

Corporate

Current price **0.39p**

Sector **Alternative Energy**

Code **AEG.L**

AIM **AIM**

Share Performance



Source: Thomson Reuters, Allenby Capital

Share Data

Market Cap (£m) **5.0**

Shares in issue (m) **1,273.5**

52 weeks High **0.685p** Low **0.33p**

Financial year end **December**

Source: Company Data, Allenby Capital

Key Shareholders

Gravendonck Prvt Foundation **18.46%**

R G Spinks **4.50%**

R M Derrickson **3.12%**

InterTrader Ltd **3.05%**

Source: Company Data, Allenby Capital

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Active Energy Group plc (AEG.L)

Active Energy Group reaches an inflexion point

Active Energy Group (AEG) is a biomass-based renewable energy business. Its chief investment proposition lies in its proprietary CoalSwitch™ technology which produces 2nd generation, biomass pellets that can be manufactured in various formulas as a substitute fuel for coal or traditional white pellets in power stations. AEG is in the process of building a 5 tonne/hour reference plant to produce CoalSwitch™ and has already received interest from potential customers. It is also proposing to build a much larger plant to service commercial scale orders for CoalSwitch™ and its derivative fuels. We envisage the full-scale production of CoalSwitch™ commencing in Q1 2021 with initial deliveries in Q4 2020, supplementing revenue already being generated by its lumber operations. Under a new and highly experienced management team we now believe AEG has the potential to generate significant revenues and earnings over the course of the next several years.

- **CoalSwitch™ is a proprietary biomass technology** - CoalSwitch™ is superior to conventional white pellet biomass products on many levels. It has a higher calorific value, can be substituted as a direct drop-in replacement to coal or co-fired with coal and/or white pellets in power stations, has a higher bulk density and does not cause fouling to furnaces. Crucially, it is feedstock agnostic and can utilise a wide range of low-cost feedstocks such as waste wood, forestry, pulp-mill/saw-mill by-products to suit customer preferences. Many other types of feedstock such as contaminated or burnt wood can be also be substituted.
- **Revenues are now being generated from lumber activities** – AEG acquired 100% control of its joint venture lumber operation in North Carolina in March 2020. This subsidiary is generating revenues from the production and sale of rail ties and lumber for the US market and exports of saw logs to SE Asia. These revenues are ramping up and are expected to accelerate strongly during the latter half of 2020 and into 2021.
- **The CoalSwitch™ reference plant now close to construction** – Following the shipping of equipment from its original site in Utah to its new site in Lumberton, North Carolina the reference plant is now close to commencing construction. The Group has received draft air quality permitting and is now awaiting final sign-off which, although being delayed by Covid-19 issues, is expected to follow post the 26 June 2020 virtual public meeting.
- **No forecasts are currently being provided** – A significant element of the financial model depends upon when the CoalSwitch™ reference plant begins to generate revenue. However, to give a sense of potential, once commissioned, we believe the plant should be capable of generating revenue of around \$6m per annum and the lumber activities, at least \$4m in a full year. Further out AEG has the potential to generate many millions of dollars. We believe that the Group, now being driven by a new management team, will ultimately reward the patience of investors.

Year End: December	2017	2018	2019
(US\$ m)			
REVENUE	-	0.195	1.896
UNDERLYING EBITDA	(2.415)	(1.848)	(0.298)
UNDERLYING LOSS BEFORE TAX	(5.771)	(2.299)	(2.976)
NET (DEBT)	(13.082)	(12.702)	(17.902)

Source: Active Energy Group plc

Please refer to the last page of this communication for all required disclosures and risk warnings.

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Investment summary

- **Strong IP and technology platform** - Active Energy Group (AEG) holds the global intellectual property rights for the manufacture of CoalSwitch™, a proprietary drop-in fuel pellet that can be used in replacement of, or in conjunction with, coal and white pellets in coal-fired power plants. Continuing research and development of the technology is expected to lead to new innovative 2nd generation biomass fuels and further additions to the IP portfolio.
- **CoalSwitch™ reference plant to be built in H2** - AEG already produces small volumes of CoalSwitch™ for customer testing and is in the process of constructing a 5 tonne per hour reference plant in Lumberton, North Carolina to provide greater volumes of CoalSwitch™, again for customer testing. It is already planning a full-scale plant of up to 50 tonne per hour capable of producing up to 400,000 tonnes of CoalSwitch™ per annum.
- **Technology license awarded** - AEG has successfully licensed its technology to a third party and has received a licence fee of \$1.8m. Furthermore, it will receive royalty payments of \$5 per tonne on all licensed product produced under the 20-year agreement. We expect revenues from licences and royalties to be an increasing element of AEG's income in future years.
- **Lumber activities already generating revenue** - AEG currently generates revenues from its lumber operations in Lumberton and these have the capacity to grow significantly over the next year or two. In the medium term we expect that an increasing proportion of revenues will be generated through the sale of CoalSwitch™ product and its derivatives.
- **Disappointing progress under previous management** - While investors may have concerns regarding the lack of progress achieved by AEG under previous management, we are convinced that the new management team headed by Michael Rowan is providing renewed impetus, focus, strategic direction and most importantly, commercial credibility.
- **Board recently strengthened by highly experienced NEDs** – The new management team has been recently strengthened by the appointment of Max Aitken and Jason Zimmerman both highly experienced entrepreneurs in respectively, biomass fuelled plants and timberland assets.
- **Efficacy of CoalSwitch™ independently verified** – The efficacy of the CoalSwitch™ product and technology has been independently verified through initial testing at the University of Utah with several utilities showing significant interest in the technology.
- **Not yet in a position to offer financial projections** - We are not able to offer formal forecasts for the Group at this stage as much depends on the financial modelling of the reference plant. At this stage, the variables are difficult to quantify with the outcome dependent upon when construction can commence, when the plant is commissioned and when sales of CoalSwitch™ begin.
- **Broad based illustrations rather than forecasts** – While we are not providing forecasts, we do offer illustrations which make broad assumptions on CoalSwitch™ and the lumber activities. We believe the reference plant for CoalSwitch™ should be capable of generating around \$6m pa of revenue while the latter has the potential to contribute initial revenues of around \$4m pa. It is possible that both numbers could be achieved in FY2021, but it is too early to convert these projections into firm forecasts. We believe that AEG has the potential to generate revenues of many millions of dollars in the longer term.

Activities

The Active Energy Group (AEG) corporate structure consists of three silos which combine to offer a complete Forest to Energy supply chain providing the assets necessary to develop AEG into a leading renewable energy company specialising in second generation biomass products and the ability to license its proprietary technology to third parties.



