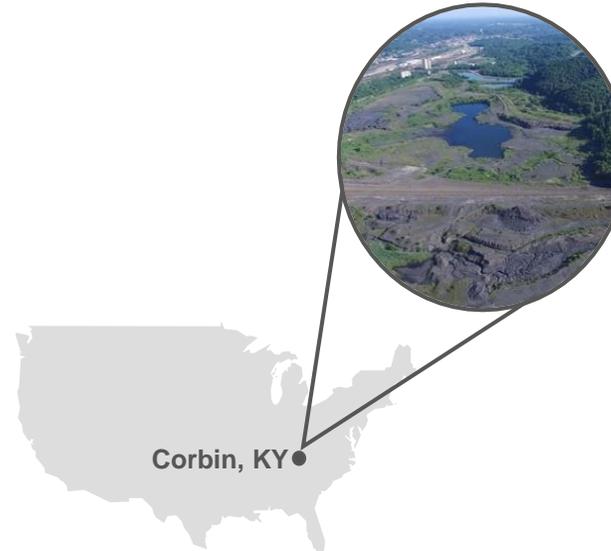
- scale
- high-quality assets
- diversity in geography and products
- a specific team to support site selection

Arq Plant – Corbin, Kentucky

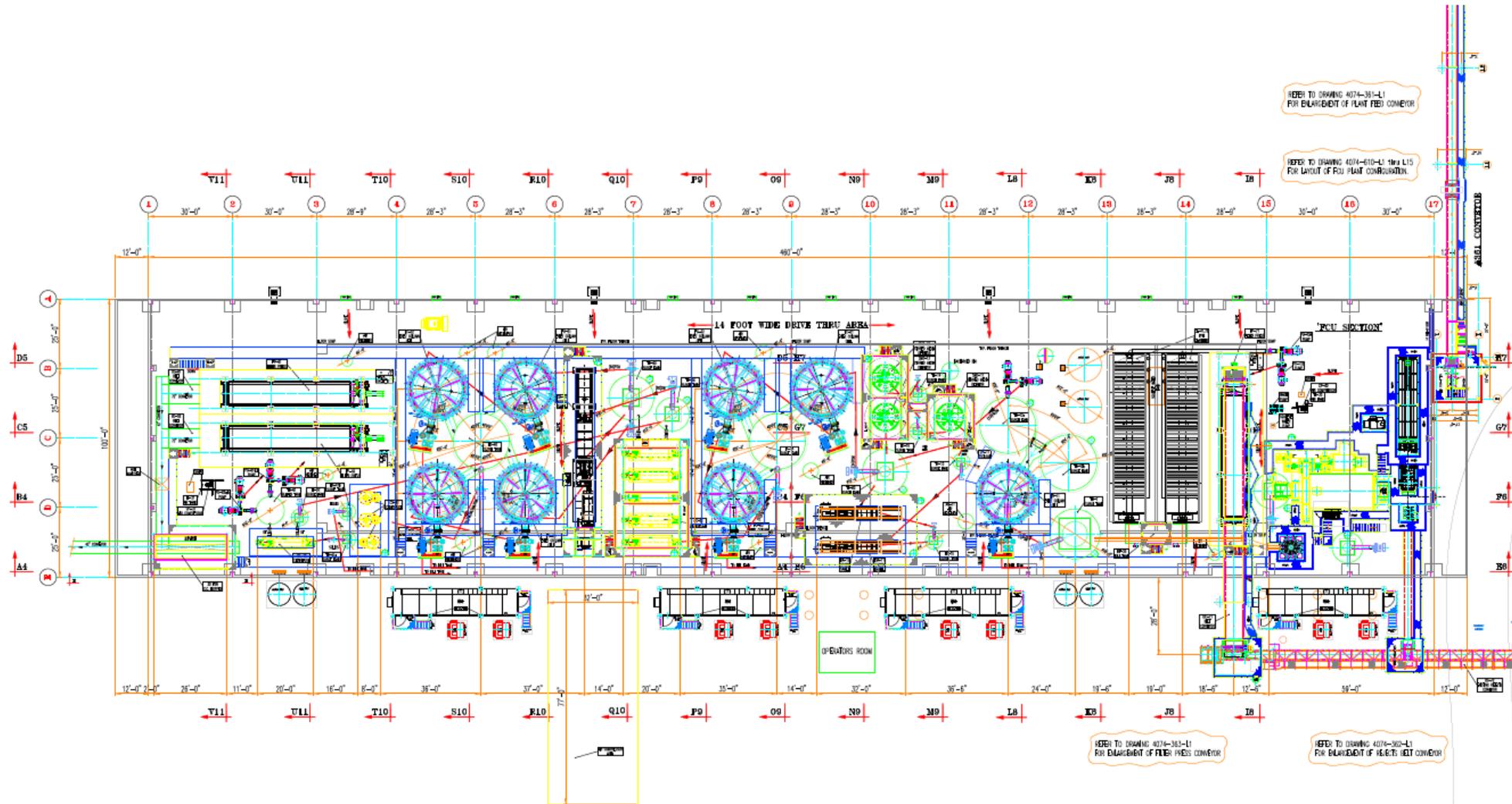
- First plant expected annual throughput of c.100,000 tonnes of Arq Fuel
- c.16.5 million tonnes of fines with c.40% hydrocarbon content
- First cake production is targeted for **Q2 2019**, with Arq Fuel production and blending scheduled for **Q4 2019**
- Product used to **satisfy initial customer testing** and **commercially demonstrating** the technology

Process and logistics

- Processing plant produces an **Arq Fuel filter cake** (c.50% moisture)
- Transported to the oil terminal at New Orleans where the filter cake is:
 - thermally dried to <2% moisture
 - blended with oil products



Corbin schedule – first production mid 2019



PLAN VIEW - ELEVATION 1089'-0" T/WALL

PRELIMINARY

Arq

Applications
and benefits

Corbin – waste left by US Steel coal prep plant



Renewed investment in Corbin



[Arq.com](https://www.arq.com)



**“Getting more from less
is the future of good energy”**

Arq.com