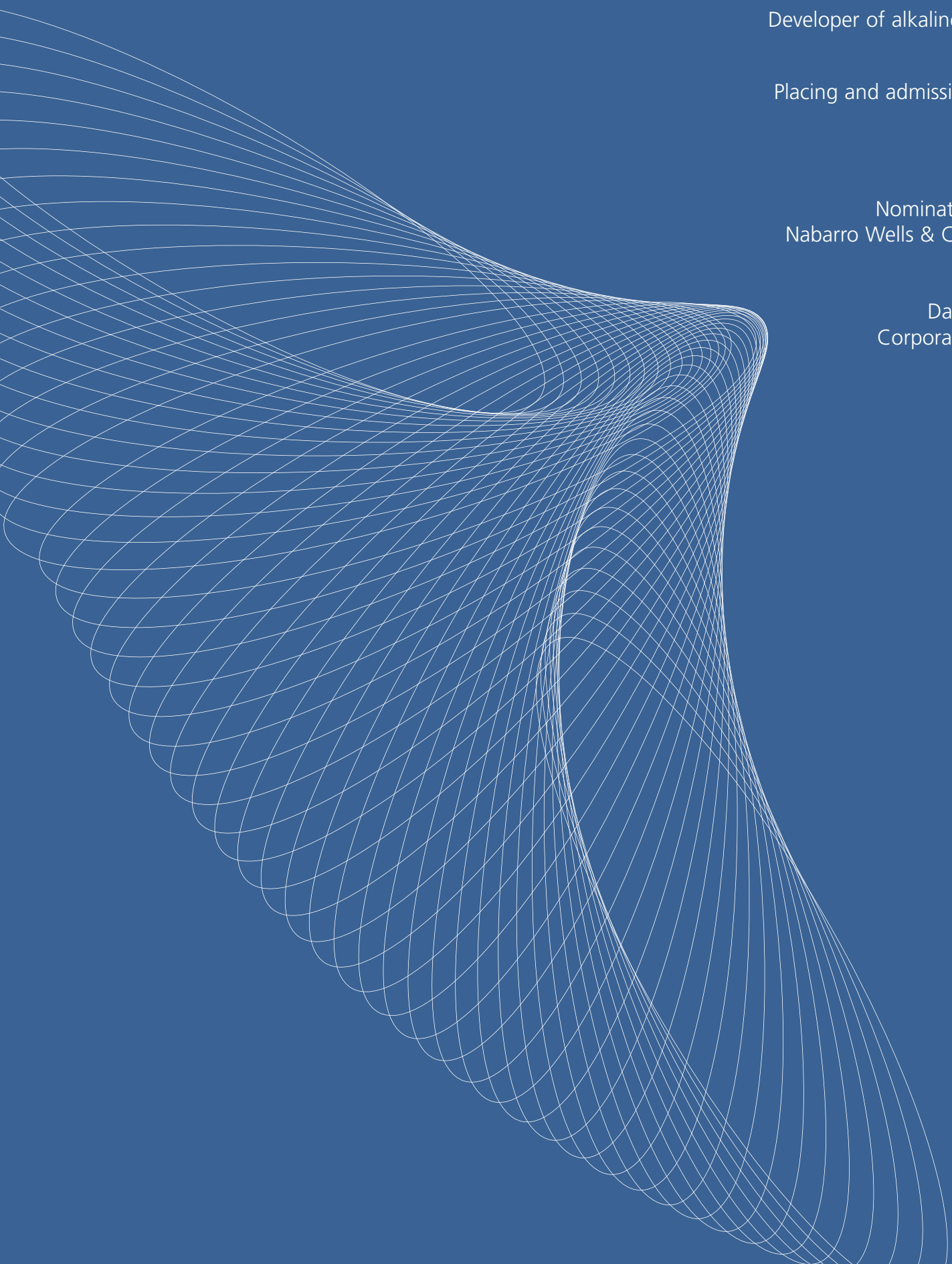
AFC Energy PLC

Developer of alkaline fuel cells

Placing and admission to AIM

Nominated adviser
Nabarro Wells & Co. Limited

Broker
Dawnay, Day
Corporate Broking



THIS DOCUMENT IS IMPORTANT AND REQUIRES YOUR IMMEDIATE ATTENTION. If you are in any doubt about the contents of this document, you should consult a person authorised under the Financial Services and Markets Act 2000 who specialises in advising on the acquisition of shares and other securities.

Application has been made for the Ordinary Shares, both issued and to be issued pursuant to the Placing, to be admitted to trading on AIM. The Ordinary Shares are not dealt on any other recognised investment exchange and no application has been or is being made for the Ordinary Shares to be admitted to any such exchange.

AIM is a market designed primarily for emerging or smaller companies to which a higher investment risk tends to be attached than to larger or more established companies. AIM securities are not admitted to the Official List. A prospective investor should be aware of the risks of investing in such companies and should make the decision to invest only after careful consideration and, if appropriate, consultation with an independent financial adviser. Each AIM company is required pursuant to the AIM Rules for Companies to have a nominated adviser. The nominated adviser is required to make a declaration to the London Stock Exchange on Admission in the form set out in Schedule Two to the AIM Rules for Nominated Advisers. The London Stock Exchange has not itself examined or approved the contents of this document.

Prospective investors should read the whole text of this document and should be aware that an investment in the Company is speculative and involves a significant degree of risk and may result in the loss of the entire investment. The attention of prospective investors is drawn in particular to the section entitled "Risk Factors" set out in Part II of this document. All statements regarding the Company's business, financial position and prospects should be viewed in light of these risk factors.

The Directors of the Company, whose names appear on page 7 of this document, accept responsibility, both individually and collectively, for the information contained in this document including responsibility for compliance with the AIM Rules. To the best of the knowledge and belief of the Directors (who have taken all reasonable care to ensure that such is the case), the information contained in this document is in accordance with the facts and does not omit anything likely to affect the import of such information.

AFC ENERGY PLC

(Incorporated and registered in England and Wales with registered number 05668788)

Placing of 13,183,034 Ordinary Shares of 0.1p each at 23p per share
Admission to trading on AIM

Nominated Adviser	*Broker*
NABARRO WELLS & CO. LIMITED	DAWNAY, DAY CORPORATE BROKING

Share Capital

(immediately following the Placing and on Admission)

Authorised			*Issued and fully paid*	
Amount	*Number*		*Amount*	*Number*
£1,000,000	1,000,000,000	Ordinary Shares of £0.001 each	£87,683	87,682,854

The Placing Shares will, upon Admission, rank in full for all dividends or other distributions hereafter declared, made or paid on the ordinary share capital of the Company and will rank *pari passu* in all respects with all other Ordinary Shares which will be in issue on completion of the Placing. The Placing is conditional upon, *inter alia*, Admission taking place on or before 24 April 2007 (or such later date as the Company, Nabarro Wells and Dawnay Day may agree).

Conditional dealings in the Ordinary Shares are expected to commence on 19 April 2007.

It is expected that unconditional dealings in the Ordinary Shares will commence on AIM on 24 April 2007. The Ordinary Shares are not dealt in on any other recognised investment exchange and no other such application has been made.

Nabarro Wells and Dawnay Day are each authorised and regulated by the Financial Services Authority and are each acting exclusively for the Company and no-one else in connection with the Placing and Admission. Neither Nabarro Wells nor Dawnay Day will regard any other person (whether or not a recipient of this document) as its customer or be responsible to any other person for providing the protections afforded to their customers nor for providing advice in relation to the transactions and arrangements detailed in this document. Nabarro Wells' responsibilities as the Company's nominated adviser under the AIM Rules are owed solely to the London Stock Exchange and are not owed to the Company or to any Director or to any other person in respect of his decision to acquire shares in the Company in reliance on any part of this document. Neither Nabarro Wells nor Dawnay Day is making any representation or warranty, express or implied, as to the contents of this document.

Nabarro Wells has been appointed as nominated adviser to the Company. In accordance with the AIM Rules, Nabarro Wells has confirmed to the London Stock Exchange that it has satisfied itself that the Directors have received advice and guidance as to the nature of their responsibilities and obligations to ensure compliance by the Company with the AIM Rules and that, in its opinion and to the best of its knowledge and belief, all relevant requirements of the AIM Rules have been complied with. No liability whatsoever is accepted by Nabarro Wells or Dawnay Day for the accuracy of any information or opinions contained in this document or for the omission of any material information for which it is not responsible.

This document, which is an admission document required by the AIM Rules, does not constitute a prospectus pursuant to Part VI of the Financial Services and Markets Act 2000 ("FSMA"), but has been drawn up in accordance with the requirements of the rules for the contents of prospectus documents prepared in compliance with Part VI FSMA, in so far as required by the AIM Rules. A copy of this document has been delivered to the London Stock Exchange as an admission document in respect of the Ordinary Shares.

In relation to each Member State of the European Economic Area which has implemented the EC Second Prospectus Directive 2003/71/EC ("Prospectus Directive"), the Company has represented and agreed that with effect from the date on which the Prospectus Directive is implemented in that Member State it has not made, and will not make, an offer of shares to the public in that Member State. For these purposes, it is not considered that an offer to the public has been made in any such Member State where (1) the number of offerees, other than "qualified investors" (as defined in the Prospectus Directive) does not exceed 99 and/ or (2) the minimum subscription value permitted to any investor in that Member State exceeds €50,000 or currency equivalent.

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Copies of this document will be available from the date of this document free of charge to the public on any weekday during normal office hours (Saturdays, Sundays and public holidays excepted) at the offices of Nabarro Wells, at Saddlers House, Gutter Lane, London EC2V 6BR and at the offices of Eversheds LLP, Solicitors, 85 Queen Victoria Street, London EC4V 4JL until at least one month from Admission.

CONTENTS

KEY INFORMATION

The following information should be read in conjunction with the full text of this document from which it is derived. Prospective investors should read the whole of this document and not rely solely on the summarised information set out below.

The Objective

AFC Energy is engaged in the design and development of alkaline fuel cells and improving the processes and reducing the costs and number of components required for their manufacture. The Company's principal objective is to position itself to develop and produce an alkaline fuel cell system at a significantly lower cost than any other fuel cell system and at a commercially acceptable price point.

A Commercial Fuel Cell

AFC Energy's initial path to market has been focussed on those industries producing hydrogen as a waste or excess by-product. The Company has signed a memorandum of understanding with Akzo Nobel, which the Directors believe provides the basis for a long-term relationship and requires the payment of deposits in respect of fuel cells to be delivered. Pursuant to the memorandum of understanding, the Company has received a contractual purchase order from Akzo Nobel under which the Company will deliver its first fuel cells to Akzo Nobel's Bitterfeld site during the first quarter of 2008. A system expansion study towards developing a 200kW system is also due to be completed by the second quarter of 2009, in collaboration with Akzo Nobel personnel.

Akzo Nobel will test AFC Energy's low-cost hydrogen fuel cell technology at its Bitterfeld site in Germany to generate clean energy from the substantial quantity of hydrogen that is currently produced as a by-product at chlorine production plants. The Directors believe that the amounts of available waste hydrogen in the global chlor-alkali industry could support approximately 3,000 MW per annum of generating capacity, representing a potential market of approximately £1 billion.

The Technology

AFC Energy has designed a simpler, significantly lower cost alkaline fuel cell system with a new concept in balance of plant design, eliminating the 'stack' and including an integrated electrode ensemble, that substantially reduces the number of components. The Directors believe that this will enable rapid construction, easy routine maintenance, including individual electrode replacement, and much reduced balance of plant. Precious metals have been almost eliminated and all materials are expected to have at least a 50 year security and multiple source of supply.

The low cost of AFC Energy's electrodes is anticipated to contribute to an intermediate solution to life expectancy problems since the replacement costs are low it should not materially alter the running costs of the system over a period of around two or three years.

In Part III of this document, Professor Keith Scott of Knowledge House of The University of Newcastle upon Tyne states: "The AFC Energy fuel cell is in an excellent position to achieve high production volumes and low cost and to become the fuel cell technology of choice in some potentially large and lucrative markets. The AFC Energy cell would appear suited to the residential and light commercial sector markets."

The Team

AFC Energy's Board and technical team enjoy considerable experience in the areas of mechanical engineering, product design, intellectual property development and of managing companies through their critical expansionary growth phase.

The Board and technical team will be supported by external consultants from leading academic institutions, including Professor Robert Slade at the University of Surrey, who will independently validate and verify test results observed by AFC Energy.

Risk Factors

Prior to investing in the Company, prospective investors should consider, together with the other information contained in this document, the risks and other factors attaching to an investment in the Company, including in particular, the factors set out in "Risk Factors" in Part II of this document.

Fuel cells traditionally rely on expensive precious metals to function — HIGH COST

AFC Energy plc has designed an electrode that replaces precious metals with nickel — LOW COST

This page is printed on the widely available Tyvek material
similar to that used in AFC Energy's electrode — THAT IS HOW AFFORDABLE IT IS

DIRECTORS, SECRETARY AND ADVISERS

Directors	Timothy Stephen Kenneth Yeo *(Non-executive Chairman)* Gerard Peter Theodore Henrique Sauer *(Chief Executive Officer)* Howard White *(Business Development Director)* Simon Howard Walters *(Finance Director)* Brian David Henderson Wilson *(Non-executive Director)* Michael Francis Mangan *(Non-executive Director)* Harry Ian Epstein *(Non-executive Director)*
Registered Office	Finsgate 5-7 Cranwood Street London EC1V 9EE
Company Secretary	Roger Powley
Nominated Adviser	Nabarro Wells & Co. Limited Saddlers House Gutter Lane London EC2V 6BR
Broker	Dawnay, Day Corporate Broking (a division of Dawnay, Day Brokers Limited) 15-17 Grosvenor Gardens London SW1W 0BD
Solicitors to the Company	Eversheds LLP Senator House 85 Queen Victoria Street London EC4V 4JL
Auditors and Reporting Accountants	Jeffreys Henry LLP Finsgate 5-7 Cranwood Street London EC1V 9EE
Solicitors to the Placing and Nominated Adviser	Rosenblatt Solicitors 9-13 St Andrew Street London EC4A 3AF
Independent Technical Expert	Dr Keith Scott Knowledge House University of Newcastle Newcastle upon Tyne NE1 7RU
Financial Public Relations Consultants	Madano Partnership 4th Floor South Harling House 47-51 Great Suffolk Street London SE1 0BS
Registrars	Computershare Limited The Pavilions Bridgwater Road Bristol BS99 7NH

PLACING STATISTICS

Placing Price per Placing Share	23 pence
Number of Ordinary Shares in issue prior to the Placing and Admission	74,499,820
Number of Placing Shares	13,183,034
Number of Ordinary Shares in issue following the Placing and on Admission	87,682,854
Estimated net proceeds of the Placing receivable by the Company[1]	£2.4 million
Proportion of enlarged issued Ordinary Share capital being placed	15.0 per cent.
Market capitalisation at the Placing Price on Admission[2]	£20.2 million
AIM Ticker Symbol	AFC
ISIN for the Ordinary Shares	GB00B18S7B29

Notes

1. Net proceeds of the Placing are after deduction of estimated expenses of the Placing approximately £600,000 (excluding VAT).
2. Market capitalisation has been calculated based on the number of Ordinary Shares in issue following the Placing at the Placing Price.

EXPECTED TIMETABLE OF PRINCIPAL EVENTS

Publication of this document	18 April 2007
Expected date of conditional dealings	19 April 2007
Admission effective and commencement of unconditional dealings in the Ordinary Shares on AIM	24 April 2007
CREST accounts to be credited (where applicable) by	24 April 2007
Despatch of definitive share certificates (where applicable) by	1 May 2007

FORWARD-LOOKING STATEMENTS

This document includes statements that are, or may be deemed to be, 'forward-looking statements'. These forward-looking statements can be identified by the use of forward-looking terminology, including the terms 'aims', 'believes', 'estimates', 'plans', 'projects', 'anticipates', 'expects', 'intends', 'may', 'will', or 'should' or, in each case, their negative or other variations or comparable terminology. These forward-looking statements include matters that are not historical facts. They appear in a number of places throughout this document and include statements regarding the Directors' current intentions, beliefs or expectations concerning, among other things, AFC Energy's results of operations, financial condition, liquidity, prospects, growth, strategies and the fuel cell industry.

By their nature, forward-looking statements involve risk and uncertainty because they relate to future events and circumstances. Actual results and developments could differ materially from those expressed or implied by the forward-looking statements. Please see the factors disclosed in Part II of this document in this regard.

Forward-looking statements may and often do differ materially from actual results. Any forward-looking statements in this document reflect the Directors' current view with respect to future events and are subject to risks relating to future events and other risks, uncertainties and assumptions relating to AFC Energy's operations, results of operations, growth strategy and liquidity. Prospective investors should specifically consider the factors identified in this document which could cause actual results to differ before making an investment decision. Save as required by law or by the AIM Rules, AFC Energy undertakes no obligation publicly to release the results of any revisions to any forward-looking statements in this document that may occur due to any change in the Directors' expectations or to reflect events or circumstances after the date of this document.

PART I

INFORMATION ON THE COMPANY

1. Introduction

AFC Energy is engaged in the design and development of alkaline fuel cells and improving the processes and reducing the costs and number of components required for their manufacture. The Company's proprietary technology, which has been under development for over six years, has already achieved some important milestones in its development, including the proof of concept on the operation of its electrode.

AFC Energy's initial path to market has been focussed on those industries producing hydrogen as a waste or excess by-product. The Company has signed a memorandum of understanding with Akzo Nobel, which the Directors believe provides the basis for a long-term relationship and requires the payment of deposits in respect of fuel cells to be delivered. Pursuant to the memorandum of understanding, the Company has received a contractual purchase order from Akzo Nobel under which the Company will deliver its first fuel cells to Akzo Nobel's Bitterfeld site during the first quarter of 2008. A system expansion study towards developing a 200kW system is also due to be completed by the second quarter of 2009, in collaboration with Akzo Nobel personnel.

AFC Energy's focus is not to re-invent alkaline fuel cell technology but to reduce significantly the cost of manufacture, and therefore the payback period to within a normal commercial timeframe, and to increase the reliability and serviceability of alkaline fuel cells through the application of cost engineering, design and technology development processes. The Directors believe that a significantly lower payback period and a guaranteed working lifetime, are essential features to enable a fuel cell technology to compete with the cost of conventional energy generation alternatives.

Alkaline fuel cell technology is an existing and well defined technology that is already used in military and space applications.

An Independent Technical Expert's Report, produced by Knowledge House of the University of Newcastle upon Tyne, is included in Part III of this document and comments on the technical aspects of the Company's technologies.

2. History and Background

AFC Energy was incorporated in January 2006 to purchase certain assets relating to alkaline fuel cell technology and know-how from Eneco and subsequently raised £1.4 million from private investors to fund the initial working capital requirements of the Company and has since raised a further £1.0 million.

Since the late 1990s Eneco had engaged in the integration of advanced energy systems in vehicles, which included fuel cell applications in vehicles and boats under the direction of AFC Energy's now CEO, Gerard Sauer, and Chief Technical Officer, Otto Carlisle. From 2000 to 2002, this work was extended to include the design and manufacture of the core systems for the same applications, culminating in late 2002 in a programme dedicated to the design of, and the manufacturing processes required, for the production of fuel cell electrodes.

Eneco adopted a dual strategy with a main team focussed on the production of a less expensive conventional three-part electrode, while at the same time a second team of scientists and production engineers pursued a more radical step change in cost engineering that resulted in the invention of a new methodology of producing both an electrode and a fuel cell system.

Despite considerable technical success, Eneco decided to concentrate on bringing hybrid power systems to market and in 2004 and 2005 it significantly reduced its research and development expenditure in relation to the second part of its dual strategy, the electrode and fuel cell system. In September 2005, Howard White was introduced to Eneco and in January 2006 concluded negotiations to purchase the know-how related to the fuel cell cost engineering from Eneco.