Source: AEG

These three silos are as follows:

Lumberton Operations

These are based at the Group’s commercial hub in Lumberton, North Carolina and encompass Active Energy Renewable Power, an operating entity which is responsible for the transactional businesses of CoalSwitch™ and the lumber activities at the Lumberton site and Lumberton Energy Holdings which owns the freehold of the site.

Pellet & IP Technologies – Active Energy Group plc is the legal entity holding the global IP to the CoalSwitch™ technology and the right to award licences. Advanced Biomass Solutions (ABS), a wholly owned subsidiary of AEG, owns the assets at the Lumberton site.

Forestry & Timberlands Operations – AEG, through Timberlands International and AE Ukraine hold timber rights in Newfoundland & Labrador and Ukraine respectively and management is looking at ways of developing business opportunities from these valuable timberland assets.

We discuss the principal trading subsidiaries contained in these silos in detail in the following pages but first it will be of benefit to readers to provide some background to AEG and the evolution and development of its current operations.

Background

Global IP acquired in 2015

AEG acquired the global IP for the CoalSwitch™ technology in late 2015 and has since been extending the capabilities of the technology and the IP, and this process continues.

Initial reference plant built in Utah in 2018 before being dismantled and moved to Lumberton in mid-2019

The Group initially built a 5 tonne per hour test facility near Salt Lake City in Utah in 2018 which provided the proof of concept of the CoalSwitch™ technology with the product being eventually independently tested and verified by the University of Utah. Despite its initial success, logistically Utah was not an ideal state to build a full-scale plant due to the lack of feedstock and the distances required for transport to shipping terminals. Consequently, the plant was dismantled and moved to a more suitable location in mid-2019.

JV with GRP formed to install CoalSwitch™ at Lumberton

In late 2018, AEG entered into an agreement with Georgia Renewable Power LLC (GRP) (a US company that maintained three biomass-to-energy power plants in North Carolina and Georgia) to form a joint venture to install CoalSwitch™ facilities at GRP's operations in Lumberton, North Carolina.

New 151 acre site acquired in Lumberton to act as the base for all AEG's US activities

A few months later, propitiously and with the help of GRP, AEG acquired its own site in Lumberton for \$3.3m, consisting of around 415,000 sq ft of covered factory space and circa 151 acres of surrounding land and was connected to GRP's power plant by an existing steam distribution pipeline. This site, which now acts as the new base for all of AEG's CoalSwitch™ and lumber activities in the US, also included ancillary facilities, such as water treatment, an analysis lab, offices and IT hardware which greatly reduced the amount of capital expenditure which otherwise would have been required.

Full scale CoalSwitch™ production expected by Q1 2021

As noted above, in the summer of 2019 the Utah plant was moved to the Lumberton site and AEG is planning to reassemble the reference plant and to commence full-scale production by Q1 2021 at the latest. The significant size of the Lumberton Site ensures substantial scope for the expansion of the initial CoalSwitch™ plant through the addition of extra CoalSwitch™ production facilities.

Existing tenants on the Lumberton site including RLS

The Lumberton Site also came with existing tenants, and two lease agreements were subsequently signed with Tencata Protective Fabrics and Renewable Logistic Systems (RLS), the latter being a supplier of saw-logs, pulpwood and wood chips to international and domestic markets.

RES JV formed in mid-2019 with AEG securing 100% ownership in March 2020

In June 2019, AEG signed a 5-year deal for the supply of up to 800,000 tonnes per annum of feedstock for the Lumberton site and in July formed a joint venture with RLS, named Renewable Energy Systems LLC (RES) enabling AEG to enter the saw logging export market at Lumberton and thus provide further revenue opportunities for the Company. In March 2020, AEG secured 100% ownership of RES, the business to be operated through AERP.

A new service agreement for logistics services at Lumberton has been entered into between RLS and AERP for the remainder of 2020 with a revised agreement to be reached thereafter to ensure that RLS continues to handle the logistics at Lumberton for all lumber and forthcoming CoalSwitch™ activities. Roger Richardson Jr, a director and shareholder of RLS was appointed as Chief Operating Officer of AERP.

Final permit to be issued following conclusion of public comment period on 26 June

Currently AEG is waiting for the final permit to be issued by the Air Quality division of the North Carolina Department of Environment and Natural Resources (NCEM). This permit should be issued imminently following the conclusion of the public comment period which ends on 26 June 2020. Following the issue of the Permit, construction of the 5 tonne per hour reference plant will commence, assuming no restriction from Covid-19 issues.

CoalSwitch™

Development of a drop-in 2nd generation pelletised biomass fuel...

...the technology of which continues to be developed resulting in new novel fuels and the potential for additional IP

What is CoalSwitch™ and where does it sit in the market?

CoalSwitch™ is a drop-in 2nd generation pelletised biomass fuel that can directly replace coal or traditional white wood pellets. It can also be co-fired at high percentages with coal in industrial power plants or replace white pellet and biomass in biomass-fired power plants without requiring any furnace, logistics, handling, or storage modifications.

As well as CoalSwitch™, the development of alternative biomass fuels is ongoing utilising various feedstocks resulting in new novel fuels with specific properties. These developments are being conducted both within the Company's ongoing internal product research and development runway and also in direct response to customer requests. This could lead to additions to the Group's already extensive IP portfolio.

CoalSwitch™ PELLETS



Existing fossil fuels supplies are finite and cannot be recycled...

Most current fuels are distilled from crude oil or obtained from natural gas pumped from limited underground reserves or mined from coal. However, coal reserves are a finite and non-renewable resource, after they are burnt it is impossible for them to be recycled back into a useful energy source.

...while producing pollutants and contributing to acid rain

In addition, burning coal produces pollutants. Coal has inorganic impurities associated with its formation underground over millions of years. The inorganic impurities are not combustible, appear in the ash after combustion and contribute to air pollution as the fly ash particulate material is ejected into the atmosphere following combustion. Coal also contains impurities such as sulphur and trace elements (including mercury, germanium, arsenic, and uranium). Burning coal oxidises these compounds releasing oxides of sulphur which are notorious contributors to acid rain.

Governments and industry continuously seeking, environmentally friendly alternatives to replace fossil fuels

Nevertheless, there are still around 12,753 coal-fuelled power stations worldwide producing 37 billion tonnes of CO₂ emissions each year¹. Therefore, governments and industry are continuously seeking more effective, environmentally safe, carbon neutral fuels to replace fossil fuels and biomass has been an obvious alternative.

¹ FutureMetrics

Most common alternative to date is white wood biomass pellets

To date the most common biomass replacement for existing coal-fired plants has been the ubiquitous white wood pellet. Some utilities, like DRAX in the UK, have invested billions of dollars to retrofit their coal fired power plants to accommodate white pellets, however, the cost of retrofitting coal plants has been substantial, approaching \$1,000 per kilowatt.