3. AFC Energy's Objectives

AFC Energy's principal objective is to position itself to develop and produce an alkaline fuel cell system at a significantly lower cost than any other fuel cell system and at a commercially acceptable price point. The development history of the Company's technology outlined above, which includes over six years of fuel cell design and integration work, has, in the opinion of the Directors, resulted in the development of considerable proprietary know-how in respect of which five patent applications have been submitted covering the electrode and other features of the system and manufacturing processes. It is intended that a number of other patents will be prepared in due course to protect various innovative aspects that are being developed.

The Company's technical strategy is to develop the electrodes into a full high-volume production product. The chosen power density is set at 100mA per cm^2. The entire work package associated with this strategy is focussed on low waste and high quality in volume production, using automotive OEM design and development principles.

The Directors believe that AFC Energy is well placed to achieve the principal objective described above and the Company has already achieved a number of critical steps towards the goal of designing and developing an affordable and commercialisable fuel cell technology as follows:

(i) The invention and development of an electrode that is capable of being produced at a very low cost when compared to other fuel cell electrodes.

Conventional electrodes for use in alkaline fuel cells typically cost in excess of $1,400/kW to produce. It is estimated by the Directors that AFC Energy's electrode — anode and cathode combined — will cost less than $100/kW to produce at a production rate of 1,000kW per annum.

The AFC Energy electrode is described in more detail in paragraph 5.1 of this Part I and has been operated under half cell conditions in excess of 3,000 hours without significant degradation in performance. In addition, the Company has operated both anode and cathode separately and in full-cell configuration. All of these tests have been carried out using transient and constant load conditions and a number under working temperature conditions. To validate and verify independently the work carried out in the Company's laboratory, certain of Surrey University's facilities and personnel are employed to run parallel tests;

(ii) The design of a simpler, significantly lower cost alkaline fuel cell system with a new concept in balance of plant design, eliminating the 'stack' and including an integrated electrode ensemble, that substantially reduces the number of components. The Directors believe that this will enable rapid construction, easy routine maintenance, including individual electrode replacement, and much reduced balance of plant. The system is described in more detail in paragraph 5.1 of this Part I;

(iii) The establishment of a team of scientists and engineers in laboratory and office premises in Dunsfold Park, near Guildford, Surrey. Details of the team are given in paragraph 10 of this Part I. A collaboration agreement has been signed with Surrey University and there are currently two students working to validate and verify the Company's results;

(iv) Establishment of a milestone-based programme towards further refinement of the electrode and production of the first prototype 3.5kW fully functional system followed by a 50kW system; and

(v) The Company has signed a memorandum of understanding with Akzo Nobel, which the Directors believe provides the basis for a long-term relationship and requires the payment of deposits in respect of fuel cells to be delivered. Pursuant to the memorandum of understanding, the Company has received a contractual purchase order from Akzo Nobel under which the Company will deliver its first fuel cells to Akzo Nobel's Bitterfeld site during the first quarter of 2008.

AFC Energy has developed technologies that use non-precious metals as their core component and has so far filed five patent applications to protect its IP, concerning the design of the electrode and the new low-cost alkaline fuel cell system and is preparing further patent applications. The Company will also seek to improve the robustness of its IP claims as the patent applications progress towards grant.

A summary of the Company's patent applications is included in the Intellectual Property Report contained in Part V of this document.

4. Fuel Cell Technologies

4.1 *What is a Fuel Cell?*

Fuel cells are devices that combine a fuel (e.g. hydrogen) and oxygen in an electrochemical reaction, producing electricity, heat and reaction by-products such as water. In contrast to most incumbent power generation technologies (which first generate heat through combustion, before electricity is generated from the heat produced) fuel cells avoid this intermediate process, and thereby hold the potential for more efficient electricity production. Certain fuel cells, including alkaline fuel cells, are zero emission devices (i.e. they do not emit by-products such as CO_2, SOX or NOX).

4.2 *Existing Fuel Cell Technologies*

There are a number of fuel cell technologies in existence. These are, briefly, as follows:

Fuel cell type	*Invented*	*Typical operating temperature*	*Typical system efficiency*	*Typical application*
Molten Carbonate	1953	650°C	40% to 50%	Power stations
Solid Oxide	1928	400°C to 1,200°C	35% to 45%	Domestic CHP
PEM	1992	90°C	35% to 40%	Vehicle power
Direct Methanol	1944	120°C	30% to 35%	Vehicle power
Phosphoric Acid	1986	150°C to 200°C	55%	Stationary power and large vehicles
Alkaline	1839	70°C	55% to 60%	Domestic, standby and marine

Note: System efficiency is measured as output in kJ compared to the calorific content in kJ of the fuels put into the system.

The above fuel cell types are explained in more detail below (information drawn from the US Department of Energy's Energy Efficiency and Renewable Energy website):

Molten Carbonate

Molten carbonate fuel cells ("MCFCs") are currently being developed for natural gas and coal-based power plants for electrical utility, industrial and military applications. MCFCs are high-temperature fuel cells that use an electrolyte composed of a molten carbonate salt mixture suspended in a porous, chemically inert ceramic lithium aluminium oxide ($LiAlO_2$) matrix. Since they operate at extremely high temperatures of 650°C and above, non-precious metals can be used as catalysts at the anode and cathode, reducing costs.

Unlike alkaline and polymer electrolyte membrane fuel cells, MCFCs do not require an external reformer to convert more energy-dense fuels to hydrogen. Due to the high temperatures at which MCFCs operate, these fuels are converted to hydrogen within the fuel cell itself by a process called internal reforming, which also reduces cost.

The primary disadvantage of current MCFC technology is durability. The high temperatures at which these cells operate and the corrosive electrolyte used accelerate component breakdown and corrosion, thereby decreasing cell life.

Solid Oxide

Solid oxide fuel cells ("SOFCs") operate at very high temperatures — around 1,000°C. High temperature operation removes the need for precious-metal catalyst, thereby reducing cost. It also allows SOFCs to reform fuels internally, which enables the use of a variety of fuels and reduces the cost associated with adding a reformer to the system.

SOFCs are also the most sulphur-resistant fuel cell type; they can tolerate several orders of magnitude more sulphur than other cell types. In addition, they are not poisoned by carbon monoxide (CO), which can even be used as fuel. This allows SOFCs to use gases made from coal.

High-temperature operation has disadvantages. It results in a slow start-up and requires significant thermal shielding to retain heat and protect personnel, which may be acceptable for utility applications but not for transportation and small portable applications. The high operating temperatures also place stringent durability requirements on materials. The development of low-cost materials with high durability at cell operating temperatures is the key technical challenge facing this technology.

Polymer Electrolyte Membrane

Polymer electrolyte membrane fuel cells (“PEMFCs”) — also called proton exchange membrane fuel cells — deliver high power density and offer the advantages of low weight and volume, compared to other fuel cells. PEMFCs use a solid polymer as an electrolyte and porous carbon electrodes containing a platinum catalyst. They need only hydrogen, oxygen from the air and water to operate and do not require corrosive fluids like some fuel cells. They are typically fuelled with pure hydrogen supplied from storage tanks or onboard reformers.

PEMFCs operate at relatively low temperatures. Low temperature operation allows them to start quickly (less warm-up time) and results in less wear on system components, resulting in better durability. However, it requires that a noble-metal catalyst (typically platinum) be used to separate the hydrogen’s electrons and protons, adding to system cost. The platinum catalyst is also extremely sensitive to CO poisoning, making it necessary to employ an additional reactor to reduce CO in the fuel gas if the hydrogen is derived from an alcohol or hydrocarbon fuel. This also adds cost. Developers are currently exploring platinum/ruthenium catalysts that are more resistant to CO.

Direct Methanol

Most fuel cells are powered by hydrogen, which can be fed to the fuel cell system directly or can be generated within the fuel cell system by reforming hydrogen-rich fuels such as methanol, ethanol, and other hydrocarbon fuels. Direct methanol fuel cells (“DMFCs”), however, are powered by pure methanol, which is mixed with steam and fed directly to the fuel cell anode.

DMFCs do not have many of the fuel storage problems typical of some fuel cells since methanol has a higher energy density than hydrogen — though less than gasoline or diesel fuel. Methanol is also easier to transport and supply to the public using current infrastructure since it is a liquid, like gasoline.

Phosphoric Acid

The phosphoric acid fuel cell (“PAFC”) is considered the “first generation” of modern fuel cells. It is one of the most mature cell types and the first to be used commercially, with over 200 units currently in use. This type of fuel cell is typically used for stationary power generation, but some PAFCs have been used to power large vehicles such as city buses.

PAFCs are most tolerant of impurities in fossil fuels that have been reformed into hydrogen than PEM cells, which are easily “poisoned” by carbon monoxide — carbon monoxide binds to the platinum catalyst at the anode, decreasing the fuel cell’s efficiency. They are 85 per cent. efficient when used for the co-generation of electricity and heat, but less efficient at generating electricity alone (37 to 42 per cent.). This is only slightly more efficient than combustion-based power plants, which typically operate at 33 to 35 per cent. efficiency. PAFCs are also less powerful than other fuel cells, given the same weight and volume. As a result, these fuel cells are typically large and heavy. PAFCs are also expensive. Like PEMFCs, PAFCs require an expensive platinum catalyst, which raises the cost of the fuel cell. A typical phosphoric acid fuel cell costs between $4,000 and $4,500 per kilowatt to operate.

Alkaline Fuel Cells

Alkaline fuel cells were one of the first fuel cell technologies developed, and they were the first type widely used in the US space program to produce electrical energy and water onboard spacecraft. These fuel cells use a solution of potassium hydroxide (“KOH”) in water as the electrolyte and can use a variety of non-precious metals as a catalyst at the anode and cathode. High-temperature alkaline fuel cells operate at

temperatures between 100°C and 250°C. However, newer alkaline fuel cell designs operate at lower temperatures of roughly room temperature to 70°C.

Alkaline fuel cells' superior system efficiency is due to the rate at which chemical reactions take place in the cell. They have also demonstrated efficiencies near 60 per cent. in space applications.

However, to compete effectively in most mainstream commercial markets, alkaline fuel cells will have to become more cost-effective. Alkaline fuel cell stacks have been shown to maintain sufficiently stable operation for more than 8,000 operating hours. To be economically viable in large-scale utility applications, these fuel cells need to reach operating times exceeding 40,000 hours, something that has not yet been achieved due to material durability issues. This is possibly the most significant obstacle in commercialising this fuel cell technology.

The Directors believe that the key attributes of the AFC Energy technology, when fully developed — low-cost materials, low-temperature operation and an easily replaceable electrode — will address this key issue of cost effectiveness.

4.3 *Fuel Cell Market*

The International Energy Agency forecasts significant growth in world energy demand to an estimated 120,000MW per annum by 2013. In addition, the worldwide need for replacement capacity is in the region of 600,000MW per annum. This need can be filled either by conventional means, such as burning hydrocarbons or nuclear power, or by non-fossil fuel burning technology such as solar, wave and hydrogen fuel cell power.

The market for commercially viable alternative sources of clean power is therefore potentially very substantial and global in scale with demand being driven by real factors including:

- economic development and industrialisation, population growth and diminishing fossil fuel reserves leading to rising energy prices;
- global warming and the anticipated clampdown on CO_2, NOX and SOX emissions; and
- increasing cost of hydrocarbon fuels.

The alkaline fuel cell technology created by AFC Energy is based on the tried and tested alkaline fuel cell technology as used in the Apollo space shuttles and Russian Navy submarines. This technology uses hydrogen and oxygen which, when passed over a suitable catalyst, will produce electricity, pure water and some usable heat energy. The process is entirely clean and produces zero emissions.

5. AFC Energy's Technology

5.1 *Overview*

Eneco, the company that previously developed the technology and know-how now owned by AFC Energy, chose to adopt and develop alkaline fuel cell technology in preference to any other fuel cell technology. This decision was made following a technical audit performed by Eneco's senior management and technical team, including Gerard Sauer and Otto Carlisle (now AFC Energy's CEO and Chief Technical Officer respectively), which led them to conclude that alkaline fuel cells possess a number of key attributes that are required in order to be able to reduce system build costs and to avoid dependency on precious metals for the fuel cell catalyst.

Research carried out by members of the Company's technical team has shown clearly that low-cost and high reliability in fuel cells are best attained by low power density of the electrode and cost engineering all aspects of the fuel cell system. It is these characteristics that are ideally suited to alkaline fuel cell technology.

AFC Energy's technology does not seek to re-invent alkaline fuel cell technology as such, since this is already well defined and developed.

AFC Energy's technical team has applied sound cost engineering design and development processes and skill sets to create new and cheaper materials and designs that should allow reliable and efficient zero emission power generation from the systems without the need for expensive and complicated parts or materials to be used.

The engineers have focussed all their attention on the underlying needs of prospective customers and the reduction of the cost of all the manufacturing processes, including some simplification of the older system's inherent complexities.

Through a process of invention and process redefinition, the Company has filed five new patent applications that cover both system and electrode aspects of design and manufacture, as well as unique material applications and selections.

All the above aspects have been exclusively focussed on low-cost and process engineering. The end result is an alkaline fuel cell system that is capable of being produced at a very low cost when compared to other fuel cell technologies on a like for like basis (i.e. 1,000 kW p.a. production rates). As the production rate increases to 10,000 kW and 100,000 kW the estimated price of the AFC Energy system is expected to reduce further on a price per kW basis.

The aspects of AFC Energy's electrode and alkaline fuel cell system which the Directors believe make them unique are as follows:

The Electrode

The electrode has been engineered to be produced at low cost without being detrimental to operating efficiency. Precious metals have been almost eliminated and all materials are expected to have at least a 50 year security and multiple source of supply.

The AFC Energy electrodes are based on new advanced manufactured materials that have unique properties required for optimum operation and low costs as follows:

- the substrate material consists of a layer of specially manufactured plastic material that is first coated with a metallic layer;
- this base layer is then used as the foundation for a number of critical material depositions that include the catalysts and conductor layers; and
- these layers are extremely thin and are highly accurately distributed onto the substrates to form a homogenous layer.

The level of accuracy combined with the thin layer construction makes for superior access by both the oxygen and electrolyte via the conductor paths. This results in a highly effective but ultra low-cost electrode construction that allows for further system improvements to be implemented.

The typical standard three part alkaline fuel cell electrode of old was typically 1mm thick, whilst AFC Energy's present new electrode design is in the region of just 200 microns in section.

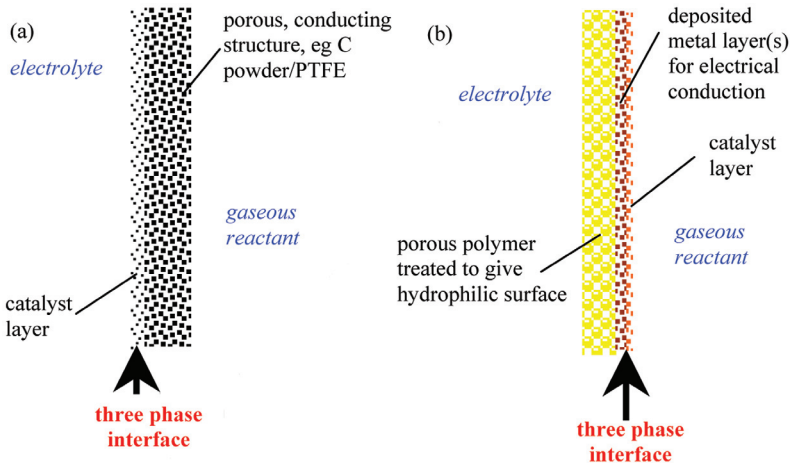


Figure 1: Structure of porous electrodes for gaseous reactants (a) conventional gas diffusion electrode (b) AFC Energy concept

In addition to the low-cost materials, AFC Energy has utilised existing manufacturing techniques to keep production simple and cheap. An added advantage of the AFC Energy electrode is that because the plastic substrate is so thin, the electrode can be positioned in the cell such that the catalyst material resides on the gas side of the electrode and still enjoys complete and direct access to the electrolyte.

The distinct advantage of this design is that the catalyst is no longer in direct contact with the electrolyte flow and this reduces the loss of catalyst material through abrasion. In addition, it prevents catalyst flooding due to over-wetting of the electrode. A patent related to this process has been applied for.

The System

AFC Energy's approach to the design of its complete system is to reduce costs further.

By utilising production engineering processes in existence and developed by the team together with the novel processes for which patents have been filed, AFC Energy aims to produce an alkaline fuel cell system at a fraction of the cost of other systems. In Part III of this document, Professor Keith Scott of Knowledge House of The University of Newcastle upon Tyne states that "The components of the AFC Energy cell stack are produced by known low cost manufacturing routes: electro-less deposition, evaporation, electroplating and spraying". He goes on to state that "However, what can be said about the AFC Energy technology, that with the cost savings of the AFC cell stack the system costs should be less than $100/kW and meet many of the targets for residential and light commercial markets." In addition, the Directors believe that the ability to replace individual electrodes at minimal cost will provide a new dimension to the life of alkaline fuel cell systems.

The dramatic decrease in estimated costs is anticipated to result not only from a far less expensive replaceable electrode but also from:

- a substantially reduced number of components in the system ("balance of plant");
- designing the stack and system in such a way that uses materials that no longer have to cope with high temperatures or pressurised environments;
- operation of the electrodes in parallel using bi-polar cell arrangement rather than in series, thereby allowing individual electrodes rather than the whole stack (as in conventional systems) to be replaced;
- eliminating the need for a nitrogen pacification system in order to shut the system down;
- minimal abrading of the catalyst as a result of the dry-side electrode noted above;
- the unique water management system noted below; and
- the depression-based pressure differentiation system explained below.

AFC Energy is targeting to produce a 3.5 kW system at a cost of below £2,000 ($4,000), based upon a production rate of 1,000 kW per annum. Five patents have been applied for in relation to the system, including:

(i) Unique water management

All hydrogen fuel cells produce water as a by-product of the electrochemical reaction.

This is unavoidable, but what one does with the water greatly influences the reliability and continuous operation of the system and the life and efficiency of the electrodes.

Through the unique properties of AFC Energy's electrode, the water produced at the active surface is drawn into the liquid electrolyte. By regulating the boil off rate in the air stream, in conjunction with the water production rate into the electrolyte, it is possible over a large range of operating conditions to have a water neutral balance in the system. The electrolyte is kept at its peak concentration throughout a wide operating range and the balance of plant requirements to maintain water balance are reduced.

(ii) Depression-based pressure differentiation

In order to circulate the electrolyte, a pump is normally used in an alkaline fuel cell system. In the AFC Energy system this pump has been replaced with a vacuum and circulating combined unit. This allows the pressure differential between the compartments to be set at the required values without resorting to additional pumps and valves to achieve this. This saves not only several components in the system but also greatly reduces the energy required to create pressure differential and gas supplies to the cell units. In addition, the depression-based system uses less auxiliary energy, and reduces the possibility of leaks, hence increasing safety.

(iii) Replaceable electrode design

One significant aspect of the new fuel cell technologies is that of stack and electrode life expectancy. In the recent past this has meant that the cells must be capable of producing power for a period of at least 20,000 hours to be a useful, cost effective appliance. AFC Energy's approach has been to invent a new system configuration that combines the electrodes, stack and system into one single assembly but allows for individual electrodes to be replaced without replacing the entire stack.

The low cost of AFC Energy's electrodes is anticipated to contribute to an intermediate solution to life expectancy problems since the replacement costs are so low that it should not materially alter the running costs of the system over a period of around two or three years.

5.2 *Technological 'Milestones' to Date*

The following milestones have been achieved over the past three years:

(i) Designed and developed a new substrate material for the use in alkaline fuel cells;

(ii) Radically reduced the number of parts needed to operate a fuel cell (the balance of plant);

(iii) Changed the whole concept of the stack and system design into a single all-encompassing unit;

(iv) Tested and verified the half-cell design of the new electrode to over 3,000 hours;

(v) Designed a new control system for electrode optimisation;

(vi) Eliminated the need for a nitrogen pacification system; and

(vii) Designed a new voltage monitoring system.