But costs are high and performance lower

The cost of white pellets is also quite high, given that they must be produced from the highest quality wood to meet the very strict fuel specifications imposed by the utilities. There are also further drawbacks in using these products as compared to coal, in essence:

- These pellets are typically expensive to transport long distances because of much lower bulk density
- They typically have a substantially lower calorific value than coal
- They contain salts and minerals that can damage power plant furnaces
- Coal plant fuel handling systems and furnaces can require major, costly retrofits to accommodate white-pellet fuels
- They can require special storage facilities to protect them from the elements and high humidity
- The feedstocks for biomass-derived fuels are expensive.

Nevertheless, millions of tonnes of white wood pellets are shipped annually

Despite these obvious drawbacks, and as noted earlier, some utilities such as Drax have made huge financial commitments to switching to biomass-derived fuels. Millions of tonnes of white wood pellets are shipped primarily from the east coast of the US annually to Drax. Similarly, other utilities world-wide have either made the switch to wood pellets (all or in part), or plan to do so over the next several years. We note that aside from several European countries, Japan and South Korea are becoming increasingly large users of biomass-derived fuels and it is believed that the US will also become an increasingly significant market over the next five years.

Switching from coal to biomass derived fuel can result in huge capital and maintenance costs

Coal plant owners can continue to invest in new controls equipment to satisfy increasingly stringent emissions requirements, but no practical technology exists that will allow coal plants to reduce their carbon footprints. Switching from coal to a typical biomass-derived fuel (all or in part) will allow the plant operator to reduce the plant's carbon footprint, but not without incurring huge capital costs and maintenance challenges.

But CoalSwitch™ is not a typical biomass-derived fuel and has many advantages over white wood pellets

Conversely, CoalSwitch™ is not a typical biomass-derived fuel. In fact, CoalSwitch™ is unlike any other biomass-derived fuel on the market. Initial tests showed that:

- It has a bulk density 46% higher than white wood pellets,
- It has an energy density higher than white wood pellets, and on a par with most coal, depending on the type of feedstock used.
- Because of CoalSwitch's™ substantially higher energy and bulk densities, shippers can transport on average 65% more GJ in the hold of a ship than the highest quality white wood pellets
- CoalSwitch™ removes essentially all soluble minerals from the feedstock and will not cause fouling or slagging in a utility furnace
- The transition from Coal to CoalSwitch™ is entirely seamless. No plant retrofits are required to burn CoalSwitch™

- CoalSwitch™ is hydrophobic. It does not require any special storage facilities. A CoalSwitch™ pellet will not absorb more than 3.5% moisture. In a humid environment, a white wood pellet will absorb moisture until it disintegrates.
- CoalSwitch™ is an essentially sulphur-free, carbon neutral alternative that can be either blended with coal at the conveyor or supplant coal entirely.

In summary, CoalSwitch™ is the first true drop-in replacement for coal and offers much better thermal properties either equal to or better than coal, as can be seen in the table below.

Competitor Biomass Analysis				
	Coal	White pellets		CoalSwitch™
		Conventional	Torried	
BTU	11,200	7,308	10,300	10,200
Calorific value MJ/Kg	23.6	17	24	23
EMC %	9.5	25	13	3
ASH %	8.5	3	> 5	< 1
Bulk density Kg/m3	> 800	500	< 400	> 900

Source: AEG

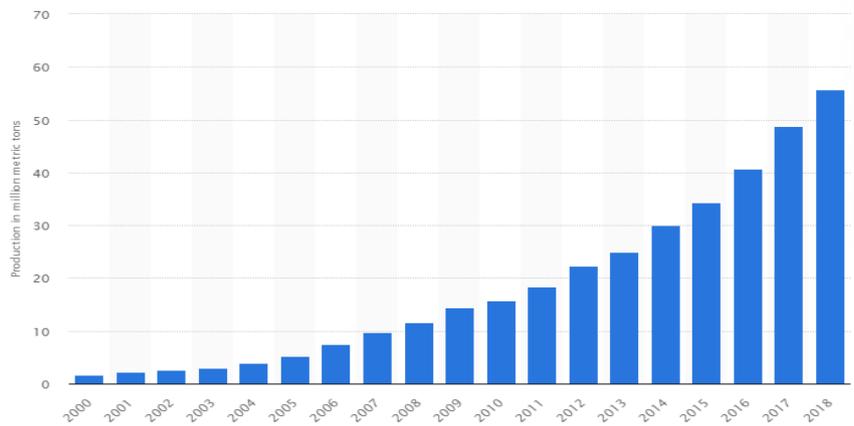
CoalSwitch™ poses many of the attributes of coal, but not its pollutants

Uniquely, CoalSwitch™ pellets possess comparable energy (BTU) levels to coal, almost identical bulk density and handling/storage/friability characteristics which, combined with greatly-reduced low and mid volatiles post-production, makes it safer to handle than traditional biomass pellets. Traditional pellets can emit large quantities of poisonous carbon monoxide during storage and can give off fine dust when handled which can cause serious dust explosions.

White pellets still seen as being preferable to burning fossil fuels and demand continues to grow

Conventional wood pellets are nevertheless seen as environmentally preferable to burning fossil fuels and it is estimated that the world market for wood pellets is growing strongly. Independent research estimates that the global wood pellet market share is set to cross US\$19bn by 2025² while another report suggests a market size of US\$15.5bn by 2025 with CAGR of 9.2%³. It is estimated that power plants accounted for 34.1% of the market in 2017.

GLOBAL WOOD PELLET PRODUCTION 2000-2018



Source: Statista

² Global Market Insights

³ Grand View Research

CoalSwitch™ process is able to convert low-value feedstock into high-value renewable biomass fuel...

...at low or no cost

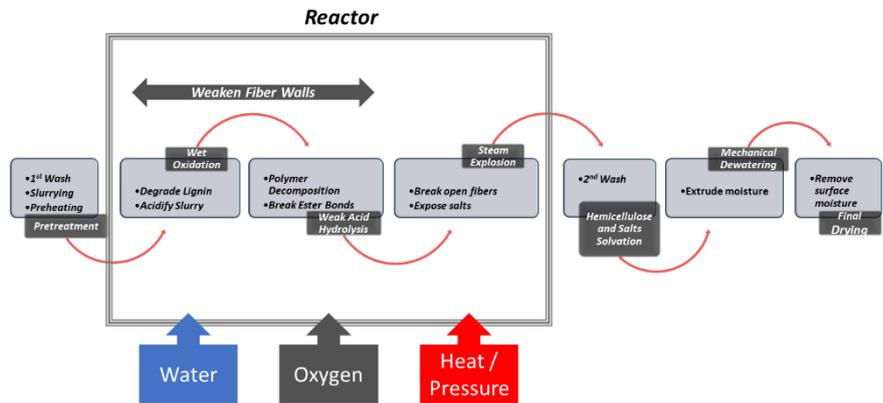
CoalSwitch™ production schematic

The CoalSwitch™ manufacturing process

Not only is CoalSwitch™ preferable to white wood pellets with thermal properties very similar to coal, the CoalSwitch™ manufacturing process is able to convert low-value forestry and agricultural waste stream feedstocks into high-value products. Such products would include pulp mill / saw mill by-products such as bark, sawdust and thinnings and forestry residues such as branches, treetops, small diameter trees, and wood which is over-age, under-quality, blow-down, beetle-killed, forest-fire damaged and industrial waste. Agricultural residues such as oil palm trunks, empty fruit bunches, palm fronds and sugarcane bagasse are also viable feedstocks.