5.3 *AFC Energy's Proposed Technological "Milestones"*

The six new milestones that the Company is aiming to achieve, and to have independently verified by the team at Surrey University, are as follows:

Milestone	*Description*	*Target Completion*
1	Small-scale single cell 500 hours operation	May 2007
2	First scaled single cell operation	August 2007
3	Scaled single cell 500 hours operation	October 2007
4	First prototype system operation	January 2008
5	System operation 500 hours	February 2008
6	Delivery of multiple systems to customer	August 2008

Source: AFC Energy development programme.

6. Intellectual Property Protection

A report produced by IP Solutions and commenting on the AFC Energy patent applications is included in Part V of this document.

The Company has made the following patent applications:

Number	*Status*	*Filed*	*Descriptive Title*
PCT/GB2007/050104	Application	6 March 2007	Hydrophilic electrode
PCT/GB2007/050105	Application	7 March 2007	Negative pressure
PCT/GB2007/050106	Application	7 March 2007	Releasable electrodes
PCT/GB2007/050117	Application	9 March 2007	Master/slaves control
GB 06 08440.4	Application	27 April 2006	Microprocessor control

Source: Intellectual Property Report prepared by IP Solutions and included at Part V of this document

Search reports have been received from the UK Patent Office in respect of all of the applications and the Company has obtained a patentability search and review from an independent patent agent, IP Solutions, in respect of all five patent applications.

Some prior art and issues relating to obviousness have been raised in respect of certain claims. As a result, the Company has identified a number of amendments with a view to strengthening the patent applications. IP Solutions has been engaged to update the patent specifications for filing before the anniversary of the original UK filing dates. As a result of the search and review, the Company has also identified several further inventions that it believes to be suitable for patent protection.

7. Business Model and Relationships

7.1 *Business Model*

AFC Energy envisages that it will eventually license its technology to third parties worldwide after it has progressed the Akzo Nobel relationship. This may be through licenses to produce the bare electrodes or complete alkaline fuel cell systems.

The Company has concluded a memorandum of understanding with Akzo Nobel. Under the terms of the agreement, Akzo Nobel will test AFC Energy's low-cost hydrogen fuel cell technology at its Bitterfeld site in Germany to generate clean energy from the substantial quantity of hydrogen that is currently produced as a by-product at chlorine production plants. Pursuant to the memorandum of understanding, the Company has received a contractual purchase order from Akzo Nobel under which the Company will deliver its first fuel cells to Akzo Nobel's Bitterfeld site during the first quarter of 2008. A system expansion study towards developing a 200kW system is also due to be completed by the second quarter of 2009, in collaboration with Akzo Nobel personnel. The Directors believe that the amounts of available waste hydrogen in the global chlor-alkali industry could support approximately 3,000 MW per annum of generating capacity, representing a potential market of approximately £1 billion.

Knut Schwalenberg, General Manager Chlor-Alkali of Akzo Nobel stated: "The Chlor-Alkali industry is energy intensive, so improving energy efficiency is a top priority to keep the processes sustainable. Huge amounts of hydrogen are produced in the electrolysis process as by-product of chlorine and caustic lye. The immediate conversion of this hydrogen into electricity, based on locally installed fuel cells, and the use of this electricity back in the electrolysis process would create an ideal loop. Akzo Nobel regards the technology of AFC Energy as promising and we are looking forward to the results of the cooperation."

The Directors also anticipate that AFC Energy may enter into joint ventures internationally to develop further and manufacture electrodes and systems as well as to achieve market penetration and after sales support. The supply of replacement electrodes is likely to become a significant source of revenue.

In addition, there are numerous other potential applications for AFC Energy's systems, which include:

(i) Domestic and light industrial power supply

A 3.5 kW system would provide sufficient electricity to supply the needs of an average three bedroom house.

Such a domestic unit would be approximately the same size as a typical white goods appliance such as a dishwasher, tumble drier or washing machine. Larger systems, of up to 50 kW, are envisaged to supply electricity to clusters of houses, offices, industrial or retail units.

(ii) Marine

Alkaline fuel cells are unique in that they are the only fuel cells that can generate efficiently in saltwater environments. This makes them particularly well suited for use in marine applications — such as auxiliary generators on yachts where quiet, clean operation would be a considerable advantage over diesel generators.

(iii) Quiet generation

AFC Energy envisages significant demand from consumers such as hospitals and film producers for quiet electricity generation.

(iv) Zero emission generation

In addition to the environmental benefits of the zero emission generation of electricity there is anticipated to be a requirement and demand from hospitals, mines and other industries for zero emission generation.

(v) Remote locations

Alkaline fuel cells are ideally suited to provide electricity in remote locations with either permanent or mobile generators. Of particular interest is their application in low temperature zones because the electrolyte allows for a quick start up in low temperatures as the freezing point of KOH is well below zero. At 6.6 Molar the freezing point of KOH is estimated to be 34°C below zero. In other types of fuel cell the water produced in the system could freeze, thereby stopping catalytic action at the active surface and ultimately causing electrode damage.

(vi) Emergency/back-up supply

Alkaline fuel cells are also ideally suited to provide emergency or back-up power supplies for applications such as telephone exchanges and mobile phone masts. Their rapid start-up capability, ability to run for long periods of time, lack of bulk compared to conventional battery back-up and long service life make them especially attractive.

(vii) Military operations

The low heat profile of alkaline fuel cells, coupled with zero emissions and quiet operation, make them particularly suitable for stealth operations.

Alkaline fuel cells are best suited to applications that require constant power supply, rather than applications such as motor vehicles which require variable supply. The Directors believe that the design and development of AFC Energy fuel cells will follow a logical path, as follows:

- 3.5 kW fuel cell — to form the basis for both industrial and domestic applications; and
- 50 kW fuel cell — will form the basis for mini-grid and industrial applications.

All aspects of the Company's commercial strategy specifically exclude potential financial benefits such as any governmental grants or subsidies, carbon credits or Renewable Obligation Certificates (ROC).

7.2 *Product Development Relationships*

AFC Energy has recently established relationships with leading UK universities in the field of fuel cell research:

- Surrey University has been contracted to carry out durability testing and transient testing of electrodes in parallel with the AFC Energy laboratory. They will also run a continuous life testing rig in parallel with AFC Energy's own laboratory; and
- The College of North West London intends to start a course in fuel cell diagnostics to train people in the skills of repairing and diagnosing fuel cell units. Under the proposed

arrangement, AFC Energy will supply the training materials and the hardware for the training course.

Further, Dr Terry Cooper, an internationally recognised plastics expert, who previously worked for DuPont in the US, has been contracted to help with material selection for the electrode substrate and other system components.

8. Competition

The Directors believe that AFC Energy's primary competition in the UK comes from other AIM listed fuel cell companies such as ITM Power plc, Ceres Power plc, Intelligent Energy Holdings plc, as well as conventional hydrocarbon sources.

Competitor	*Fuel cell type*	*Applications*	*Established*
CMR Fuel Cells plc	Direct Methanol	Stationary Power Generation	2000
Ceramic Fuel Cells Ltd	Solid Oxide	CHP	1992
ITM Power plc	Polymer Electrolyte Membrane	Electrolysers	2002
Intelligent Energy Holdings plc	Proton Exchange Membrane	Vehicles/CHP	1995
Ceres Power plc	Solid Oxide	CHP	2001

Source: company websites and promotional material

In addition, there are a significant number of smaller independent companies and focussed fuel cell teams within large multinational companies working on fuel cell technology, including alkaline fuel cells. As noted in the report produced by Knowledge House in Part III of this document, companies such as Gaskatel GmbH (Germany) and Astris Energy (Ontario) are also experimenting with inexpensive materials in alkaline fuel cells.

Outside of the UK, significant research is being undertaken, in particular, in the United States and Japan, into different types of fuel cell and as the fuel cell technologies move to commercialisation, increasing competition is likely to come from overseas.

The Directors believe that AFC Energy will also compete with diesel generators produced by established companies such as Honda, Kubota, and Mitsubishi. There is a volume related price bracket that allows $100-150/kW prices to be quoted for this technology. However, the Directors believe that for a quiet, zero emission, portable generator made from a basic internal combustion device the cost would be at least $1,500/kW for a portable device and $3,000-4,000/kW for a stationary device which the Directors believe is comparable to the targeted AFC Energy costs.

9. Reasons for the Placing and Use of Proceeds

The Company is seeking admission to AIM in order to access a broader investor base and to provide access to equity capital markets.

The proceeds of the Placing will be used to finance the working capital requirements for the Company's proposed development of the Company's alkaline fuel cell technology in line with the Company's business described in this document and to fund the Company's costs of Admission as follows:

Use of Proceeds	*£ million*
Electrode development	0.84
System development	1.13
Commercialisation	0.10
Corporate costs and working capital	0.36
Admission costs	0.60
Total	3.03

Following Admission and completion of the Placing, and assuming no further income streams, the Directors consider that the Company will have secured sufficient funds to develop the Company's alkaline fuel cell technology to the point of delivering prototypes of its 3.5kW system to Akzo Nobel in line with the contractual purchase order.

10. Directors and Employees

AFC Energy's Board and technical team enjoy considerable experience in the areas of mechanical engineering, product design, IP development and of managing companies through their critical expansionary growth phase. On Admission, the Company's Board and technical team will comprise the following people:

10.1 *Board*

As at the date of this document, there are seven members of the Board, four of whom are non-executive directors.

Tim Yeo — Non-executive Chairman (Aged 62)

Tim Yeo has been Member of Parliament for South Suffolk since 1983. Prior to 1997 he served as a Minister in the Conservative Government, latterly as Minister of State for the Environment. Between 1998 and 2005 he was a member of the Shadow Cabinet, and since 2005 he has been Chairman of the Environmental Audit Committee.

He is Chairman of Univent plc, a nursing home operator, and a director of ITI Energy Limited, which supplies gasifiers.

Gerard Sauer, Ing-MVT — Chief Executive Officer (Aged 61)

Having been educated and trained in both Holland and Germany, Gerard established a prototype engineering business in the UK in 1971, working exclusively in the motor sport arena. During the latter part of the 1980s an increasing amount of design and development work involved integrating advanced drive systems and fuel cell based integration work. Gerard worked increasingly on development and design work in the fields of SOFC, PEM and alkaline fuel cell system integration involving cars, vans, buses, boats and static generators. From 2001 onwards, Gerard instigated and led Eneco's "Own Electrode Project" to establish the creation of a real world low-cost electrode and fuel cell system.

Howard White — Business Development Director (Aged 53)

Howard founded AFC Energy in January 2006 for the purpose of purchasing the alkaline fuel cell assets of Eneco Limited. He has extensive experience in the ownership and management of businesses in the manufacturing, leisure and technology sectors. Howard's achievements of note include taking a stake in the engineering company Christy Hunt plc, acquiring Deritend Stamping plc and taking responsibility for group operations before selling to Triplex Lloyd PLC. He has also been responsible for the reorganisation (under Chapter 11 of the US Bankruptcy Code) of Solitron Devices Inc., a New York Stock Exchange-listed company. He was an executive director of Stanelco plc for several years and was latterly Managing Director.

Simon Walters, ACA — Finance Director (Aged 44)

Simon qualified as a chartered accountant in 1986 and joined the corporate finance department of Stoy Hayward. In 1990, he left to join Fuller Peiser, a national property consultancy, as Finance Partner where he stayed for two years before becoming Finance Director of the privately-held Molyneux property group, whose interests included 52 per cent. of USM-listed Molyneux Estates plc. In 1997, he became Finance Director of the operating companies of Shani, a fully-listed UK clothing manufacturer with operations in the UK and Eastern Europe.

In 1999, Simon became Finance Director of Wood Hall Securities, a private equity group with funds invested in a range of private high-growth businesses and a significant property portfolio. Simon has also been a Non-Executive Director of Bilston & Battersea Enamels plc, Finance Director of the Fish!

chain of restaurants and a director of NetFM, an internet radio station where he headed a consortium of backers. Simon is currently managing director of FD Solutions and since 2003 has provided finance director services to listed and unlisted companies in various sectors.

Brian Wilson — Non-executive Director (Aged 58)

Rt Hon. Brian Wilson is a Privy Councillor and former UK Energy Minister who was a Member of Parliament from 1987 to 2005. In all, he held five Ministerial posts and latterly acted as the Prime Minister's Special Representative on Overseas Trade. Since leaving politics, he has maintained a strong interest in the energy sector on which he writes and broadcasts extensively, as well as holding several non-executive positions. He is also a director of Celtic Football Club.

Dr Michael Mangan — Non-executive Director (Aged 65)

Michael has a PhD in plasma behaviour in very high current electrical discharges from the University of Liverpool. He has extensive experience of electricity application projects for electric road vehicles gained from work at the Electricity Council, Lucas and more latterly Chloride Silent Power (CSPL), which he joined in 1986 as team leader for the US DOE sponsored sodium sulphur battery development programme. Michael joined the fuel cell company Zevco (later ZeTek Power plc) in 1998 as General Manager, based in Belgium and transferred to the Fuel Cell Systems subsidiary of ZeTek Power plc in 2000 as technology director, responsible for the development of operational fuel cell systems and third party training programmes. Following the closure of ZeTek Power plc in 2001, he continued with similar work for Eneco.

Harry Epstein — Non-executive Director (Aged 46)

Harry is the Vice President of Innovations for Havi Global Solutions, the provider of packaging, promotions and supply chain management globally to some of the world's leading brand owners in the food service industry. Harry has been responsible for leading major brands into a sustainable solution, not only for packaging but sustainable architecture and energy, and has advised and developed proposals for creating as comprehensive a carbon neutral footprint in all areas as is feasible. Harry sits on various committees associated with environmentally responsible solutions. Harry has over 18 years of senior management experience; most of the time spent in the telecommunications and computer industries.

10.2 *Technical Team*

In addition to certain members of the Board described above, the Company's technical team includes the following:

Otto Carlisle, BEng (Hons), MSc, CEng, MIMechE — Chief Technical Officer (Aged 32)

In 2000, Otto completed his degree in Mechanical Engineering with Automotive design at Brunel University and joined Eneco to work on the design and development of the Alkaline Fuel Cell system, stacks and electrodes. In 2004 Otto became the Design Office Manager and was responsible for the development and testing of an in-house electrode and complete new system design. Otto became a Chartered Engineer and a Member of the IMechE in 2004 and finished his Masters in Renewable Energy Systems Technology at Loughborough University in 2005.

Dr Amitava Roy BSc, M-Tech, PhD — Fuel Cell Scientist (Aged 35)

Amitava has considerable experience in the design, repair, maintenance and operation of fuel cells. He has spent 3 years on repair, maintenance and regular operation of the alkaline electrolyser (36kW) and PEM fuel cells (2kWe CHP and 5kW) and investigating their performance at the Hydrogen and Renewable Integration (''HARI'') field demonstration project in Leicestershire.

Amitava has developed dynamic and transient models incorporating thermodynamics, electrode kinetics, heat and mass transfer mechanism, differential pressure, corrosion analysis, gas and fluid handling systems and the efficiency of fuel cells and electrolysers using Matlab-Simulink. He is experienced in developing specifications and fabrication of bipolar plates, current collectors, catalyst deposition on

electrodes, cathodic protection, nano-filtration for hydrogen purification and balance of plants. Amitava also used nanotechnology based catalyst from low-cost carbon nanotube and metals on electrodes and performed electrochemical characterisation and testing. He develops software modelling for designing the control parameters and integration of multiple variable components and balance of plant. He also has developed hybrid configuration between super-capacitors and batteries for load sharing and peak load management of fuel cells.

Dr Jon Sansom BSc (Hons), PhD — Fuel Cell Scientist (Aged 42)

Jon started his career in the telecommunications industry installing and commissioning digital systems and services. He then worked with Dr Peter Slater at the University of Surrey where he obtained a PhD in the "Synthesis and Characterisation of New Electrode Materials for use in Solid Oxide Fuel Cells". He continued working with Dr Peter Slater developing "New Ionic and Mixed Conducting Materials for Fuel Cell Applications" before joining AFC Energy.

Roger Pitts — Production Design Engineer (Aged 59)

Roger completed an engineering apprenticeship covering most aspects of tool making and production engineering during which time he achieved an HNC in mechanical engineering. He qualified as a mould tool designer and has since gained over thirty years' experience in the plastics industry, fourteen of which was as the director of a mould making company. Roger has an in-depth knowledge of injection mould design with a full understanding of the requirements of product design for high volume production. Roger's experience of product design is varied, with a bias towards plastics and the requirements for moulding with the ability to take an initial concept through development, prototype manufacture and high volume production.

10.3 *Employees*

As at Admission AFC Energy employs 20 staff, including the Directors, all located in the United Kingdom, with the exception of Harry Epstein who is based in the US. The Company's staff are distributed by activity as follows:

Activity	*No. of staff*
Directors (including non-executives)	7
Technical staff*	11
Administrative staff	2
Total	20

*Includes two placement students from Surrey University

10.4 *Consultants*

In addition, the Company utilises the services of specialised external consultants where required. These include Professor Robert Slade of the school of biomedical and molecular sciences at Surrey University, a recognised expert in fuel cell research who has also been Chair of the Materials Chemistry Laboratory since 2002. Professor Slade has overseen fuel cell related research projects for the European Commission, EPSRC and private companies across Europe.

11. Corporate Governance

11.1 *Audit Committee*

The Company has established an Audit Committee.

The Audit Committee will meet at least twice each year and at any other time when it is appropriate to consider and discuss audit and accounting related issues. The Audit Committee will be responsible for monitoring the quality of internal controls and for ensuring that the financial performance of the Company is properly monitored, controlled and reported on. It will also meet the Company's auditors without executive Board members being present and review reports from the auditors relating to

accounts and internal control systems. The Audit Committee comprises two non-executive directors, Brian Wilson and Tim Yeo, and will be chaired by Tim Yeo.

11.2 *Remuneration Committee*

The Company has established a Remuneration Committee.

The Remuneration Committee will review the performance of the executive Directors and set the scale and structure of their remuneration and the basis of their service agreements with due regard to the interests of Shareholders. In determining the remuneration of executive Directors, the Remuneration Committee seeks to enable the Company to attract and retain executives of the highest calibre. The Remuneration Committee will also make recommendations to the Board concerning the allocation of share options to employees. No Director is permitted to participate in discussions or decisions concerning their own remuneration. The Remuneration Committee comprises the Chairman, Tim Yeo, and two other non-executive Directors, Brian Wilson and Michael Mangan.

11.3 *AIM Rules Compliance Committee*

An AIM Rules Compliance Committee has been established which will meet at least twice a year and at any other time when requested by a member of the committee. The AIM Rules Compliance Committee will be responsible for, *inter alia*, monitoring the quality of internal procedures, resources and controls to enable compliance by the Company with the AIM Rules and the AIM Rules for Nominated Advisers and to enable the Company to seek advice from its nominated adviser regarding compliance with the AIM Rules and AIM Rules for Nominated Advisers whenever it is appropriate to do so and to take such advice into account. In undertaking its duties, the committee shall bear in mind the size, profitability and market capitalisation of the Company, its reputation, its performance relative to other similar companies, the performance of individuals and the best interests of shareholders. The AIM Rules Compliance Committee comprises of Tim Yeo, who will be chairman, Brian Wilson and Michael Mangan.

11.4 *QCA Guidelines*

In addition, following Admission, the Company intends to adopt practices to comply with the provisions of the Quoted Companies Alliance Corporate Governance Guidelines for AIM companies ("QCA Guidelines").

The Company has adopted a share dealing code, relating to dealings in Ordinary Shares by Directors and relevant employees in accordance with the AIM Rules and will take proper steps to ensure compliance by the Directors and those employees.

The Company has departed from certain aspects of the QCA Guidelines in that Non-Executive Directors have been granted warrants to subscribe for new Ordinary Shares. However, such warrants are not subject to performance criteria. In the opinion of the Board and each of the Non-Executive Directors concerned, these warrants are not considered material enough to either the Company or the Director concerned to impair his independence. Consequently, the Non-Executive Directors are considered by the Board to be independent.

12. Current Trading and Prospects

Following the purchase of certain assets and know-how relating to alkaline fuel cell technology from Eneco in January 2006, the Company has identified and refurbished a suitable laboratory, recruited a team of fuel cell experts and design engineers and commenced development and testing of its alkaline fuel cell technology. As a result of the memorandum of understanding with Akzo Nobel (detailed at paragraph 8(c) of Part VI of this document) the Company is now receiving a monthly income stream.

Following Admission and completion of the Placing, and assuming no further income streams, the Directors consider that the Company will have secured sufficient funds to develop the Company's alkaline fuel cell technology to the point of delivering prototypes of its 3.5kW system to Akzo Nobel in line with the contractual purchase order.

13. Lock-in Undertakings

Each Director (and their related parties, as applicable), two applicable employees and five significant shareholders have undertaken to the Company, to Nabarro Wells and to Dawnay Day that they will not dispose of Ordinary Shares for a period of one year following Admission and, they will not at any time after the first anniversary of Admission and prior to the second anniversary of Admission sell any Ordinary Shares other than through Dawnay Day (or any successor to it as broker to the Company), so as to maintain orderly market in the shares of the Company.

These undertakings do not apply in certain specified circumstances set out in the AIM Rules, including acceptance of an offer for all of the Ordinary Shares that (if accepted) would result in the offeror obtaining or consolidating control of the Company (as defined in the City Code) or the execution of an irrevocable commitment to accept such an offer.

The Lock-in arrangements outlined above will apply in respect of 46,426,630 existing Ordinary Shares, representing, in aggregate, 52.9 per cent. of the Company's issued share capital on Admission. In addition, the lock-in arrangements also extend to the 4,039,980 new Ordinary Shares that would be issued pursuant to the exercise of the warrants described in paragraph 14 below.

The Lock-in agreements relating to the Directors are contained within the Placing Agreement which is summarised in paragraph 8 of Part VI of this document. All other Lock-in agreements are summarised in paragraph 8 of Part VI of this document.

14. Share Options

The Board believes that a key element of the Company's retention and reward strategy for employees will be to align their interests with those of the Shareholders, as well as to encourage employee share ownership and to facilitate the retention of key staff through the operation of employee incentivisation schemes.

Accordingly, the Board has established the Executive Schemes. Under the Executive Schemes, the Company may grant options to acquire Ordinary Shares to employees of the Company and its subsidiaries. Where the necessary statutory conditions are met the Executive Schemes will facilitate the grant of enterprise management incentives which qualify for beneficial tax treatment. Where such statutory conditions cannot be met, the Executive Schemes also allow the grant of unapproved share options that will not qualify for any beneficial tax treatment.

Further details of the Executive Schemes are set out in paragraph 4 of Part VI of this document. Options over a total of 7,179,660 Ordinary Shares under the Executive Schemes have been granted on or prior to Admission and remain outstanding, and details of the options granted to Directors are set out in paragraph 5(b) of Part VI of this document. Following Admission the Company does not intend to grant any further options pursuant to the AFC Energy plc 2006 Share Option Scheme. To the extent that AFC Energy do issue any further options following Admission, these will be issued pursuant to the AFC Energy plc 2007 Share Option Scheme.

Following Admission, the terms of the Executive Schemes will restrict the aggregate options to be granted to 10 per cent. of the Company's issued share capital from time to time as is further described in paragraph 4(ix) of Part VI of this document.

In addition the Company has granted warrants over 4,039,980 new Ordinary Shares to the non-executive directors, certain advisers and other individuals. The warrants are subject to the Lock-in undertakings summarised in paragraph 13 above. Details of these agreements are summarised in paragraph 8 of Part VI of this document.

15. Dividend Policy

The Company is at an early stage in its development and has not, to date, generated profits. The Board does not anticipate that it will be in a position to consider the declaration and payment of dividends until such time as its alkaline fuel cell technology has successfully gained commercial acceptance and the Company has sufficient distributable reserves to do so.

16. Taxation

General information relating to UK taxation in relation to Admission and the Placing is summarised in paragraph 9 of Part VI of this document.

A prospective investor who is in any doubt as to his or her tax position, or is subject to tax in a jurisdiction other than the UK, should consult his or her independent financial adviser and/or other professional advisers immediately.

17. Terms and Conditions of the Placing

Dawnay Day has conditionally agreed to use its reasonable endeavours to place, as agent for the Company, 13,183,034 Placing Shares at the Placing Price which will represent approximately 15.0 per cent. of the enlarged ordinary share capital of the Company following Admission.

The gross proceeds of the Placing are expected to be £3.0 million and the net cash proceeds to the Company of the Placing (after deduction of expenses (estimated in total at £0.6 million (excluding VAT)) are expected to be £2.4 million.

The Placing Shares will be issued fully paid, and following allotment, will rank in full for all dividends or other distributions hereafter declared, made or paid on the ordinary share capital of the Company and will rank *pari passu* in all other respects with all other Ordinary Shares in issue on Admission. The rights attaching to such Ordinary Shares are set out in paragraph 3 of Part VI.

The Placing is conditional, *inter alia*, on Admission. The Placing and Admission is subject to certain conditions contained in the Placing Agreement. The Placing Agreement contains provisions entitling Dawnay Day and Nabarro Wells to terminate the Placing Agreement at any time prior to Admission in certain circumstances. If this right is exercised the Placing will lapse.

The Placing Shares are not being offered generally and no applications have or will be accepted other than under the terms of the Placing Agreement and the Placing Letters. The period within which placing participants may be accepted pursuant to the Placing and arrangements for the payment and holding of subscription monies pending Admission are set out in the Placing Agreement and in the Placing Letters sent out to prospective placees. It is expected that the proceeds of the Placing due to the Company will be received by it on or soon after Admission.

The Placing Shares are in registered form. Prior to admission, the Company has issued share certificates in respect of its issued share capital, and has maintained its register of members in book entry form. The register of members has been maintained by the Company at its registered office.

It is expected that, subject to the satisfaction of the conditions of the Placing, the Placing Shares will be registered in the names of the placees subscribing for or acquiring them and issued or transferred either:

- in CREST, where the placee so elects and only if the placee is a "system member" (as defined in the Uncertificated Securities Regulations 2001) in relation to CREST, with delivery (to the designated CREST account) of the Placing Shares subscribed for or purchased expected to take place on 24 April 2007; or
- otherwise, in certificated form, with the relevant share certificate expected to be despatched by post by 1 May 2007.

Notwithstanding the election by placees as to the form of delivery of the Placing Shares, no temporary documents of title will be issued. All documents or remittances sent by or to placees or as they may direct will be sent through the post at their risk.

Pending despatch of definitive share certificates or crediting of CREST stock accounts (as applicable), the Company's registrars will certify any instrument of transfer against the Company's register of members.

Further details of the Placing Agreement are set out in paragraph 8(f) of Part VI of this document.

18. Admission to Trading and Dealing Arrangements

Application will be made for admission of the Ordinary Shares comprised within the issued and to be issued share capital of the Company to trading on AIM. It is expected that Admission will become effective and that unconditional dealings in the Ordinary Shares will commence on 24 April 2007. The Ordinary Shares will have the ISIN number GB00B18S7B29.

Prior to Admission, it is expected that dealings in the Ordinary Shares will commence on a conditional basis on 19 April 2007. Settlement of dealings from that date will be on a three day rolling basis. The earliest date for settlement of such dealings will be 24 April 2007. All dealings in the Ordinary Shares prior to the commencement of unconditional dealings will be on a "conditional basis", will be of no effect if Admission does not take place and will be at the sole risk of the parties concerned. These dates and times may be changed. Each investor will be required to undertake to pay the Placing Price for the Ordinary Shares sold or issued to such investor, in such manner as shall be directed by Dawnay Day. Dealings in advance of crediting of the relevant CREST stock account shall be at the risk of the person concerned.

The Ordinary Shares are not dealt on any other recognised investment exchange and no application has been or is being made for the Ordinary Shares to be admitted to any such exchange.

19. CREST

The Ordinary Shares will be held in CREST in accordance with the Company's Articles. Application will be made for all of the issued and to be issued Ordinary Shares to be eligible for admission to CREST with effect from Admission. Accordingly, settlement of transactions in the Ordinary Shares following Admission may take place within the CREST system if the individual Shareholders so wish. CREST is a paperless settlement procedure which allows securities to be evidenced without a certificate and transferred other than by written instruction.

CREST is a voluntary system and holders of Ordinary Shares who wish to receive and retain share certificates will be able to do so. Should Shareholders wish to hold their Ordinary Shares in CREST, they will need to follow the requisite CREST procedures for the dematerialisation of their shareholding.

The Directors have applied for the Ordinary Shares to be admitted to CREST with effect from Admission. Accordingly, it is expected that the Ordinary Shares will be enabled for settlement in CREST following Admission.

Additional information

Prospective investors should carefully consider the information set out in Parts II to VI of this document, and in particular the section entitled "Risk Factors" in Part II of this document which sets out certain principal risk factors relating to any investment in the Ordinary Shares.

PART II

RISK FACTORS

Before deciding whether to invest in the Company's Ordinary Shares, prospective investors should carefully consider the risk factors set out below together with all other information contained in this Admission Document.

The Directors consider the following risks to be the most significant for potential investors. The risks listed below do not necessarily comprise all of those associated with an investment in the Company. The investment offered in this document may not be suitable for all its recipients. An investment in the Company is only suitable for investors who are capable of evaluating the risks and merits of such investment and who have sufficient resources to bear any loss which might result from such investment. No relative importance of the risk factors below ought to be inferred from the order in which they appear. In particular, the Company's performance may be materially and adversely affected by changes in the market and, or economic conditions and by changes in the laws and regulations (including tax law and regulations) relating to, or affecting, the Company or the interpretation of such laws and regulations.

If any of the following risks actually occur, the Company's business, financial condition and the results and the scope of its operations could be materially and adversely affected. In such circumstances, the trading price of the Ordinary Shares could decline, and investors may lose all or part of their investment. Prospective investors are accordingly advised to consult an independent adviser who is authorised under the Financial Services and Markets Act 2000 and who specialises in advising on the acquisition of shares and other securities before making the decision to invest.

1. BUSINESS RISK

1.1 *Company's Objectives*

The value of an investment in the Company is dependent upon the Company achieving its objectives, being primarily the successful commercialisation of the Company's alkaline fuel cell technology. There can be no guarantee that the Company will achieve these objectives to the level of success that the Directors expect, in the timescale that the Directors expect or at all.

1.2 *Commercial Risk*

Return on investment is not just dependent upon the successful technical development of the Company's alkaline fuel cell technology but also upon the Company being able to secure suitable terms to license or outsource the manufacturing and marketing of its product. Unforeseen problems with the mass manufacture of the Company's alkaline fuel cell or excessive marketing costs could adversely affect the commercial success of the Company and the return on investment.

1.3 *Technical Risk*

New technology, changing commercial circumstances and new entrants to the markets in which the Company operates may adversely affect the Company's value. Gerard Sauer and Otto Carlisle have spent 8 years and 7 years respectively developing the Company's alkaline fuel cell technology which has involved addressing various technical issues. Although the Directors believe that any major technical issues with the Company's alkaline fuel cell technology have been addressed, there can be no guarantee that further, as yet unforeseen, issues will not arise which could affect adversely the Company's on-going technical development, growth and business performance.

The Company has yet to build a full-scale electrode, fuel cell stack or fuel cell system. Once constructed the electrode, stack and system will be subjected to extensive testing and problems and delays may be encountered at that stage that were previously unforeseen.

1.4 *Competition*

AFC Energy's technology may face competition from other fuel cell technologies, both alkaline based and other technologies. Given the Company's patent applications, subject to risk factor 1.5

below, and confidential know-how the Directors do not believe that there currently exist any other fuel cell companies whose fuel cell manufacturing cost is as low as that estimated by AFC Energy.

In addition, the Company faces competition from existing hydrocarbon based technologies such as the internal combustion engine, which currently dominate most of the markets that AFC Energy will be targeting.

Many of the Company's competitors have financial resources, customer bases, businesses or other resources, which give them a significant competitive advantage over AFC Energy.

1.5 *Intellectual Property Protection*

The business of the Company is dependent on certain intellectual property rights. Many participants in the fuel cell industry have patents and patent applications and have demonstrated a readiness to pursue litigation based on allegations of patent or other intellectual property infringement. The Company could incur substantial costs in defending or bringing a claim whether or not successful. A successful claim for infringement against the Company and its failure or inability to licence or develop the infringed intellectual property on acceptable terms and a timely basis, could harm the Company's business, operating results and, or financial performance.

No assurance is given that the Company will develop technology which is capable of being protected or that any protection gained will be sufficiently broad in its scope to protect the Company's intellectual property rights and exclude competitors from similar technology. Further, there can be no assurance that:

- patent applications now existing or made in the future will be granted;
- patents granted to the Company will be sufficiently broad in scope to provide protection for the Company's intellectual property rights against third parties;
- the validity or scope of any patents which may in the future be granted to the Company, or that claims in relation to the patents, will not be questioned or asserted by other parties; or
- a third party will not claim prior rights in relation to intellectual property used by the Company.

AFC Energy's intellectual property protection is UK patent applications, which are still at an early stage of the application process and have not progressed to the international phase. There is no guarantee that any of the applications will result in a granted patent and the Company may become subject to lawsuits in which it is alleged that AFC Energy has infringed the intellectual property rights of others or the Company may commence lawsuits against others who the Directors believe are infringing upon the Company's rights or claims.

The Company is at a very early stage in the development of its technology and protection of intellectual property relating thereto. Infringement reviews have yet to be undertaken in respect of the patent applications submitted by the Company and there is a risk that the current patent applications may not proceed to grant.

1.6 *Reliance on Strategic Relationships*

AFC Energy does not intend to manufacture alkaline fuel cells itself but will seek to license or outsource manufacturing. As demand and production volumes increase there could be no guarantee that disruption at third party manufacturers will not affect adversely the Company.

1.7 *Force Majeure*

The economics of AFC Energy's projects may be adversely affected by risks outside the control of the Company including labour unrest, civil disorder, war, subversive activities or sabotage, fires, floods, acts of God, explosions or other catastrophes, or epidemics.

1.8 *Uninsured Risks*

Although the Company proposes to maintain insurance which the Directors consider to be appropriate, there may be circumstances where the Company's insurance will not cover or be adequate to cover the consequences of certain events. Moreover, there can be no assurance that AFC Energy will be able to maintain adequate insurance in the future at rates the Directors consider reasonable. Thus AFC Energy may become subject to liability for hazards which cannot be insured against or against which it may elect not to be insured because of high premium costs or other commercial reasons. There can be no assurance that the Company will be able to obtain insurance at reasonable rates (or at all), or that any coverage it obtains will be adequate and available to cover any such claims.

1.9 *Dependence on Key Personnel*

The operation of AFC Energy is largely dependent upon the continuing employment and provision of services by certain key executives and personnel for its success. The future results of the Company depend significantly upon the efforts and expertise of such individuals. While the Company may enter into employment contracts with those persons the loss of service of any key management personnel could have a material adverse effect on the business of the Company and the retention of their services cannot be guaranteed. In addition, AFC Energy may find it difficult to recruit new executives and employees. The business may suffer if the Company fails to attract, employ and retain the necessary skilled and experienced personnel.

1.10 *Additional Capital*

The Company has incurred losses to date and expects losses and cash expenditure to continue until it achieves commercialisation and begins licensing and entering into joint ventures in respect of its alkaline fuel cell technology.

AFC Energy may require further financing in addition to amounts raised in the Placing if additional income streams are not secured and its capital requirements vary materially from the Company's expectations. Any additional equity financing may be dilutive to shareholders and debt financing, if available, may involve restrictions on other forms of financing and operating activities. If the Company is unable to obtain additional financing as needed, it may be forced to reduce the scope of the Company's operations or its anticipated expansion, or ultimately cease to trade.

1.11 *No Diversification*

Generally, risk is reduced through diversification. However, the Company will concentrate on one core area — the development and commercialisation of alkaline fuel cells.

1.12 *Environmental risks*

Hydrogen is a volatile compound and has a wide flammability range. The Company has extensive hydrogen sensing and safety equipment in place and has retained Koch Enterprises Health and Safety Consultants to perform safety checks and issue appropriate certificates. AFC Energy was issued with a hydrogen safety certificate in January 2007, which is valid for one year.

Supply fuel shut down systems are checked every month and the whole laboratory is equipped with hydrogen suitable equipment, such as explosion proof light fittings and anti-static mats and surfaces. The whole lab is on a separate electrical circuit.

1.13 *Supply of Hydrogen*

There is not currently an established fuel supply infrastructure for hydrogen and there is no guarantee that such an infrastructure will be developed.

There are a number of ways to generate hydrogen, namely through reforming from hydrocarbons, electrolysis and biomass gasification. However, none of these are presently part of a general supply chain network. The density of hydrogen is low and transporting it over long distances is not

currently economically viable, although companies such as Linde, BOC and BP do provide hydrogen for specialist purposes in high pressure bottles (175 Bar).

AFC Energy intends to install its systems in locations where hydrogen is already present and in use. However, the failure of a general hydrogen infrastructure to develop may reduce the potential market for the Company's products.

1.14 *Regulatory Issues*

The commercialisation of AFC Energy technology may require future changes to the regulatory environment in the United Kingdom and, or overseas. There can be no assurance that such changes will be enacted in a timely manner or at all or that the result of the changes will not result in significant expenditure by AFC Energy.

1.15 *Early stage of AFC Energy*

The Company was only established in 2006, and has not been earning revenue, and is not currently profit making. The development and grant of the Company's business and its ability to earn revenues and make a much greater profit cannot be assured.

1.16 *Akzo Nobel*

The memorandum of understanding "MoU" referred to in paragraph 8 of Part VI of this document is an enduring agreement with no defined end date, which the Directors understand is intended to support a long-term relationship with Akzo Nobel. However, the MoU and contractual purchase order allow for termination by either party, at any time, at which point the Company would have to repay to Akzo Nobel the monthly payments which Akzo Nobel has at that stage paid to the Company, less the cost of any systems delivered and commissioned.

2. RISKS RELATING TO THE ORDINARY SHARES

2.1 *Control by Major Shareholder*

Upon completion of the Placing, The Age of Reason Foundation will be interested in an aggregate of 25.8 per cent. of the issued share capital of the Company. Mr Ben White, the adult son of Mr Howard White, a Director, is the primary beneficiary of The Age of Reason Foundation. The Age of Reason Foundation and Mr Howard White may therefore be able to exercise significant influence over certain corporate governance matters requiring shareholder approval, including the election of Directors and the approval of significant corporate transactions and any other transactions requiring a majority vote.

2.2 *Investment Risk and nature of AIM*

An active trading market for the Ordinary Shares may not develop and the trading price for Ordinary Shares may fluctuate significantly. Prior to the Placing, there has been no public market for any of the Ordinary Shares. The price at which the Placing Shares are offered may not be indicative of the price at which the Ordinary Shares will trade following completion of the Placing. In addition, there can be no assurance that an active trading market for the Ordinary Shares will develop, or, if it does develop, that it will be sustained following completion of the Placing, or that the market price of the Ordinary Shares will not decline below the Placing Price.

Admission to AIM should not be taken as implying that there will be a liquid market for the Ordinary Shares. It may be more difficult for an investor to realise his investment in the Company than in a company whose shares are quoted on the Official List of the UK Listing Authority.

The trading price of the Ordinary Shares will also be subject to significant volatility in response to both Company specific and broader issues.

The future success of AIM and the liquidity in the market for Ordinary Shares cannot be guaranteed. In particular, the market for Ordinary Shares may be, or become, relatively illiquid

particularly given the lock-in arrangements described in paragraph 8 of Part VI of this document and therefore the Ordinary Shares may be or may become difficult to sell.