Each of these can be readily acquired for very low cost (frequently just the logistic costs associated with their aggregation and transport). In many instances, these feedstocks are unusable by other biomass applications (especially those that are intended to produce a solid fuel) because of high levels of mineral contamination.

The diagram below, summarises the process employed by AEG to produce CoalSwitch™. The essential difference between the AEG process and other biomass beneficiation processes intended to produce a solid fuel is the thorough removal of soluble mineral contaminants through pre- and post-washing with water. Up to 50% of the soluble mineral contaminants in the feedstock can be removed with a vigorous pre-wash given that much of the mineral contamination resides on or close to the surface of the material.



Initial independent tests by University of Utah confirmed the attributes of CoalSwitch™

Independent testing confirms CoalSwitch™ efficacy

Because the process very effectively reduces the concentration of light volatiles, the resulting pellets can be pulverized in existing coal mills without the increased risk of a mill fire. This was confirmed in an independent test performed by the University of Utah under the sponsorship and supervision of Rocky Mountain Power, a wholly owned subsidiary of PacifiCorp, a large U.S. electric utility. This distinguishing attribute of the CoalSwitch™ product was immediately recognized by other large electric utilities as an essential credential for the consideration of CoalSwitch™ as a drop-in coal replacement.

The initial tests referred to above, conducted at the University of Utah’s Industrial Combustion and Gasification Research Facility confirmed these statements:

- CoalSwitch™ burned at near-identical temperatures to coal
- CoalSwitch™ burned more efficiently than coal and produced far less ash
- CoalSwitch™ burned cleaner than coal and when co-fired with coal generated less Sulphur Dioxide than the coal alone

- CoalSwitch™ was essentially free of both Potassium and Sodium, so combustion did not cause fouling (deposits)
- The CoalSwitch™/coal blend had a lower Loss-on-Ignition than the pure coal, leaving far less unburned carbon in the ash
- An analysis of the chemical and physical properties of CoalSwitch™ revealed values in line with ENplus, DIN or PFI certification standards on pellets

CoalSwitch™ reference plant moved from Utah to Lumberton in 2019

Production of CoalSwitch™ moves to Lumberton, NC

However, while the tests carried out by the University in 2018 were a success, it was clear that Utah, while being home to the founders of the technology was not an ideal base for CoalSwitch™ as it was situated in an urban environment close to Salt Lake City with very poor logistics for the supply of feedstock into the plant and the shipping of CoalSwitch™ product.

JV formed at Lumberton to advance the commercial development of CoalSwitch™...

As noted earlier, discussions with GRP in Lumberton, North Carolina resulted in the formation of a JV to advance the commercial development of CoalSwitch™ fuel into operational power plants and was followed by the purchase of substantial land adjacent to GRP’s facilities.

...which now forms the base for all of AEG’s US operations

This site at Lumberton now forms the base for all of AEG’s activities in the US, including the re-assembly of the 5 tonne per hour reference CoalSwitch™ plant. Construction, of this plant is expected to take around three to four months to complete.

Small volumes of CoalSwitch™ for testing are already being produced at Lumberton

It is worth noting that AEG already produces small volumes of CoalSwitch™ at Lumberton for product testing by potential customers but that the 5 tonne per hour plant is still required to manufacture the higher volumes that customers require for thorough larger scale testing in their power stations.

Significant customer interest already evident

CoalSwitch™ economics

Once up and running AEG believes that it has significant interest from potential buyers of the product and already has a purchase order from a potential customer. Initially, orders will be for evaluation purposes and so in relatively low volumes. However, it was to satisfy this initial demand for testing that the pilot plant was intended.

As noted earlier in this report, the wood pellet market is relatively mature and as such is a commodity where prices are quoted on a global spot basis, although many power companies, such as Drax, have entered into long term supply agreements at fixed pricing.

CoalSwitch™ to be priced competitively with white wood pellets

Pricing for white wood pellets are running at around \$200 - \$225 per metric tonne (CIF) and \$150 - \$170 per metric tonne (FOB). AEG believes that its CoalSwitch™ product will be priced competitively, albeit commanding a modest premium to the traditional pellet by virtue of its superior performance. Clearly, much of the price equation would be dependent on the volume of any resulting offtake agreements.

Overheads primarily relate to feedstock, energy and delivery costs. With respect to feedstocks, AERP is accumulating its own stock of waste wood and sawdust from the activities of its lumber operations at Lumberton where it produces rail ties for three US customers and exports saw logs to South East Asia. As these activities scale up, the waste they produce will become more meaningful in relation to the requirements for the CoalSwitch™ operations.

The CoalSwitch™ process enables the use of previously unusable or economically unviable waste timber such as contaminated or redundant industrial residues and including sawdust, demolition and construction materials and even burnt wood and chemically-

Basic illustration of CoalSwitch™ plant economics

treated wood, such as railway sleepers (ties). In addition, Lumberton (as the name suggests) does not suffer a shortage of trees. It is also not unrealistic that in certain circumstances producers of uneconomic and unusable waste wood may actually pay AEG to take the waste away.

Example

A working assumption for the 5 tonne per hour CoalSwitch™ plant could look something like the following:

- 1) The base assumption is that two tonnes of feedstock typically produces one tonne of finished CoalSwitch™ product.
- 2) Assuming feedstock at around \$25 per tonne and CoalSwitch™ selling at say \$200 per tonne (FOB) would result in a gross profit of \$150 per tonne.
- 3) Deduct energy, administration and delivery costs and the contribution profit could be around \$40-\$60 per tonne signifying a contribution margin of between 20% and 30%.

These inputs are considered conservative; feedstock costs could be significantly lower as could delivery costs, particularly as it is becoming increasingly evident that there will be strong demand for the CoalSwitch™ product to be used domestically in the US, so limiting the need for overseas transport. Additionally, the steam used in the pelleting process could be piped into the plant from the neighbouring GRP facility to which the AERP plant is already connected by an existing steam line.

Reference plant should be capable of producing 30-35,000 tonnes of CoalSwitch™ pa...