The market price of the Ordinary Shares could be subject to significant fluctuations due to a change in investor sentiment regarding the Ordinary Shares or in response to various facts and events, including variations in the Company's interim or full year operating results and business developments of the Company and/or its competitors.

Potential investors should be aware that the value of securities and the income from them can go down as well as up and that investment in a security which is traded on AIM might be less realisable and generally carries a higher risk than a security quoted on the Official List. The Ordinary Shares will not be quoted on the Official List.

The price which investors may realise for their holding of Ordinary Shares, and when they are able to do so, may be influenced by a large number of factors, some of which are specific to the Company and others of which are extraneous. The Ordinary Shares may not be suitable for short-term investment.

Investors should therefore consider carefully whether investment in the Company is suitable for them, in light of the risk factors outlined above, their personal circumstances and the financial resources available to them.

The potential risks set out in this Part II do not necessarily comprise all those faced by the Company and are not intended to be presented in any assumed order of priority.

PART III

INDEPENDENT TECHNICAL EXPERT'S REPORT

Technical Due Diligence Report on the Development Programme of AFC Energy plc

A report produced by Knowledge House of
The University of Newcastle upon Tyne

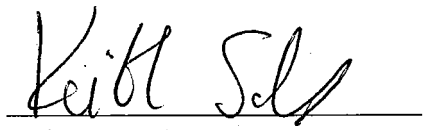
Prepared for:

AFC Energy plc
Finsgate
5-7 Cranwood Street
London EC1V 9EE

Nabarro Wells & Co. Limited
Saddlers House
Gutter Lane
London EC2V 6BR

Dawnay, Day Corporate Broking (a division of Dawnay, Day Brokers Limited)
15-17 Grosvenor Gardens
London SW1W 0BD

18 April 2007



Professor Keith Scott
For and on behalf of:
Knowledge House
University of Newcastle upon Tyne
Stephenson Building
Newcastle upon Tyne
NE1 7RU

Executive Summary

The alkaline fuel cell (AFC) is a promising technology for applications in the residential and light commercial markets. The current AFC, like the PEMFC and SOFC, cannot be manufactured at sufficiently low prices to compete directly with alternative power sources for commercial applications. AFC Energy has focused on alkaline fuel cells, which are the original fuel cell technology, and engineered a solution that is potentially cheaper and more robust than any of their competitors.

This report is an assessment of the progress made in the alkaline fuel cell technology of AFC Energy plc. AFC Energy's alkaline fuel cell is based on a new low cost electrode structure and configuration called the dry side electrode (DSE). This electrode, contrary to other alkaline fuel cell electrodes, is hydrophilic and uses very low cost materials in its construction. In addition AFC Energy has important new cell stack and control design concepts that will simplify cell maintenance, assist in quick electrode replacement and manage water balance.

The report is an analysis of the performance achieved to date in the fuel cell test programme and project work streams; in the context of the novelty, attractiveness and commercial potential of the alkaline fuel cell technology under development by AFC Energy, by an independent expert from the University of Newcastle upon Tyne. The work has involved a review of relevant literature, a review of relevant technical documents and reports from AFC Energy, a tour of facilities at AFC Energy and interviews with the AFC Energy management team.

The report provides a brief introduction to current fuel cell technology and background of the status of competing technology (to AFC Energy's proposed technology) in the AFC and other fuel cell sectors. It also describes the novelty of the AFC Energy approach to alkaline fuel cells and analyses the progress made to date and the prospects for the future.

AFC Energy has been testing single cathodes for the alkaline fuel cell based on the DSE concept, at its new Dunsfold laboratory, for some eight months. Prior to this, electrodes have been tested for several years by the predecessor company DFC Energy. The DSE is believed to be one of; if not; the cheapest electrode available for alkaline fuel cells. The cell voltage and current density characteristics have shown some very promising results; 0.74 V and 0.65 V (not IR corrected) at 50 and 100 mA cm^{-2} respectively; at room temperature with ambient (CO_2 containing) air. With IR correction this performance is equivalent to cathode potentials of approximately 0.78 V and 0.75 V at 50 and 100 mA cm^{-2} respectively. Cathodes have been operating continuously for over 3,450 hours; although degradation in performance of 100 mV occurred in that time frame. Further optimisation work of the cathode is planned which can potentially lead to higher voltages. In addition higher voltages will be achieved when the cell operating temperature is increased to a normal operating point of around 70°C. In view of these factors it can be anticipated that cathode voltages over 0.8 V can be achieved at current densities of 100 mA cm^{-2} under continuous operation.

Single electrode studies on the anode, using Ni alloy electrocatalysts, have shown stable performance for over a thousand hours of operation at room temperature. The latest anodes gave voltages of 176 mV (not IR corrected) equivalent to 80 mV with IR correction, although this is largely due to the low surface area of catalyst used and low content of electrocatalyst used. Based on AFC Energy's initial data and previous work on Ni alloy anodes, coupled with the use of higher temperatures, potentials as low as 50 mV are realisable through the proposed anode optimisation studies. Overall it is expected that AFC Energy's electrodes are capable of achieving their target of 0.65 V (cell voltage) at 100 mA cm^{-2}.

AFC Energy has prepared a design and operating strategy plan for the intended electrode pre-production line. An alternative lower cost substrate material has been identified and improvements in electrode construction that potentially reduce the cost of manufacture have been identified. A suitable scale up programme for evaluating single electrodes and stacks has been proposed. This programme will enable cells to be tested at the higher temperatures of operation of 65°C. The condition of the catalyst(s) will be investigated after its operation, to assess any potential damage due to the electrochemical activity. The cell stack design is well advanced and development of control and monitoring of the fuel cell system is in hand. From the studies carried out to date and the proposal for the next stages of R&D, the author is of the opinion that AFC Energy has a technology that could potentially make a significant impact on the development and application of fuel cells in selected markets.

Contents

1. Introduction

An assessment of the progress made in the alkaline fuel cell technology of AFC Energy is reported by an independent expert from the University of Newcastle upon Tyne. The assessment is based on the author's knowledge of fuel cell technologies and markets and draws on available relevant literature, interviews with key members of the AFC Energy management team and a tour of AFC Energy's facilities at Cranleigh. The assessment is also based on technical documents, patent documents and an AFC Energy powerpoint presentation.

1.1 Aims and scope

AFC Energy has focused on alkaline fuel cells to develop a power source technology for light commercial and residential markets. The aim of this technical progress report is to assess the effectiveness and cost advantages of AFC Energy fuel cell technology based on current progress in the company's fuel cell work streams.

The report considers the following areas:

- AFC Energy has taken the lowest cost technology fuel cell and reduced the cost of production and maintenance dramatically, thereby increasing its market applications and potential; and
- AFC Energy has focused on alkaline fuel cells, which are the original fuel cell technology, and engineered a solution that is cheaper and more robust than any of their competitors.

The report looks at any technical issues associated with manufacturing the cell and the availability of contractors to build it under licence. Analysis of the progress of the work streams currently underway (binder, electrodes and working prototype), the likelihood of success and implications thereof against the following key features of the AFC Energy proposition:

- the binder and the electrode "continuous printing process";
- dry side electrode;
- negative pressure balance of electrolyte and "water neutral" operation of electrolyte;
- intelligent control system;
- "Unique" cost advantage of the AFC Energy technology; and
- Engineering & manufacturing of AFC Energy's balance of plant.

1.2 The author

Keith Scott has led the electrochemical materials processing centre at the University of Newcastle upon Tyne since its creation in 1994. He has been a Professor in Electrochemical Engineering since 1994 and heads a group of some 24 researchers in a range of fuel cell technologies, including polymer electrolyte and alkaline fuel cell systems. He is a leader in the field of fuel cell engineering science and technology and has research interests in electrocatalysts and membrane materials. He has been invited to present over 50 talks on his research worldwide. He has published more than 250 research papers and 5 books and holds patents on fuel cell materials. His publication record is acknowledged in a survey by the Institute of Scientific Information (ISI) in the years spanning 1993 to 2003, as the second top author in fuel cells. His research grant income includes funding from EPSRC, The Royal Society and The EU, Carbon Trust, and UK and international companies. He is the financial hub of the EPSRC SUPERGEN Fuel Cell Consortium and a member of the EPSRC Energy Advisory Committee. He is on the editorial boards of several journals including Fuel Cells.

2. Fuel Cells

Fuel cells are gradually becoming accepted as the future method for clean and efficient energy generation and in particular when hydrogen is used as the fuel. They can interface with a broad base of electrical technology and power cars, locomotives and ships, consumer electronics, and generate neighbourhood community heat and light. The high efficiency of fuel cells, currently $>60\%$, compared to

approximately 22% for gasoline or 45% for diesel internal combustion engines will dramatically improve the energy efficiency of fuels.

A fuel cell consists of two electrodes separated by a thin electrolyte to form an electrochemical cell. A fuel cell doesn't need recharging; it will produce energy continuously, in the form of electricity (and heat) as long as fuel is supplied. In a typical fuel cell (Fig. 1.), hydrogen gas reacts electrochemically at one electrode (anode) and oxygen (from the air) reacts at the other electrode (cathode) to form water, and to produce electrical energy.

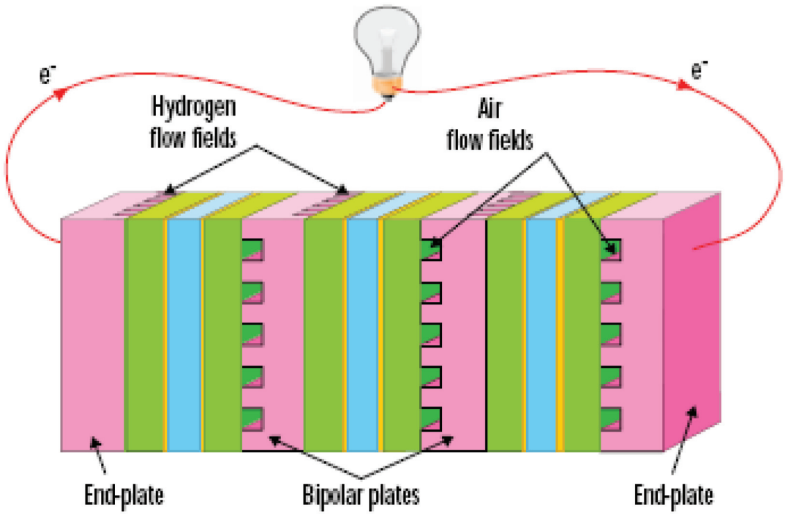


Fig. 1. Schematic of a fuel cell

The versatility of fuel cells makes them workable in nearly any application where electricity is useful. Stationary fuel cell plants already provide 200 kilowatts of neighbourhood electrical power with efficient operation in Japan. Smaller scale residential uses of fuel cells to generate electricity and heat are already under development. Fuel cells can provide the power for consumer electronics (laptop computers, cell phones, digital cameras and audio players) with greater operation periods (without the need for recharging) than batteries at the same volume and weight. Electronics applications of fuel cells are expected to be the first to widely reach the consumer market and establish public visibility and acceptability for hydrogen technology.

2.1 Current Fuel Cell Technology

Fuel cells are classified according to the choice of electrolyte and fuel, which in turn determine the electrode reactions and the type of ions that carry the current across the electrolyte. The electrolyte can conduct either positively charged (cations, e.g. H^+) or negatively charged ions (anions, e.g. OH^-). Most fuel cell power systems comprise a number of components:

- Unit cells- in which the electrochemical reactions take place;
- Stacks- in which individual cells are modularly combined by electrically connecting the cells to form units with the desired output capacity; and
- Balance of plant- which comprises components to: provide feed conditioning (including a fuel processor if needed), for thermal management, and electric power conditioning, among other ancillary and interface functions.

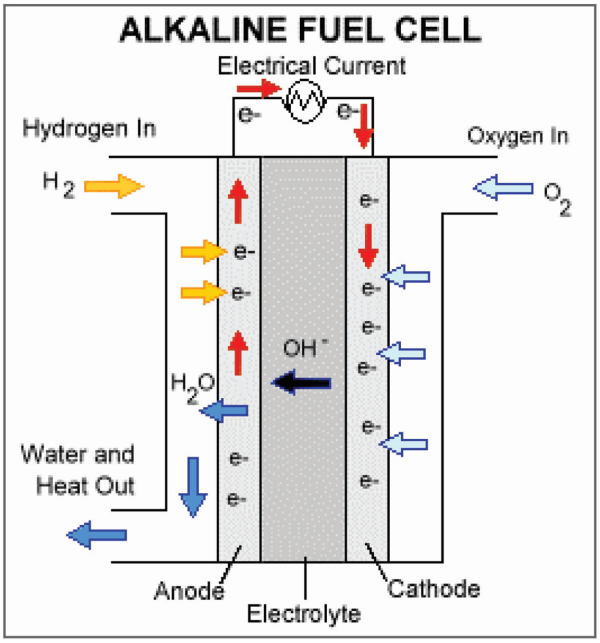
To date there are six fuel cell types developed as viable systems for a range of power applications. These fuel cells, summarised in Table 1, are classified in terms of the electrolyte used and operate at significantly different temperatures.

Table 1. Fuel cell types

Fuel cell type	*Invented*	*Typical operating temperature*	*Typical system efficiency*	*Typical application*
Molten Carbonate	1953	650°C	40% to 50%	Power stations
Solid Oxide	1928	400°C to 1,200°C	35% to 45%	Domestic CHP
PEM	1992	90°C	35% to 40%	Vehicle power
Direct Methanol	1944	120°C	30% to 35%	Vehicle power
Phosphoric Acid	1986	150°C to 200°C	55%	Stationary power and large vehicles
Alkaline	1839	70°C	55% to 60%	Domestic, standby and marine

2.2 *Alkaline Fuel cells*

Figure 2 shows the operating principles of the H_2/O_2 AFC, using a hydroxide electrolyte. KOH is used as the electrolyte as it has the highest conductivity among the alkaline hydroxides. The AFC provides excellent performance compared to other fuel cells due to its good O_2 electrode kinetics and ability to use a wide range of electrocatalysts; notably non-precious metals e.g. Ni.



Anode Reaction:
$2H_2 + 4OH^- \rightarrow 4H_2O + 4e^-$ (1)

Cathode Reaction:
$O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$ (2)

Overall:
$2H_2 + O_2 \rightarrow 2H_2O$ (3)

Where: e = electron, H = Hydrogen, O = Oxygen

Fig. 2. Principles of Operation of H_2/Air Alkaline Fuel Cell, Circulating Electrolyte

The perceived drawback with terrestrial applications of the AFC was that CO_2, present in the air or in a hydrocarbon derived fuel, reacts with the OH^- ion in the electrolyte to form carbonate. Developers of AFCs, who pursued the technology for terrestrial applications, used circulating electrolytes with an external, soda-lime absorber to resolve the problem of CO_2 in the air stream. With a circulating electrolyte the quantity of CO_2 can be kept to a minimum, compared to a continual build-up with an immobilized electrolyte. Life expectancy increases (5,000 hour) and is considered suitable for personal automobile engine life. The continuous circulating electrolyte, during normal operation has several advantages over an immobilized system:

(1) no drying-out of the cell occurs. The water content of the caustic electrolyte remains quite constant everywhere inside the stack;

(2) heat management in the stack becomes unnecessary – the electrolyte itself is a cooling liquid;

(3) accumulated impurities, such as carbonates, are concentrated in the circulating stream and can be easily removed;

(4) there is no significant OH^- ion concentration gradient; and

(5) the flowing electrolyte prevents the build-up of gas bubbles between electrodes and electrolyte.

Traditional Cell Components

Alkaline fuel cells use porous gas diffusion electrodes with high surface areas to provide a large contact zone where reactant, electrolyte and catalyst meet (a three phase zone). The high surface areas are produced by binding carbon powders or sintering metal powders such as Raney metals. In the latter the metal provides the high catalytic activity for the electrode reactions. The electrode is hydrophilic and capillary forces keep the electrolyte in the pores when an overpressure is applied to the gases relative to the electrolyte. In the use of carbon supported catalysts, bonding is achieved by using polytetrafluoroethylene (PTFE) which makes the electrode hydrophobic and serves to retain the electrolyte in the pores of the electrode.

The cell polarisation performance of an AFC varies greatly depending on the temperature and pressure, use of air or oxygen as oxidant and fuel cell catalysts and other components used. The typical electrical performance of an AFC gives a cell voltage of 0.84 V at a current density of 100 mA/cm^2 using air; but with precious metal catalysts at both anode and cathode (ca. 0.5 mg/cm^2).

In general electrode development in circulating electrolyte AFC's has concentrated on:

– multi-layered structures with porosity characteristics optimized for flow of liquid electrolytes and gases (H_2 and air), and

– catalyst development to reduce Pt loadings or replace Pt with non-precious metals that give required lifetime operation

2.3 Competitive Technology to Alkaline Fuel Cells

Of the six fuel cell types, there are realistically only two that can be considered as competitors to alkaline fuel cells in the target light commercial and residential sector markets: PEMFC and SOFC. Although there are great expectations in relation to direct methanol fuel cells or similar cells using liquid fuels in the target sector of AFCs their costs are likely to be too great at the current time to make them competitive. Estimations of the cost of the DMFC vary but typically are of the order of $580/kW for a 50 kW unit. One company CMR have an innovative approach to DMFC (and potentially other fuel cell technologies) which involves mixing fuel and air in a flow through porous MEA. The concept achieves a very compact unit without the need for expensive internal sealing and thus potentially offers a significant reduction in cost. However the CMR concept is at an early stage of development.

2.3.1 SOFC

The solid oxide fuel cell uses a ceramic electrolyte which makes the cells relatively difficult to manufacture in terms of component assembly, sealing, etc. and thus increases the cost. A new generation of SOFC is under development (e.g. Ceres Power) that operates at temperature down to 500°C, which allows the use of stainless steel in the cell components. The relatively high operating temperature enables; efficient conversion to power, allows internal reforming and produces high quality by-product heat for cogeneration or for use in a bottoming cycle. These features have made the SOFC an attractive emerging technology for stationary power generation in the 2 kW to 100's MW capacity range.

There are several companies worldwide developing SOFC products and in the UK three companies that have spun out from University Research; notably Ceres Power. More recently SOFC systems for domestic/small business applications have attracted interest. These units, from Global Thermoelectrics and Ceramic Fuel Cells Ltd, are of 1 kW to a few kW in power rating and have reported electrical efficiencies of 35% and total efficiency of 90% with natural gas as fuel. Auxiliary power units, with system size of 2 kW down to 0.5 kW, for the transportation sector are also being developed by BMW/ Delphi and Honeywell.

2.3.2 PEMFC

Polymer electrolyte fuel cells use platinum catalysts which are deposited onto the surface of the proton conducting solid polymer electrolyte. They can generate high power densities, providing a small footprint, and have attracted the majority of commercial interest recently, with a large number of companies actively researching and developing cell stack systems. In the UK companies such as Intelligent Energy Holdings plc, Voller Energy Group plc and Johnson Matthey plc have major interests. They are attractive for certain mobile, residential and portable applications and especially as a prime motive power for automobiles and other forms of transport. The PEMFC typically operates at low temperatures, enabling faster start-up than higher temperature fuel cells.

The general consensus of opinion is that the performance of the PEMFC needs to improve to achieve efficiencies better than 60%. This requires major improvements in the cathode catalyst. There is also a major requirement for all cell components to be more durable in operation to meet performance specification targets. These targets are typically 5,000 hours for transportation and 20,000 hours and more for stationary power generation. Historically the cost estimations of PEMFC this decade have been several hundred dollars per kW based on a 50 kW stack in volume manufacture. As shown in Table 2 the major costs are the membrane and electrocatalysts. The studies have shown that there is little scope for radical cost reduction associated with economies of scale and thus cheaper materials need to be developed.

Table 2. Cost breakdown for a 50 kW PEMFC stack (volume 500,000 units)

Component	2003 $/kW[a]	2005 $/kW[b]
Membrane	56[1]	6.9[2]
Electrodes	83	83.7
GDL	14	5.5
Bipolar plate and cooling plate	22	5.1
Others	7	6.9
TOTAL	182	108

a: Fuel Cell Report to Congress, US Department of Energy, February 2003.

b: E.J. Carlson, P. Kopf, J. Sinha, S. Sriramulu, Y. Yang. Cost Analysis of PEM Fuel Cell Systems for Transportation NREL Report / SR-560-39104, September 30, 2005.

1: based on $100/m^2.

2: based on $48/m^2.

The figures assume a catalyst loading of 0.8 mg/cm^2 at 250 mW/cm^2.

The cost estimate in 2003 was $182/kW based on the projected cost of membrane of $100/m^2. The US Department of Energy ("USDOE") is targeting $50/kW, which is an order of magnitude reduction in cost for volume scale production. Platinum price has a significant impact on cost because of the electrode's contribution. Recent platinum prices are at all time highs ($900/troz) while historic prices established over the last 100 years are half this value. Thus cost estimates over recent years have not significantly decreased the cost of PEMFCs; mainly as a result in the doubling in Pt cost (and estimated loading doubling to 0.75 mgPt/cm^2). Cost predictions were $118/kW in 2004 based on a power density of 350 mW/cm^2 and in 2005, $108/kW based on a power density of 600 mW/cm^2.

In domestic applications (<10 kW) the target costs for fuel cell systems is around $1,250-1,750/kW to compete with conventional combustion boiler systems. It has been predicted that to meet these targets requires 100,000 units to be produced annually.

2.3.3 Fuel Cell Markets

Over the last decades, phosphoric acid, tubular solid oxide, and molten carbonate fuel cell systems have been demonstrated at greater than 200 kW. These stationary and distributed demonstrations have validated the current costs of $4,000-12,000 per kW, and reliability of 10,000-20,000 hours. Today, the most widely deployed fuel cells cost approximately $4,500/kW and in contrast, a diesel generator

costs $800 to $1,500/kW. The United States is particularly prominent in developing fuel cell technologies; with the USDOE supporting the largest budgets for fuel cell R&D. Fuel cell technologies that are supported through this program are solid oxide fuel cells (SOFC) and molten carbonate fuel cells (MCFC). The USDOE formed the Solid State Energy Conversion Alliance (SECA) with a goal to, by the end of this decade, produce a core solid-state fuel cell module that would cost $400/kW or less; significantly lower (by about a factor of ten) than current fuel cell products. SECA is comprised of fuel cell developers (FuelCell Energy, Delphi, General Electric, Siemens Power Generation, Acumentrics, and Cummins Power Generation), small businesses, universities and national laboratories. The SECA alliance was formed to accelerate the commercial readiness of SOFCs in the 3 kW to 10 kW for use in stationary, transportation, and military applications. This cost target is based on 5 kW modular systems at a production volume of 100,000 units. Current estimates for volume production of SOFC are $980/kW. Longer term projections are for $350/kW. At this price, fuel cells would compete with gas turbine and diesel generators and gain widespread market acceptance. The key is the development of a compact, lightweight, 3 kW to 10 kW "building block" module that can be mass-produced using manufacturing advances that have lowered costs in the electronics industry.

For PEMFCs, stack cost and performance targets set by the USDOE, that are required to enter the commercial markets in competition with existing technologies (ICE's), are indicated in Table 3.

Table 3. Cost and performance targets for PEMFCs

	Transport (family car)	*Micro-scale power generation (Small Hotel)*
Stack parameter		
Stack cost ($/kW)	45	180
Stack power (kW)	50-80	1-20
Stack lifetime (hours)	5,000	40,000

In 2003 there were some 80 companies active in developing fuel cell systems for the small residential market. It is estimated that some 1900 units have been installed, in the range of 0.5-10 kW power; an increase of 800 since 2002. 80% of the units were installed in the USA. In the EU, companies such as Plug Power, Vaillant and Sulzer-Hexis are active. In Japan the target was to bring 1 kW units to the market at a cost of $4,200 in 2005. The sector is dominated by the PEMFC although some 20% are based on SOFC with seven companies involved. The forecast for uptake of these units is 500,000 by 2010.

Overall despite the great level of activity in research to develop new low cost membranes, electrolytes and electrodes, the costs are not low enough to meet most of the required targets for commercial applications. What is required is further development and innovation that make radical changes in cost possible coupled with Government incentives for users to install an energy efficient and more environmentally friendly power sources based on fuel cells.

3. The Alkaline Fuel Cell Sector

Merits of the alkaline fuel cell technology are beginning to be recognized and AFC technology is now entering a period of renaissance. Having suffered from investor disinterest in the past two decades, with its share of starts and failures (e.g. Elenco NV, ZeTek Power plc, Eident Energy SAS), circulating electrolyte cells are reportedly being developed by several companies, such as; Da Capo Fuel Cell Ltd. (which bought ZeTek Power (formerly Zevco and Elenco)), Astris Energy, Cenergie, Gaskatel GmbH, Fuel Cell Control and Apollo Energy System Inc., for motive and backup power.

Apollo Energy Systems Inc. in 1997 started to develop mass produced low-cost AFC electrodes based on thin PTFE bonded carbon electrodes. Stacks were built consisting of 21 cell units giving 15 V i.e. 0.71 V/cell at 400 mA/cm^2 (@ 75°C) with 0.5 mg/cm^2 Pt catalyst. Cenergie, founded in 2002, by a group of former ZeTek managers, produces AFCs. Cenergie has embarked on developing new alkaline fuel cell technology and states it is ready to launch what promises to be the most reliable and economic fuel cell yet.

Fuel Cell Control offers for sale complete 2.5 kW, 28V fuel cell engines and claims that a 500 W 13.6V DC engine will be available, to be followed by 5 kW (28V) and 10 kW (48V) systems especially suited for telecommunications use. Each fuel cell gives 0.93 volts at no load and 0.66 volts at full load. Modules are matrices of six plates in series and four plates in parallel; each module providing 4 volts at 100 amperes full load. A 2.5 kW fuel cell consists of a single stack of six modules in electrical series. The price for an AFC stack is quoted at $50,000. The system is actually a Zetek or Cenergie AFC stack, plus all the necessary peripherals to form a fully automatic stand-alone unit, producing 33 volts at no load and 24 volts DC at 105 amperes.

Gaskatel GmbH, make the EloFlux fuel cell which is based on inexpensive carbon, nickel and silver — as catalysts. Cell stacks are available with outputs of > 3V and 250 W. Cell dimensions are 10.5 × 23 × 3.5 cm, giving power up to 0.5 kW/litre with a weight of 1.40 kg. The gas diffusion electrodes have a bi-porous microstructure and are made by a dry mixing process; of the PTFE, catalyst and additives. These materials are rolled to a thin, flexible, endless sheet. An additional screen is introduced into the flexible sheet, providing the electrode with a higher mechanical stability and a lower ohmic resistance.

Astris Energi Ontario has focused on development of good performance cells built from inexpensive, materials. The present third generation MC250 1 kW stack, poised for commercialization, will be offered to AFC system integrators as a building block of fuel cell systems in a variety of applications. Inherent cost of direct materials to build a MC250 stacks are quoted as approximately US$230/kW.

To illustrate the performance of the AFC with circulating aqueous electrolyte technology, data published in 2004 on the Eident Energy commercially sold sub-stack is shown in Fig. 3. The latest performance was 590 W at 4 V and 51% total efficiency (η) versus LHV, i.e. 137 mA cm^{-2} at 0.67 V per cell. The cell used Pt based electrodes with loadings of 0.25 mg cm^{-2}. The data indicates that the major cause for loss in cell power and efficiency is associated with cathode polarisation (Fig. 3b).

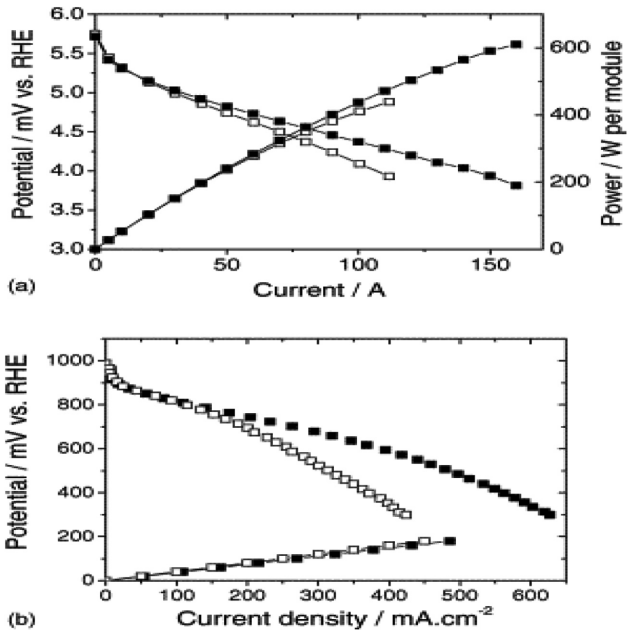


Fig. 3. Improvement of the performance of the Eident AFC technology due to newly introduced electrodes (V1.0 vs. V1.1).
(a) Performance of EE AFC module—(□) Module V1.0 (June 2001): catalyst loading, 1.2 mg cm^{-2}; (■) Module V1.1 (April 2003): catalyst loading, 0.5-0.6 mg cm^{-2}.
(b) Performance of the electrodes in a V1.1 module—(□) Version 1.0 (June 2001): catalyst loading, 0.6 and 0.65 mg cm^{-2} for the cathode and the anode, respectively; (■) Version 1.1 (April 2003): catalyst loading, 0.25-0.3 mg cm^{-2} for both the cathode and the anode.

4. Manufacturing Technology of AFC Energy

AFC Energy has five patents applications which cover aspects of electrode design, water management, depression based electrode control and replaceable electrode design.

4.1 AFC Energy electrode design novelty

The electrode configuration used in the AFC Energy fuel cell uses a novel approach of supporting the active catalyst on a hydrophilic porous support. All other AFC developers are believed to still utilise a hydrophobic environment for the electrodes, in which for example a PTFE layer is exposed to the gas side and the catalyst side is exposed to the electrolyte. An objective for the AFC Energy electrode

configuration is to achieve satisfactory operation of the electrode in their so called 'Dry Side Electrode' (DSE). The DSE consists of an inert porous support onto which is deposited a porous metallic conducting layer to which the required catalyst layer can then be deposited. The DSE is shown in the Figure 4 below in the bi-polar arrangement, though can equally be applied to homo-polar (or mono-polar) cell arrangement. The DSE arrangement is such that the catalyst is positioned next to the gases, i.e. air and hydrogen. The hydrophilic substrate as a result is next to the KOH electrolyte. An advantage gained by this configuration is that it minimizes the potential erosion of the catalyst, by removing it from direct contact with the continuous flow of the aggressive KOH electrolyte. The configuration is similar to that used in PEMFC electrodes except in that case the support layer is a non-porous ion exchange membrane.

AFC Energy has several important patent applications that cover the electrode design, stack design operation and control. The DSE design increases efficiency and life and offers unique water management and automatic pacification. The electrodes are of a one piece construction including seals, conductor, catalyst and gas and liquid passages and are replaceable relatively quickly and cheaply, which in part may obviate the need for long life. The cell is however designed with long life in mind by using low current densities. Higher current densities could in the future improve on systems costs provided reliability of the cell is maintained.

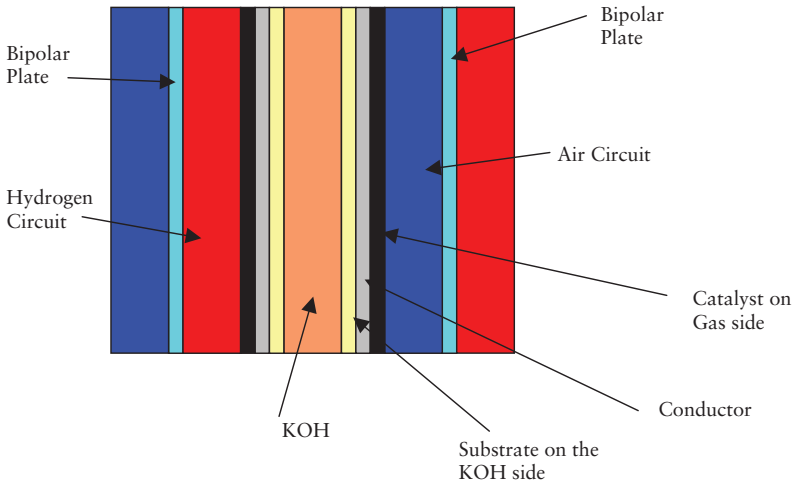


Fig. 4. Electrode, KOH and gas configuration with the Bipolar DSE

4.2 Pressure Balance and water balance

In cell operation a stable 3-phase interface is essential for operation. Creating a 3-phase interface means balancing the capillary forces in the porous electrode and pressure differentials between liquids and gases. This is not generally difficult to achieve provided electrode size is not too large. By creating the three phase electrode-electrolyte-gas interface within the porous electrode region, this will ensure that any potential blocking of catalyst sites by supporting substrate is minimised, or negligible. The usual way of controlling the position of the interface between the gas and the electrolyte is to provide a pressure differential across the electrode. This has usually been achieved with the gas maintained at a high pressure with the electrolyte at ambient pressure or a slightly positive pressure.

The novel AFC Energy proposal, to achieve the 3-phase interface, is to operate the cell such that the flowing KOH electrolyte is at a reduced pressure (around −50 to −100 mbar) with the gases at ambient or slightly elevated pressure of around 50 mbar. This approach offers the advantages of reducing the gas pressure and thus cost of supply and reduces the load burden on the cell seals. Another advantage is that the fuel cell can then be stored in a flooded state; i.e. by removing the liquid pumping the reduced pressure differential causes electrolyte to fill the gas chambers. This eliminates the need for the fuel cell to be purged with inert gas (such as nitrogen) whilst not in operation. On starting up the

fuel cell, the negative electrolyte pressure is re-established to evacuate the electrolyte from the gas chambers into the electrolyte chamber. Thus, the need for a separate pacification system that supplies and maintains inert gas in the gas chambers on shut down is reduced thereby reducing the number of components, the weight, volume, cost, complexity and number of control systems of the fuel cell. The reduced pressure may also facilitate removal of the water product into the liquid electrolyte and reduce the amount of water in the air stream. The air exhaust will contain water vapour which will be lost to the atmosphere by evaporation and can be the way in which the water produced during the electro chemical reaction is balanced to achieve equilibrium. The rate of evaporation to achieve equilibrium can be controlled in two ways. One is by varying the air flow rate, between acceptable stoichiometric ratios. The other is where a balance is obtained at approximately 65°C, 6 molar KOH and air at a stoichiometric ratio of 3.0, and is self regulating. Both methods can potentially eliminate the need for a condenser.

4.3 Control System and cell switch out

Fuel cell electrodes in stacks are occasionally prone to failure or to give a reduced and unacceptable performance. It is desirable to be able to effectively and cheaply monitor the voltages and when the voltage is unacceptable to remove the faulty electrodes. AFC Energy has designed a voltage monitoring system for monitoring the voltages of a stack of fuel cells. The monitor consists of a master monitoring unit with a hierarchy of monitoring units comprising a set of slave monitoring units, comprising a plurality of voltage-measuring circuits. Each circuit is electrically connected to one of the fuel cells and provides a signal indicative of the voltage of the cell. Hence when the voltage is monitored and, when the voltage falls below a predetermined value, a decision may be made to replace the electrode.

AFC Energy has also designed the cell stack to potentially enable convenient removal of faulty electrodes or replacement of all electrodes without compromising the later use of the remaining cell components. The prior approach to cell stacking; for example in PEMFC; has been to seal electrodes and plates and gaskets/seals together; which on loss of cell performance has meant complete replacement of the stack. The AFC Energy cell offers a lower cost option to cell stack maintenance and to application in use.

4.4 Balance of Plant

All fuel cells require balance of plant components to support their operation. In current AFC designs these include the air blower, electrolyte circulation, nitrogen purging, CO_2 scrubber, as well as heat exchangers and controllers. In the AFC, recirculation of the KOH achieves the required cell cooling although the AFC requires removal of CO_2 from the stack air supply. The lime scrubber puts an additional weight and volume penalty on the AFC and a maintenance factor to replace the "lime cartridge" at regular intervals. This should not however be a major issue in operation of the AFC — simply think of replacing an oil filter in internal combustion vehicles. The costs estimates made in 2002, of the peripheral equipment for both AFC and PEMFC were both $255 for a 7 kW system.

There are some additional costs for the AFC that occur in practical operation: for the soda lime for CO_2 scrubbing and the cost of the replacement KOH electrolyte. The largest cost of these two is the lime, which is predicted to be $80 for a 7 kW unit with a lifetime of 5,000 h, assuming an 80% utilisation of the lime. The overall resultant costs for PEMFC and AFC systems are shown in Table 5 and indicate that the AFC should be competitive with the PEMFC. This comparison is particularly sensitive to the cost of the lime based on assumed usage. However what can be said about the AFC Energy technology, that with the cost savings of the AFC cell stack the system costs should be less than $100/kW and meet many of the targets for residential and light commercial markets.

Table 4. Cost comparison of AFC and PEMFC for 7 kW stack

(From G.F. McClean et al: An Assessment of Alkaline Fuel Cell Technology, Int. J. Hydrogen Energy, Vol. 27 (2002), pp. 507-526)

Component	*Compressed PEMFC*		*Ambient air PEMFC*		*Ambient air AFC*	
	Upper bound	*Lower bound*	*Upper bound*	*Lower bound*	*Upper bound*	*Lower bound*
Stack cost ($/kW)	1,220	60	6,100	180	643[A]	155
Stack cost	8,540	420	42,700	1,260	10,942	1,084
Balance of plant	798	798	256	256	255	255
Consumables	N/A	N/A	N/A	N/A	1,053	89
Total	9,338	1,218	42,956	1,516	12,250	1,428
Total per kW	1,334	174	6,136	217	1,750	204

[A] The author believes that some data reported in the table taken from the review of McClean is incorrect. This error appears to be in the upper bound cost of the AFC: Stack cost ($/kW). The final cost data of total and total per kW are believed to be correct as they are discussed in the text and appear in an additional table in the review of McClean.

5. Evaluation of AFC Energy Work Programme

The AFC Energy work programme is geared towards providing an alkaline fuel cell technology that can compete in several markets including; domestic power generator, mobile generators in urban areas, stand-by power for the mobile phone industry, marine applications for both inland and sea faring vessels and mini grid applications up to 50 kW.

The AFC Energy team have been developing the fuel cell technology in several important areas; cathode and anode materials, power and stability performance, the electrode and cell stack and system design and modelling, control and monitoring and electrode fabrication facilities. A significant amount of effort has gone into single electrode tests and lifetime studies both at AFC Energy at Cranleigh and also in confirmation studies at Surrey University. In view of this effort the AFC Energy test data is evaluated against available data in the literature.

5.1 Cathode Performance

AFC Energy alkaline fuel cell technology is based on low cost catalyst materials such as activated carbon for the cathode. For preparation of the cathode, the catalyst is mixed as an ink with a solvent and binder of polyethylene. Following suitable heating and stirring and then cooling the ink is used for application of the catalyst layer onto the electrode substrate. AFC Energy is examining the proportions of binder (and mixed binders) with solvent and catalyst in order to prepare cathodes of different morphologies and porosities. The effect of physical structure as well as catalyst loading on performance is under detailed examination and is clearly an important factor in striving to achieve the best and most stable cathode performance.

Some typical performance data of the cathodes, made using the activated carbon based inks, gave a performance; at ambient temperature; of around 0.72 V at 50 mA/cm^2 (Fig. 5) and 0.65 V at 100 mA/cm^2 (electrode number C0098). More recent data shows a cathode performance of around 0.75 V at 50 mA/cm^2 and 0.7 V at 100 mA/cm^2. There is, as would be expected, variations in the performance of different cathodes but clear evidence that the cathode performance has steadily improved through a methodical experimental programme. This is apparent in both the cathode polarisation data and in the lifetime data as discussed in the following section.