Five tonnes per hour of CoalSwitch™ production would equate to 120 tonnes per day, 840 tonnes per week and 30-35,000 tonnes per annum. This could generate annualised revenues of around \$6m for the Group.

...with a full-size plant producing up to 400,000 tonnes pa

This is modelled on just the initial CoalSwitch™ pilot plant and AEG has commissioned Andritz Group, a leading global engineering company, to provide engineering support to ensure that the site had the capacity to produce up to 400,000 tonnes of CoalSwitch per annum and revenues of around \$80m.

The economics relating to a full-scale plant would differ greatly from the pilot plant. Current thinking has shifted from the construction of a modular batch process to one of a continuous process whereby feedstock is continually fed into the system thus generating much higher volumes, more economically.

Construction costs = circa \$1m/tonne

We believe that the cost of a full-scale CoalSwitch™ plant would equate to around \$1m/tonne hour, thus for a 50 tonne per hour plant the cost would be \$50m. Added to that would be the purchase of a site (if required), site improvements, utilities, feedstock storage, product storage, and bulk material handling systems, product packaging systems and the transportations costs associated with delivering equipment to the site. In addition, the costs of applying for necessary permitting and approvals could also be significant.

Approaches received from potential licensees and first licence awarded to RMDE

Licensing

AEG has been approached by a number of third parties interested in licensing its technology and its first licence award was to RMD Environmental, Inc. (RMDE) in November 2019. RMDE is a British Columbia-based forestry management and environmental engineering and consultancy business, and the licence agreement is to develop and manage projects involving the use of CoalSwitch™ technology in each of the Crown Provinces of Alberta and British Columbia in Canada (the "Territories").

Under the terms of the licence agreement, RMDE has acquired from AEG the exclusive rights for the sale and commercial development of opportunities to which the

\$1.8m license fee received and subsequent royalty payments of \$5/tonne on all licensed product

CoalSwitch™ technology (the Licensed Product) may be applied in the Territories for the next 20 years. AEG has received from RMDE a license fee of US\$ 1.8 million and will receive subsequent royalty payments of US\$5.00 per tonne on all Licensed Product that is produced by RMDE, its clients or partners, for the duration of the Licence Agreement.

It was anticipated that RMDE would commission its first CoalSwitch™ plant within the next 18 months, subject to environmental and other permitting processes being finalised at its first location. Initial preparatory and pre-engineering work by RMDE has commenced in Alberta for its first plant and RMDE is examining additional projects using the CoalSwitch™ technology in each of the Territories.

Significant opportunities for further licence awards in future years

In addition to the RMDE licence, we believe there are significant opportunities for AEG to award further licences and discussions are already well advanced with potential customers.

The Lumberton Manufacturing Hub

Lumberton site acquired for \$3.33m

AEG acquired the industrial site in March 2019 for \$3.33m from its previous owners Alamac Holdings. The consideration was satisfied by the payment of \$1.08m in cash and the balance through the issue of \$2.25m Series “B” CLNs. The CLNs are redeemable convertible at the Company’s option from March 2020 and are convertible up March 2022 at 1p per ordinary share.

Substantial site of 151 acres and 415 sq ft of covered factory space

The Lumberton site comprises 415,000 sq ft of covered factory space and around 151 acres of surrounding land. The site is now the new base for all AEG's CoalSwitch™ and lumber operations in the US and will house the first permanent production facility for CoalSwitch™.

Strategically located

Lumberton is strategically important as its location is close to the Eastern Seaboard of the United States and in the heart of the lumber production region in North America which will be logistically sound as it seeks to generate regular sales of its products to the USA, Western Europe and South East Asia.

The Lumberton Site also includes key ancillary facilities, such as water treatment, an analysis lab, offices and IT hardware, thus further reducing the amount of capital expenditure required for the Lumberton Site. The Company is currently focussed on establishing its first 5 tonne per hour industrial-scale CoalSwitch™ and once operational the Company expects to expand production of CoalSwitch™ to an initial target of 400,000 tonnes per annum.

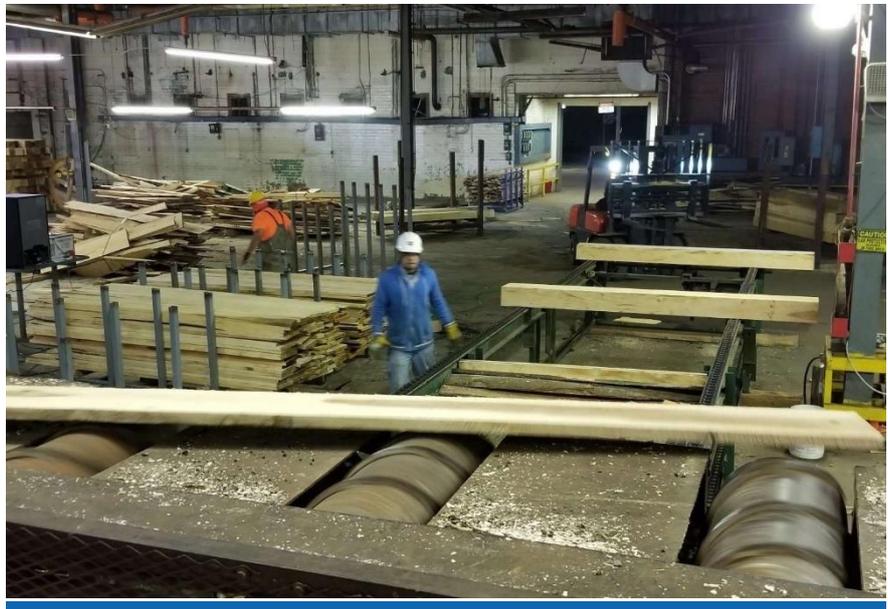
The Company also benefits from complementary biomass, lumber, saw logging and other commercial opportunities in the Lumberton area while activities at the Lumberton site have already commenced with the saw logging and sawmill operations creating future feedstock for CoalSwitch™. The Company is actively looking at other environmental initiatives for the Lumberton site.

THE LUMBERTON HUB



Source: AEG

Lumber and Timber Operations



Lumber and timber operations at Lumberton now 100% owned by AEG and generating increasing revenues...

...while also providing raw feedstock for CoalSwitch™ production

Estimated split of lumber revenues – 80% rail ties and lumber and 20% export of saw logs

Circa 45,000 rail ties shipped pa at around \$30 each (c.\$1.35m revenue pa)

Initially envisaged 300 – 500 containers of saw logs exported per month...

As noted earlier, In March 2020, AEG acquired full control of RES and has consolidated all the existing lumber activities at Lumberton through AERP.