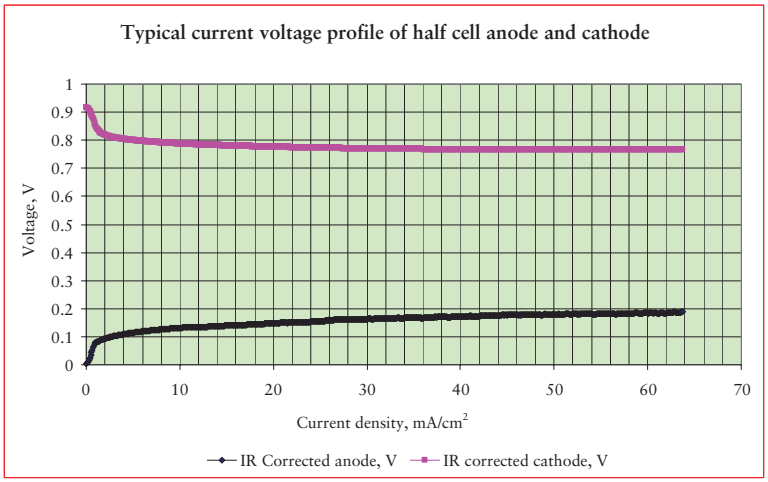


Fig. 5. Polarisation (voltage vs. current density) data of cathodes based on activated carbon.

The data so far obtained is at a notional room temperature between 17-23°C. It is well known that an increase in temperature will improve the oxygen reduction kinetics of the alkaline fuel cell system. The extent of the improvement depends upon the electrocatalyst and the electrode structure. For example with a platinum black cathode an increase in temperature from say 20 to 50°C may typically increase the potential by a factor of 50 to 150 mV in the current density range of 50 to 150 mA cm^{-2}. (see Fig. 6) The temperature coefficient is a measure of the effect of temperature on the increase in potential (units of mV/°C). For such platinum black electrodes this coefficient is around 3 mV/°C in the temperature ranges of 20–40°C and 50–70°C; at current densities of 100 and 50 mA cm^{-2} respectively. As an approximation this temperature effect could realise up to a factor of 3 times the power density when the temperature is increased from around 20 to 50°C.

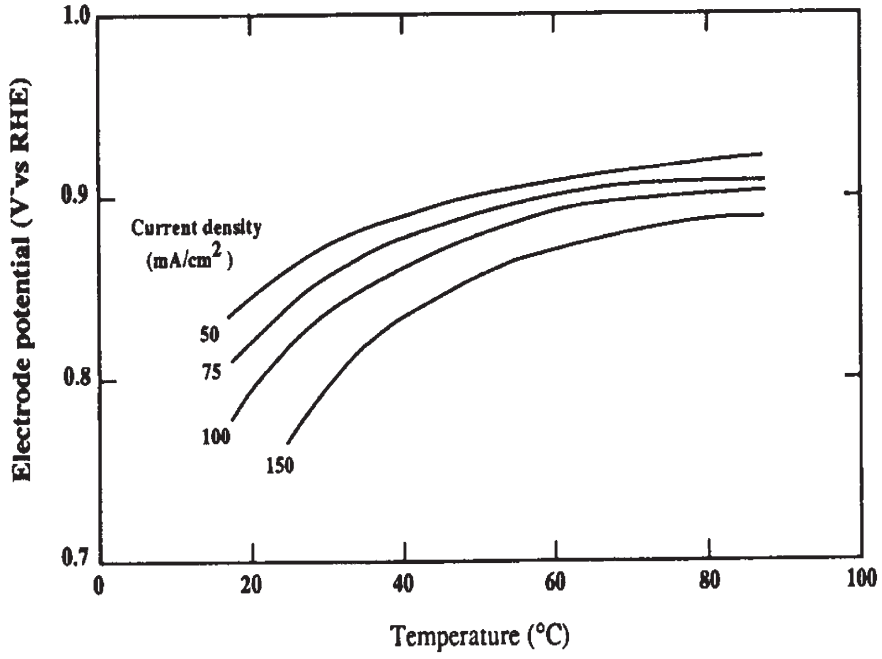


Fig. 6. Effect of temperature on cathode performance

Based on this temperature effect; then at a current density of 100 mA cm^{-2}, a cathode potential in excess of 800 mV can be anticipated for the AFC Energy cathode. This prediction is well in excess of the quoted target of a current density of 100 mA cm^{-2} and 0.6-0.65 V at a temperature of 70°C. The aspects of the

carbon cathode material performance at higher temperature and the stability have of course to be considered and examined experimentally in cells and stacks.

5.1.1 Effect of catalyst

The active carbon used as the cathode electrocatalyst has promising activity for oxygen reduction and has the clear advantage of low cost. The catalyst performance is comparable with that recently obtained by Gamburzev with a carbon supported silver electrocatalyts e.g. at 150 mA cm^{-2} a potential of 0.75V (vs. HE). It is well known that the most active electrocatalysts are based on platinum and that higher potentials can be achieved under cell operation with Pt in comparison to other materials such as activated carbon. Fig. 7 illustrates some recent reported differences in performance by Lima. Notably the Pt catalyst gave an approximate 100 mV higher potential than that of the carbon material. However the use of Ag and Ag /Co catalyst did not show a marked improvement on carbon i.e. only around 20 mV.

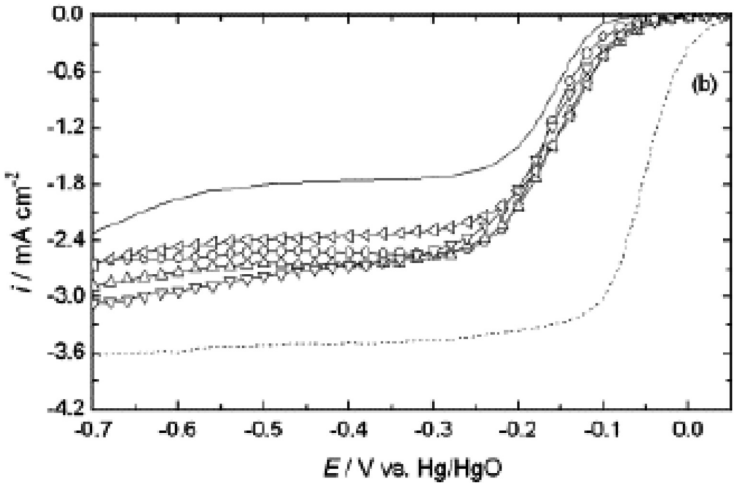


Fig. 7. Steady state polarization curves for the ORR on the Vulcan carbon powder, Co/C, Ag/C, Ag-Co/C and Pt/C catalysts in KOH 1.0 mol L^{-1} at 25°C. (b) disk current density (per geometric area). ω=1600 rpm.

The performance of AFC Energy cathodes would appear to be as good as that achieved with non-precious metal electrocatalysts, which although are much cheaper than Pt would add significant cost to the overall cell cost.

5.1.2 Cathode Stability

Life cycle tests have been conducted on the AFC Energy cathodes for some significant time periods. These tests notably have been performed without removal of carbon dioxide from the air. The data reported in the AFC studies have generally shown deterioration in performance; over periods of 500 hours or more of continuous operation. For example one cathode C0098 gave a performance; at ambient temperature; of around 0.72 V at 50 mA/cm^2 and 0.65 V at 100 mA/cm^2 and after 500 hours operation gave around 0.67 V at 50 mA/cm^2 and 0.58 V at 100 mA/cm^2 (Fig. 8). The most recent test data has demonstrated over 3600 hours of continuous operation at a current density of 50 mA cm^{-2}; as shown in Fig 9. In this time period the voltage fell by approximately 100 mV from 0.74 V to 0.64 V. This is equivalent to a voltage degradation of around 200 mV/year with a reduction in power density of some 15% and electrical efficiency of 8% over a year.

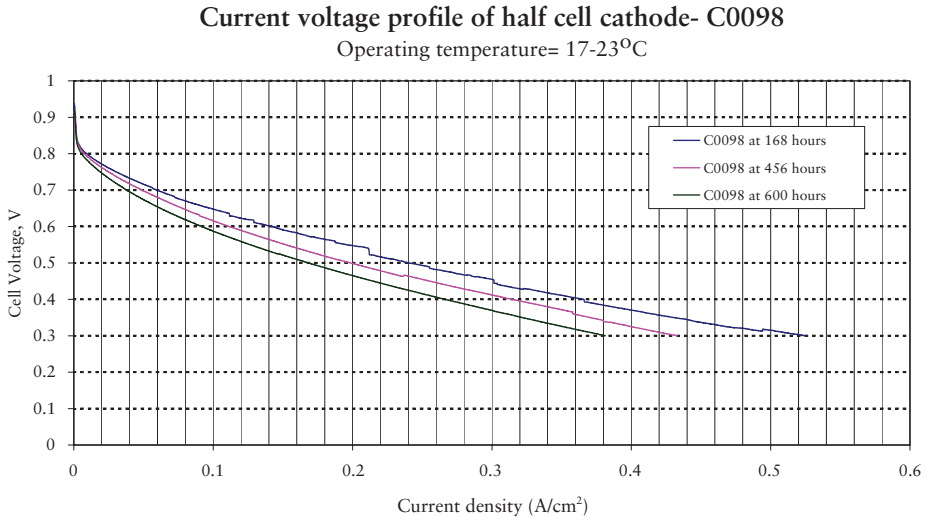


Fig. 8 Cathode polarisation data obtained during lifetime studies.

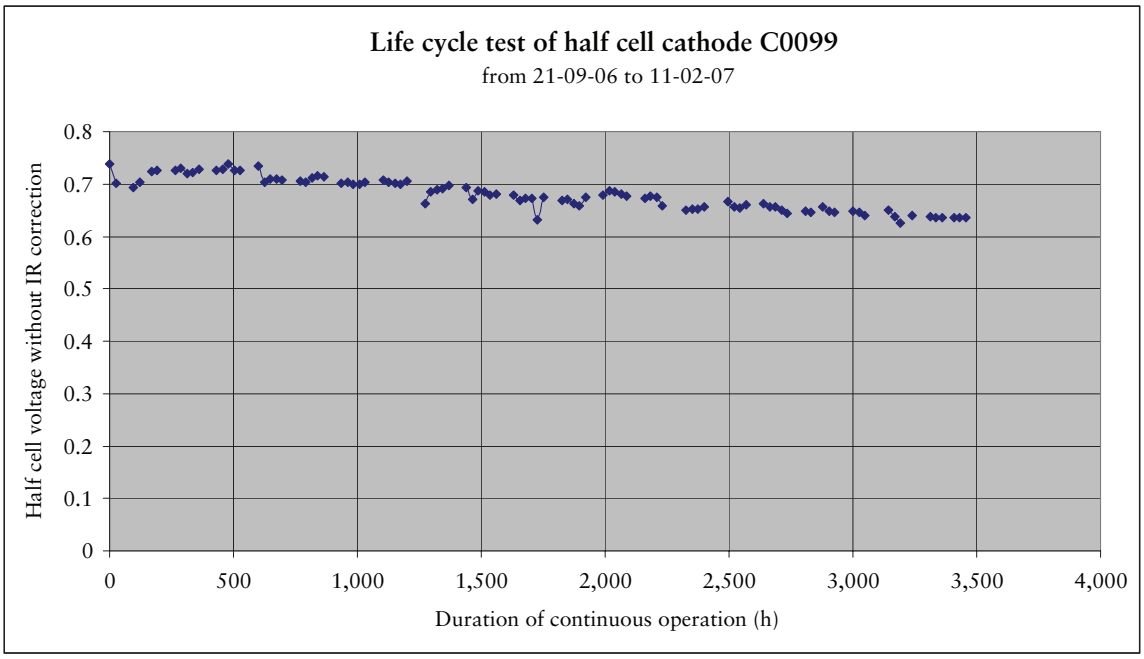


Fig 9. Lifetime tests of active carbon based cathodes at 50 mA cm^{-2} and 17-23°C.

Overall, several AFC Energy electrodes have been operated for over 1,000 hours of continuous operation and other cells have been operated under transient conditions for 600–760 hours.

In general there are several possible reasons for the fall in performance which include:

— corrosion of the carbon electrode in the alkaline electrolyte which reduces the catalyst content as well as changing electrode morphology and surface area

— long term; contamination of the alkaline electrolyte from the CO_2 present in air (ca 350 ppm)

— possible insoluble carbonate formation in the electrode from carbon dioxide reaction with hydroxide and possible impurities. Such impurities could be present in the carbon electrocatalysts or other electrode materials

— build up of resistive oxidation layers in the electrode structure

— flooding of pores due to change in wetting characteristics

— delamination of the electrode metallic contact layers causing higher internal cell resistance.

The identification of the cause of degradation requires a series of tests; many of these have to be done post mortem. For example, optical and electron microscopy of the electrode structure: polymer support; seed layer electroplate layer and electrocatalyst layer to determine any contamination by carbonate, change in structure or de-lamination and measurement in change in surface area and porosity. Other tests can be performed in situ using voltammetry and AC impedance.

Investigation of many of the causes of degradation is proposed by AFC Energy; which includes the use of AC impedance to identify any changes in internal electrode resistances and cell polarisation. The use of electrode steady state polarisation at regular intervals is also used to monitor performance. Such data can potentially indicate any adverse performance at higher current densities. AFC Energy has been using a carbon dioxide scrubber in its electrode tests for several months now which will virtually eradicate carbonate contamination.

Of the potential causes of the fall in cathode potential the issue of CO_2 contamination and its influence on electrode degradation is not totally resolved. The formation of potassium carbonate from the reaction of carbon dioxide with potassium hydroxide has been shown not to be a significant factor (McClean). The solubility of potassium carbonate is high in electrolyte solutions and needs to build up to high levels before adversely affecting cathode kinetics.

The degradation effect in general does depend upon the materials chosen to form the electrodes and consequently reports in the literature on the extent of degradation are varied. For example Kinoshita cites that at 670 mV with 50 ppm CO_2 in the air stream the power output was reduced from 70 to 50 mW/cm^2 (approximately a 30% reduction) over 6,000 h in a non-continuous test, for a 500 W stack.

More recent studies have been conducted with cathodes using silver catalysts, gas diffusion electrodes (GDEs) for up to several thousand hours with a constant load of 150 mA/cm^2 (Gülzow). The reactants were contaminated with 5% CO_2. Fig. 10 shows the electrochemical performance during the long-term experiments performed with the silver cathodes. The decrease of electrochemical performance for all cathodes is similar and independent of the presence of CO_2 in the oxygen. This indicates that the carbon dioxide neither influences the electrochemical performance nor accelerates the degradation process. The slope of the time-dependent electrochemical performance shows a decrease of 17 mV/1000h for the cathode; which is similar to that of AFC Energy electrodes.

Electrochemical impedance spectroscopy measurements recorded during a long-term experiment with silver cathodes in pure oxygen have shown that the decrease of the electrochemical performance is induced by a decrease in the active surface and an increase in mass transport resistance. The decrease of the electrochemical performance could be explained by alteration or decomposition of the PTFE. PTFE is necessary for the gas transport and influences the extension to the three phase zone. It is likely that all binders used in AFCs will potentially suffer from some form of degradation.

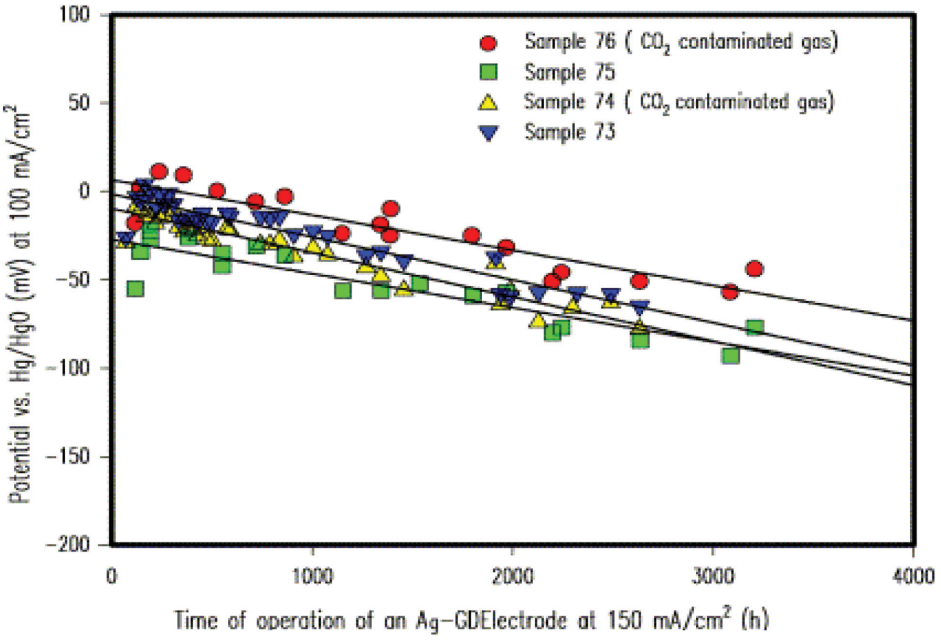


Fig. 10. Change of the electrochemical performance of the silver cathode during operation with pure oxygen and oxygen containing 5% CO_2. (Gülzow)

The work of Kordesch and co-workers in 1992 on the degradation in AFCs emphasised that the loss of performance was due to the electrochemical corrosion of the electrodes. A degradation in the performance under working conditions was reported as 10–30 mV/1,000 h over 3,500 h at 100 mA cm^{-2} and 65°C, using precious metal catalysts (loading 1.5 mg cm^{-2}).

Eident Energy have reported the most recent degradation studies on AFC fuel cell stacks (Gouérec). The electrodes were multilayered; hydrophobic (PTFE) bonded precious metal electrocatalysts supported on carbon. The cathodes had a low metal loading of <0.3 mg cm^{-2} and showed a degradation of 5–10 mV/1000 h over a period of 2800 h at 0.1 A cm^{-2} (Fig. 11). This result also compares favourably with the degradation rate of 17 mV/1000 h achieved with silver based cathodes. Notably the degradation is more intense with the higher current density of operation used (150–200 mA cm^{-2}).

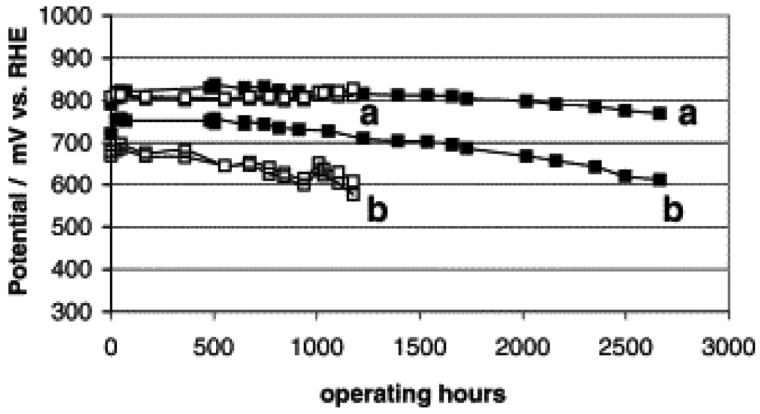


Fig. 11. Evolution of the performance of the V1.0 (□) and the V.1.1 (■) EE cathodes in half-cell configuration at 0.1 A cm^{-2} (a), 0.15 and 0.2 A cm^{-2} for V1.0 and V.1.1 respectively (b).