The lumber activities of RLS were already generating modest revenues prior to the establishment of its joint venture with AEG through the sale of rail ties, lumber and woodchip to the US domestic market and saw logs for the export market, typically South East Asia. However, volumes were relatively modest until the joint venture was incorporated. Now that this operation is 100% owned by AEG, production will be ramped up and is already providing an immediate and meaningful revenue stream for the Group.

In addition, the waste wood, woodchips and sawdust produced from the lumber operations will act as supplements to the feedstock required by CoalSwitch™ and other 2nd generation pellet production at Lumberton. In addition, the use of these waste feedstocks will help AEG in its goal to turn the Lumberton facility into a carbon neutral site for all lumber activities and biomass production facilities.

Currently, around 80% of revenues from the lumber activities are generated from the supply of rail ties and woodchip to the US domestic market. The balance relates to revenues derived from the export of saw logs to South East Asia, Australia and Latin America. Over time we believe there are significant opportunities to grow both activities but would anticipate their respective contributions to move nearer to 50/50.

Activities have increased steadily and we believe that AERP is shipping some 45,000 rail ties per annum at a price estimated to be in the region of \$30 per rail tie (\$1.35m per annum). The rail tie operation has three main customers, all in the US, with one customer currently accounting for over 50% of sales.

At the time of the original joint venture it was envisaged that volumes of saw logs could reach a level of 200-500 containers of saw logs per month for the export market, which at

...however, activities only began in late 2019 and production is still ramping up. 100 containers should be shipping by June 2020

An important element in the AEG investment proposition

25m³ per container would be equivalent to 5,000 m³ – 12,500m³ of saw logs per month and at \$85/m³ would be equivalent to around \$5.1m to \$13m of revenue per annum.

These activities only really began in earnest in late 2019, therefore AERP is still ramping up production and has yet to achieve the bottom end of the target range. Current activity is running at around 50 containers per month or 1,250m³ (around \$1.3m pa).

However, management believes that the site could be shipping around 100 containers per month by the end of Q2 2020 and given the commercial interest that the Company is receiving this could be expanded further through the provision of extra shifts and the consequent requirement for an increase in feedstock and working capital.

Moving to a two-shift pattern would effectively double the numbers and could be achieved by Q3 or Q4, assuming normal working conditions (post-Covid) were re-established.

Clearly, as can be seen from the above, the lumber activities of AEG, while not generating headlines for the Group or seen as the exciting part of the business, is nevertheless an important element in the Group's investment proposition. It is also extremely important for AEG in terms of providing feedstock for CoalSwitch™, immediate revenues and cash flow for the Group while having the potential to scale up significantly and producing meaningful revenues for the Group in the future.

We note the market for saw logs in China is increasing strongly following an earlier slowdown in imports into the country and this could in time become an important market for AEG.

Forestry and Timberlands Operations

Management focus has been focused on CoalSwitch™ and the lumber activities to date...

Currently, AEG has forestry and timberland operations in Newfoundland & Labrador and in the Ukraine operated by its Timberlands International subsidiary. Understandably, management time and focus is currently very much centred upon the ramp up of activities at the Group's Lumberton site for both CoalSwitch™ and the lumber activities. However, its forestry assets are substantial and can be categorised as follows.

Newfoundland and Labrador

In late 2018, Timberland International (Newfoundland and Labrador) Ltd received confirmation of approval by the Ministry of Fisheries and Land Resources of the Crown Province of Newfoundland and Labrador (the 'Province') in regard to the issue of two five-year Commercial Timber Permits ('CTPs') for Forestry Management Areas 17 and 18. Each permit is issued with a five-year revolving renewal facility relating to the Annual Allowable Cut ('AAC') of 100,000 cubic metres per annum, which equates to 500,000 cubic metres over five years.

Ukraine

AEG has no current active business in Ukraine at this time, however, the Group retains its supply contract granted by the Lyubomi Forestry, which is the administrator of the Lyubomi Forest in the Ukraine. Following the extension of the contract term during 2014, the remaining useful life on contractual relationships is 45 years.

...but management currently evaluating strategy regarding its Forestry and Timberland assets

The Group is currently reviewing the optimal commercial strategy to develop its opportunities and assets in Newfoundland and Ukraine.

Current Group financing

While AEG's functional currency is US\$ the Group's debt is denominated in pounds sterling which is then translated at the balanced sheet date in US\$. As at 31 December 2019 AEG had net debt of \$17.9m which consisted of cash of \$0.4m and debt of \$18.3m which can be broken down further as follows.

Borrowings and cash		
Years to 31 December	2018	2019
	\$	\$
CLNs	(11,672,738)	(18,190,732)
Loan	(1,327,707)	(108,850)
Cash	298,768	397,323
Net cash/(debt)	(12,701,677)	(17,902,259)

Source: AEG

In 2017 the Group raised £11.57m through the issue of convertible loan notes (CLN) which have a maturity date of 14 March 2022 and can be converted into ordinary shares in AEG at any time at a 30% premium to 2.535p (3.2955p). The CLN has a coupon rate of 8% and as at 31 December 2019 the CLNs outstanding were £11.302m.

Two further tranches of CLNs denoted "Series B CLNs" and raising a total of \$6.9m were issued in 2019 and convertible into ordinary shares at 1p. Other smaller issues of Series B have since occurred bringing the total Series B debt to £4.513m while some bondholders have converted their holdings into ordinary shares.

Interest payments on CLNs deferred until September 2020

In February 2020, the Company reached agreement with the bondholders that the interest payment on the CLNs would be deferred for a 12-month period ending 30 September 2020 and that the Company would have the option to pay the deferred interest in either cash or the issuance of additional CLNs.

The Board has stated that the deferral will enable AEG to conserve around £1.2m of cash through the deferral period. Finally, the Group has in issue, an unsecured loan which at 31 December 2019 totalled \$108,805.

As a result of the CLNs and loan note issuance, net debt is clearly very high relative to the Group's equity and indeed, on any other metric. In addition, the total annual interest charge of c. \$2.4m per annum is substantial relative to turnover.

However, it should be remembered that the Group has only just moved into the revenue generation phase and thus any analysis of debt/equity metrics should really only be considered in a year or two, when revenues are reflecting the full potential of the lumber activities and CoalSwitch™.

CLNs AND RIGHTS OVER SHARES			
	£	Conv rate (pence)	Rights over shares
Series A	10,451,563	3.2950	317,194,628
Series B	4,183,626	1	418,362,600
CLN issued in lieu of interest	579,815	1	57,981,500
Total at 31 December 2019	15,215,004		793,538,728

Source: Active Energy Group plc

Full conversion of CLNs, warrants and options would result in an additional 916.5m shares issued or 41.8% of total

In addition, by that stage (all other things being equal), the share price should have strengthened considerably leading to a likely conversion of the CLNs into equity and the issue of 793.5m shares or 38.4% of the equity as enlarged by the conversion, so it is arguably reasonable at this stage to consider the CLNs as quasi-equity.

Warrants and options and full dilution

As at 31 December 2019 AEG had warrants and options outstanding of 123,001,619 with a weighted average exercise price of 3.46p. Assuming full conversion of the CLNs and exercise of the options and warrants, the ordinary shares in issue would increase by 916.5m to 2,190m, with those new shares representing 41.8% of the enlarged share capital.

Illustrations, not Forecasts

Financial modelling depends significantly on the timing of commencement of sales of CoalSwitch™

We are not providing forecasts at this stage. As noted earlier in this report, the financial modelling of the business is highly dependent on the timing and commencement of operations at the soon to be built CoalSwitch™ reference plant, notwithstanding the fact that revenues are now being generated from the lumber operations at Lumberton.

While we have offered various scenarios, these are still far from forming dependable forecasts. However, we do foresee a stage in the not too distant future where we can offer forecasts of revenues from both of the main revenue generating operations of the Group.

The lumber operations, which only commenced towards the later part of 2019 and are now 100% owned by AEG should be the first to allow us to provide reasonably accurate forecasts. The CoalSwitch™ operation, once up and running will probably be slow to ramp up volumes given that early orders are likely to be for testing before enterprise level demand is forthcoming.

Revenue scenario					
CoalSwitch	tph	hours	days	\$/t	revenue pa
	5	18	7	185	\$6,060,600
Export of saw logs	Containers pm	m3/container	total m3 pm	\$/m3	revenue pa
	100	25	2,500	85	\$2,550,000
Rail ties, lumber	volume pa	price per tie (\$)			revenue pa
	45,000	30			\$1,350,000
Scenario total					\$9,960,600

Source: Allenby Capital

Licensing of the technology will also be a valuable revenue generator as will any subsequent royalties, but the latter is likely to be much further down the line, perhaps contributing in 2022.

Further out, will be the build of a full scale plant at a cost of \$1m/tonne hour which will require a mixture of project financing and equity but at that stage it should be much more clear as to the likely demand for CoalSwitch™ and its derivatives.

Clear potential for the group to generate sales of many millions of dollars in the future

It is therefore easy to see how each of AEG's operations could ramp up very significantly over a 3-5-year time horizon ultimately providing the Group with revenues in the hundreds of millions of dollars. Consequently, we believe that the Group provides a compelling investment proposition at this current stage of its development.

SWOT analysis

<u>Strengths</u>	<u>Opportunities</u>
ESG strong	To take a significant share of the renewable biomass fuel market
Truly disruptive fuel	Expansion of lumber activities into new markets
Strengthened management team	Greater efficiencies by utilising feedstock generated internally
Global IP	Construction of commercial scale reactor
Carbon neutral/negative activities	Creation of additional IP
<u>Weaknesses</u>	<u>Threats</u>
Historically over promised and under delivered, albeit under previous mgmt.	Competition from new alternative fuels
Significant debt levels	Funding for commercial reactor
Execution risk	
Highly geared balance sheet	

Source: Allenby Capital

The Board

Michael Rowan (Chief Executive Officer)

Michael is a qualified solicitor, qualified investment manager and successful corporate financier with a broad range of international commercial and legal experience. After graduating from the University of Cambridge, he practised as a solicitor at Linklaters in London, Hong Kong and New York, working with leading global financial institutions. He then moved to Merrill Lynch International in London and New York, where he became a director of Equity Capital Markets, with responsibility for origination, execution and commercial negotiation of equity and equity-linked transactions, including major privatisations in the UK and EMEA regions.

Since then, Michael has held senior roles within the venture capital and mid & small cap broking sectors in London and Hong Kong. More recently, he was Business Development Director and an Investment Manager at JM Finn & Co and he continues to be involved in private companies which specialise in investing in international micro capital and seed financing opportunities. He was appointed as Chief Executive Officer in July 2018.

Antonio Esposito (Executive Director)

Antonio is a qualified engineer with over 18 years' experience in logistics, operations, business development and project management globally and has an in-depth understanding of commodities export and global markets with a focus on woods and biomass-based fuels. He has a proven track record as a project manager, having been in charge of both the construction and the launch of a production facility in Eastern Europe, as well as overseeing the construction of biomass fired power plants in various locations worldwide.

More recently, Antonio has managed the export of wood, wood products and other bulk commodities to South East Asia, India and Europe in addition to the procurement of wood supplies in excess of 5 million tonnes per annum. Whilst serving as Chief Operating Officer at Active Energy he was instrumental in the planning and construction of the Company's inaugural CoalSwitch™ plant in Utah, U.S. and the planned roll out of the Company's associated technologies in AEG's target markets.

James Leahy (Senior Independent Non-Executive Director)

Beginning his career at the London Metal Exchange, James has spent the subsequent 34 years involved in stockbroking and commodities in a variety of roles, including research analyst, equity salesman and specialist corporate broker, which covered mining finance, origination and distribution. He has worked on a wide range of projects worldwide, ranging from industrial minerals, coal, iron ore, precious metals, copper, diamonds, lithium, uranium, plantations, forestry and palm oil. Lately, he has employed his corporate governance skills, having gained substantial experience as an independent director on the boards of several quoted and unquoted companies.

In addition, James has direct experience in capital markets, having worked at James Capel, Credit Lyonnais, Nedbank, Canaccord and Mirabaud, where he gained invaluable experience with international institutional fund managers, hedge funds, private equity and sector specialist investors. Additionally, Mr Leahy has been involved in many IPOs, as well as primary and secondary placings, and the development of junior mining companies through to production. He is currently a director of the listed fund Geiger Counter Ltd, Savannah Resources plc and a private start up, Energy Minerals Investments Ltd.

Max Aitken (Non-Executive Director)

Max is an entrepreneur who has founded and been instrumental in the financing of several businesses in energy, IT, and media. He is currently the CEO of Estover Energy Ltd. Over the last 10 years Estover Energy has established itself as a leader in the UK biomass industry developing 3 wood-fuelled biomass CHP plants producing up to 70 MW in the UK, financed with £375m of capital. He is also a trustee of the Beaverbrook Foundation London, and President of the Beaverbrook Canadian Foundation in Montreal. He is also a Non-Executive Director for 42 M&P, a fully integrated management and production company in the TV and film industry, based in London and Los Angeles. Max was appointed to the Board in January 2020.

Jason Zimmermann (Non-Executive Director)

Jason Zimmermann has over 20 years' experience in the timber resource sector. He is currently the President of Zimmfor Management Services Ltd ("Zimmfor"), an industry leading consulting firm focused on sustainable forestry management. Jason has field and technical expertise relating to timberland assets worldwide and Zimmfor has worked with AEG in previous projects in Canada and Ukraine. He is a Registered Professional Forester and a graduate of the University of British Columbia with a Bachelor of Science in Forestry. James was appointed to the Board in January 2020.

Income Statement (historic)

CONTINUING ACTIVITIES			
Y/E December	\$m FY 2017A	\$m FY 2018A	\$m FY 2019A
UNDERLYING			
Revenue	0.000	0.195	1.896
Cost of sales	0.000	0.000	0.000
Gross profit	0.000	0.195	1.896
<i>margin</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
R&D expenditure	-2.390	0.000	0.000
Admin expenses (pre-D&A and share based payments)	-0.025	-2.043	-2.194
Underlying EBITDA	-2.415	-1.848	-0.298
D&A	-0.325	-0.045	-0.217
Underlying operating loss	-2.740	-1.892	-0.515
Finance income	0.000	0.000	0.000
Finance costs	-3.031	-0.407	-2.461
Underlying (loss)/before tax	-5.771	-2.299	-2.976
Tax	0.355	1.346	0.875
Underlying (loss) after tax	-5.415	-0.953	-2.101
STATUTORY			
Underlying operating loss	-2.740	-1.892	-0.515
Impairment charges	-2.213	-0.951	0.000
Share based charges	-0.308	-0.895	-0.369
Statutory operating (loss)	-5.261	-3.739	-0.884
Finance income	0.000	0.000	0.000
Finance costs	-3.031	-0.407	-2.461
Statutory (Loss) before tax	-8.292	-4.145	-3.345
Tax	0.355	1.346	0.875
Statutory loss after tax	-7.936	-2.799	-2.470
WAS	829.908	1,013.576	1,201.907
WAS FD	829.908	1,013.576	2,121.007
Year-end shares	-	1,208.676	1,273.539
BASIC EPS (cents)			
Underlying basic EPS (c)	(0.65)	(0.09)	(0.17)
Statutory basic EPS (c)	(0.96)	(0.28)	(0.21)
FULLY DILUTED EPS (cents)			
Underlying fully diluted EPS (c)	(0.65)	(0.09)	(0.10)
Statutory fully diluted EPS (c)	(0.96)	(0.28)	(0.12)
BASIC EPS (pence)			
Underlying basic EPS (p)	(0.53)	(0.08)	(0.14)
Statutory basic EPS (p)	(0.78)	(0.22)	(0.17)
FULLY DILUTED EPS (pence)			
Underlying fully diluted EPS (p)	(0.53)	(0.08)	(0.08)
Statutory fully diluted EPS (p)	(0.78)	(0.22)	(0.09)

Source: Active Energy Group plc

Balance Sheet (historic)

CONTINUING ACTIVITIES			
	\$m	\$m	\$m
Y/E December	FY 2017A	FY 2018A	FY 2019A
Non-current assets			
Intangible assets	8.055	8.460	9.180
PP&E	3.792	5.376	9.232
Available for sale financial assets	0.787	0.752	1.471
Total non-current assets	12.633	14.588	19.883
Current assets			
Inventory	0.020	0.000	0.000
Trade and other receivables	0.518	1.704	1.147
Cash	0.142	0.299	0.397
Total current assets	0.680	2.003	1.544
Total assets	13.314	16.591	21.427
Current liabilities			
Trade & other payables	-1.945	-2.852	-2.391
Borrowings	0.000	-1.328	-0.109
Finance leases	-0.090	0.000	0.000
Total current liabilities	-2.034	-4.179	-2.500
Non-current liabilities			
Deferred tax	-0.384	-0.242	-0.364
Finance leases	-0.206	0.000	0.000
Borrowings	-13.224	-11.673	-18.191
Total non-current liabilities	-13.814	-11.914	-18.555
Total liabilities	-15.849	-16.094	-21.055
Net current assets/(liabilities)	-1.354	-2.176	-0.956
Net assets	-2.535	0.497	0.372
Cash	0.142	0.299	0.397
Borrowings	-13.224	-13.000	-18.300
Net debt	-13.082	-12.702	-17.902
BALANCE SHEET RATIOS			
	\$m	\$m	\$m
Y/E December	FY 2017A	FY 2018A	FY 2019A
Long-term financial debts	(13.224)	(11.673)	(18.191)
Short term financial debts	-	(1.328)	(0.109)
Gross (debt)	(13.224)	(13.000)	(18.300)
Cash and cash equivalents	0.142	0.299	0.397
Net (debt) / cash	(13.082)	(12.702)	(17.902)
Acid test (Current Assets less inventory / Current Liabilities)	0.32	0.48	0.62

Source: Active Energy Group plc

Cash Flow (historic)

CONTINUING ACTIVITIES			
Y/E December	\$m FY 2017A	\$m FY 2018A	\$m FY 2019A
Loss for the period	-15.221	-3.186	-2.470
Share based charges	0.308	0.895	0.369
Depreciation	0.280	0.000	0.066
Amortisation	0.045	0.045	0.151
R&D	1.244	0.000	0.000
Impairment of PP&E	0.000	0.065	0.000
Impairment of intangible assets	0.000	0.951	0.000
Write off of goodwill	2.213	0.000	0.000
Loss/(profit) on disposal of PP&E	2.130	0.002	0.679
Revaluation of investment for sale	-0.455	0.035	0.000
FX	-0.556	-0.967	0.613
Finance expense	3.031	1.047	1.744
Income tax	-0.005	-0.143	0.123
Operating cash flow before WC	-6.986	-1.256	1.274
<i>(Increase)/decrease in inventories</i>	<i>0.405</i>	<i>0.020</i>	<i>0.000</i>
<i>(Increase)/decrease in receivables</i>	<i>2.132</i>	<i>-1.187</i>	<i>0.558</i>
<i>(Decrease)/increase in payables</i>	<i>-1.372</i>	<i>0.907</i>	<i>-0.156</i>
Net WC movement	1.165	-0.259	0.402
Cash outflow from operating activities	-5.821	-1.515	1.676
Income tax	-0.007	0.000	0.000
Net cash outflow from operating activities	-5.828	-1.515	1.676
Purchase of intangible assets	-1.438	-1.109	-0.519
Purchase of PP&E	-3.923	-1.777	-1.757
Sale of PP&E	0.222	0.123	0.363
Net cash outflow from investing activities	-5.140	-2.763	-1.913
Issue of equity net	3.143	3.299	0.000
Loans raised	7.538	2.350	2.763
Unsecured loans repaid	0.000	0.000	-1.219
Finance expenses	-1.693	-1.193	-1.207
Net cash inflow from financing activities	8.987	4.456	0.337
Net increase/(decrease) in cash	-1.980	0.178	0.100
Cash at start of year	2.122	0.142	0.299
FX	0.001	-0.021	-0.001
Cash at end of year	0.142	0.299	0.397

Source: Active Energy Group plc

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