Polarisation curves were recorded after performance stabilisation (24 h) and then after 100, 250 and 480 h (Fig. 12a). It is clear here that the loss in performance at the higher current densities is due to an

increase in mass transport resistance. In this study degradation was shown to be independent of electrode operation and operating temperature, and only a function of the time that a cathode was kept in contact with a static pressure of KOH. Sources of degradation were clearly identified. They originate from a slow but constant physical flooding of the cathodes. This is in agreement with Kordesch and co-workers who observed a reduction of the electrode surface area and an increase in the wetting of the electrode as a function of hours the electrode is operated. The increased wetting results in a hindrance to the air diffusion inside the catalytic layer, which results in a slow degradation of the electrochemical performance with operating time. The presence of Pt was found to accelerate the rate of corrosion while adding PTFE delayed its rate. They also report the denaturing of the PTFE binder with time, and loss of hydrophobicity of this material. Kordesch and co-workers conclude that the main source of performance degradation was due to the corrosion of the carbon (in this case a Vulcan XC-72-R, a carbon black derived from oil, from the company Cabot Carbon) due to the electro-generation of HO_2^- during the ORR as well as the chemical reaction of the carbon with the KOH.

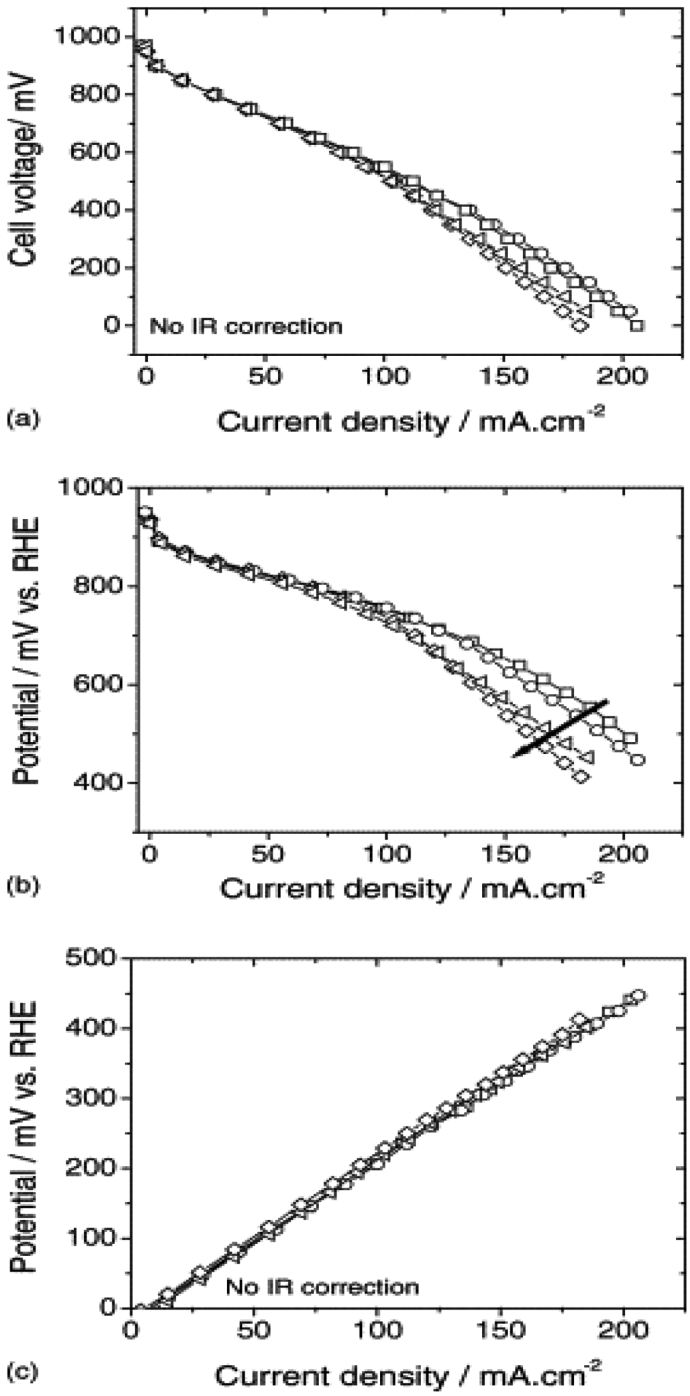


Fig. 12. Evolution of the performance of a 4 cm^2 single cell (V.1.0) as a function of the time: (a) under continuous operation at constant voltage (0.6 V), electrolyte: 6.6 KOH, 70°C, gases: air (1.05 10^5 Pa) and H_2 (1.05 10^5 Pa). The contribution of each electrode vs. RHE is presented in graphs (b) and (c) for the cathode and the anode, respectively: day 1 (□), day 4 (○), day 11 (◁), day 20 (◇). The IE curve for the anode is here not corrected of the Ohmic losses due to the electrolyte chamber.

Overall the performance of the AFC Energy cathode looks very promising with cathode potentials as good as those with non-precious metal catalysts and the extent of degradation similar to those reported by previous workers; with both precious metal and non-precious metal carbon supported electrocatalysts.

The reasons for the degradation in cathode potential has yet to be established but is likely to result from cathode carbon corrosion and possibly a change in the wetting of the electrodes.

5.2 Anode Performance

The anode in the AFC should in principle be less problematic than the cathode in terms of achieving the required performance; due to the more facile nature of hydrogen oxidation. The performance of the AFC Energy anode based on Ni/Al and carbon is shown in Fig. 13; The IR uncorrected potential is 175 mV at 50 mA cm^{-2}. This data is comparable with that achieved recently by Eident Energy; 100 mV at 50 mA cm^{-2} (Fig 12) noting that the latter data was at 70°C. This performance is achieved with an anode with a low loading (10%) of Ni electrocatalyst. Notably the AFC Energy anodes show stable behaviour (over 1200 hours) with no identifiable loss in performance.

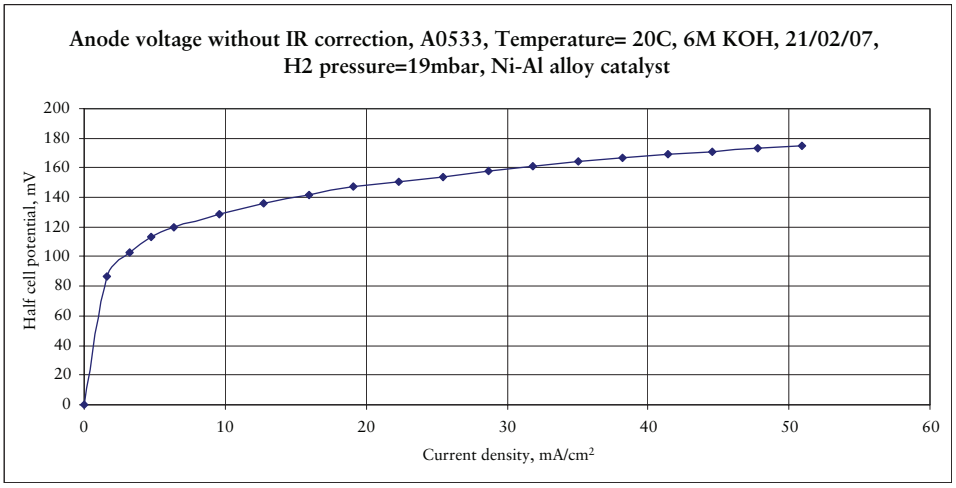


Fig. 13 Anode polarisation curve (voltage vs. Current density) at 20°C with Ni-Al alloy catalyst

This current AFC Energy anode performance is now starting to approach some of the best data reported for other alkaline fuel cell anodes based in Ni alloys, e.g. the work of Gulzow (Fig. 14) where anode polarisation loss is around 40 mV at 100 mA cm^{-2}. These latter electrodes were prepared from PTFE and a porous nickel-aluminium alloy containing 50 wt.% of each metal, which is much higher than that tested in the AFC Energy anodes. The catalyst was activated by dissolving the aluminium in KOH at 350°K. After this procedure, the catalyst contained less than 5% of aluminium. After activation process with hydrogen evolution at 5 mA/cm^2 for 18 h, the electrodes were tested at constant loading in a half cell equipment. During the fuel cell operation, the electrochemical performance decreased due to changes of the polymer (PTFE).

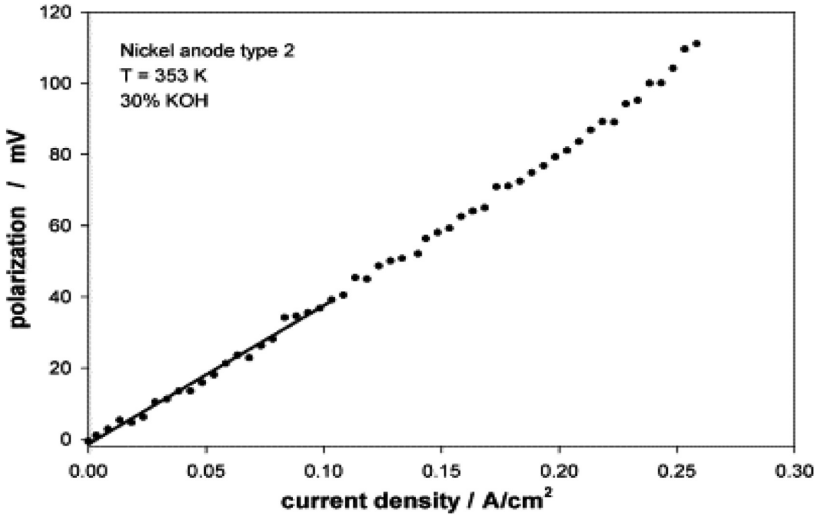


Fig. 14. Typical V-i curve. From the shown straight line, the surface specifically conductivity will be calculated

The anode loses performance during cell operation; as indicated in the data of Fig 15 for a current density of 100 mA cm^{-2}. The specific conductivity is effectively the ratio of current density (in mA cm^{-2}) to cell voltage (mV). For example a value of 1.0 at 50 mA cm^{-2} was equivalent to a polarisation of 50 mV and the value at 100 mA cm^{-2} was equivalent to a polarisation of around 120 mV. Lower values mean higher polarisation. After an initial loss in performance the anode polarisation is relatively steady increasing by around 10 mV over 1,000 h operation

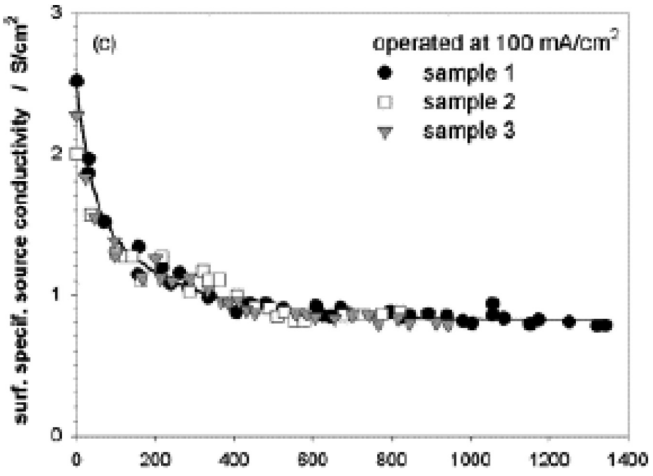


Fig. 15 Change in source conductivity of nickel anodes at 100 mA cm^{-2}.use only one data figure

An aspect that has been considered in the performance of the anodes is whether or not carbon dioxide would degrade performance. Any carbonate in the alkaline electrolyte forms CO_3^{2-} ions, which could move in the electrical field to the anodes. If carbonates deposit on the anode, they could close the pores in the electrode. Gülzow showed that during lifetimes studies of Ni anodes the specific surface was nearly constant and no change was induced by the carbon dioxide. The decrease of the electrochemical performance of the anodes during operation with pure and CO_2 containing hydrogen is shown in Fig. 16; where the electrochemical performance was not significantly influenced by carbon dioxide.

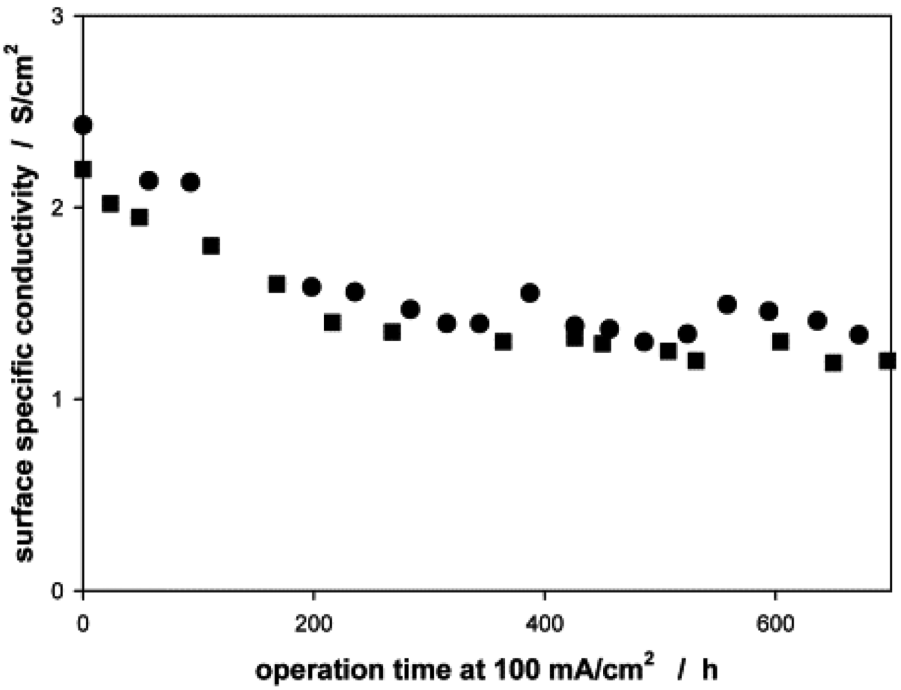


Fig. 16. Change of the electrochemical performance of the nickel anodes during operation with pure hydrogen (circles) and hydrogen containing 5% CO_2 (squares).

The work carried out by Eident Energy on anode degradation in AFC stacks (Fig 12c) showed no change of the anode polarisation over the time scale of the tests.

The influence of an increase in temperature on the anode will, as with the cathode, produce a significant improvement in anode polarisation. It would be expected that with suitably produced porous Ni based electrocatalysts anode polarisation would be no more than 50 mV at a current density of 100 mA cm^{-2}. It is also expected that anode degradation will not be a major issue as it has been shown by AFC Energy and previous researchers that fuel cell degradation comes almost solely from the cathode.

5.3 Electrode manufacture

Success of the AFC Energy fuel cell relies on a number of factors: use of suitable porous supports; methods of and materials for the conducting coatings; deposition of catalyst layers and achieving a suitable 3-phase interface for reaction.

Polymer substrate

The porous support is required to have several important characteristics; be hydrophilic, inert to high concentrations of KOH at temperatures, up to approximately 80°C; to have a suitable porosity; be of suitable strength; with a required bubble point and be of low cost. Potential commercial materials have been identified by AFC Energy based on polymers of ethylene; propylene and vinyl chloride (Table 5). A spun fibre of polypropylene from Scimat has been evaluated successfully in electrode tests. A quoted cost is \$3.5 /m^2 which equates to a cost of approximately \$4.8 /kW of cell power at the anticipated target current density of 1 kA/m^2.

To ensure reliability of supply AFC Energy has sourced a supply of an alternative substrate; Tyvek made from high density polyethylene (HDPE). This material is nearly half the cost of the current material; but in its manufactured state is hydrophobic and thus not immediately suitable for the AFC Energy electrode. However a simple chemical treatment process has apparently been developed by AFC Energy that renders the material hydrophilic and this treatment step can be incorporated quite easily and effectively in the electrode processing line.

Table 5. Substrate Properties

Make	*Tyvek*	*Tyvek*	*Scimat*	*Scimat*	*Jungfer*	*Porvair*
Type	1082 D	1073 D	700/70	700/77	—	Vyon
Material	HDPE	HDPE	PP	PP	PVC	HDPE
Manufacture	Spun bonded	Spun bonded	Spun Fibre	Spun fibre	—	—
Temperature limit	100 deg C	100 deg C	100 deg C	100 deg C	—	—
Strength	excellent	excellent	V good	good	Brittle	Rigid
Bubble point	100 mbarg	60 mbarg	70 mbarg	85 mbarg	85 mbarg	80 mbarg
Purity	Pure	Pure	Pure	Pure	—	—
Thickness (microns)	275	205	165	125	200	750
Weight (g/m^2)	105	75	55	57	—	—
Hydrophilic	No	No	Excellent	Good	No	No
Cost ($\$/m^2$)	2	NA	3.5	NA	5.0	10.5
Availability	High	High	High	High	Low	Low
Absorption (g/m^2)	Na	Na	100	50	NA	NA

Electrode conducting layers

The electrode conducting layers are to enable current to flow out of the cell. Several non-precious metals can be used for the coating including silver; nickel; titanium; all of similar cost. An initial 0.5 micron seed coating of silver has been selected; which can be deposited by electro-less deposition (sputtering); as silver provides good adhesion and has good conductivity. Thicker coatings of a few microns; of cheaper conducting Cu metal can then be applied by electro-deposition; followed by a protective coating of Ni. Metal costs are low; less than $20/kW. Both deposition techniques are well known and commercially available. Appropriate coating manufacturers have been identified. AFC Energy are currently looking to replace the expensive vacuum deposition step with a lower cost option which would ensure that manufacturing costs are kept low.

Electrocatalyst layers

Carbon catalyst materials are applied using standard techniques such as spraying; as an ink formed with a low cost polymer in a suitable solvent. The use of a non-precious metal; Ni as anode and active carbon as cathode electrocatalyst; look to be suitable and provides the required low cost. A spray system which will give repeatability in ink coating and thus electrocatalyst layer thickness and potentially performance has been specified and ordered. Spraying of electrocatalyst can create a significant waste of electrocatalyst and thus for the anode a screen printing option is under evaluation. Stability of the electrodes over the required lifetime is a factor that needs to be demonstrated in fuel cell tests.

A major factor of AFC Energy fuel cell technology is the low cost of their cells using cheap materials; inexpensive carbon-and-plastic electrodes, cheap electrolyte and inexpensive bipolar plate — if needed. Table 6 shows the estimated costs of AFC Energy cell design which still remain valid. These costs make the AFC Energy fuel cell technology an attractive and economic option, even allowing for the cell frame and manifolding costs, when compared to predicted costs of other systems based on hydrophobic PTFE bonded electrodes. Small scale production volumes of the order of 1000's, have quoted costs of current AFCs at $205/kW. High volume production costs (in 2000) are quoted at: $155/kW.

Table 6. AFC cell material costs

Materials	*Total*	*Substrate*	*Silver*	*Copper*	*Nickel*	*Ni anode Ni alloy*	*C Cathode Carbon*
Cost per kW ($/kW)		10.6	7.05	0.65	0.63	5.1	0.92
% cost		42.37	28.37	2.63	2.53	20.46	3.64
Total cost /kW ($/kW)	24.95						

5.4 Progress on Work Streams

Overall the dry side electrode design is technically sound and potentially of low cost. The suitability of the DSE is to be demonstrated through a series of single cell module (SCM) tests of small scale and large (15×25 cm) full scale electrodes as part of performance evaluation. The small scale SCM rig has been trialled successfully and design work on the large scale SCM is progressing. This design work includes finite element analysis (FEA) of fluid flow in the gas channels using a commercial software package, which also has software that can be used to model fuel cell electrodes. The tests rigs will include provision for heating to eventual desired operating temperatures.

The components of the AFC Energy cell stack are produced by known low cost manufacturing routes: electro-less deposition, evaporation, electroplating, and spraying. Companies have been identified who can satisfy the production requirements for the first phase of stack from manufacture. The stack sealing which is always an important (and difficult) issue, is being addressed, with an in-situ liquid sealant application with curing being considered. The fuel cell stack and system design is underway with new design team staff recruited. The system design includes suitable gas supplies, air blowers, KOH store, power conditioning air cooling and heat exchangers.

The fuel cell stack; hydrogen fuel is to be supplied as a dead-end feed, with frequent purging to remove any build up of contaminants. Air is to be supplied at between 3 to 4 times stoichiometric excess, which will ensure good cathode performance and water management. The stack system is currently designed with a soda-lime scrubber to remove the majority of the carbon dioxide from the air fed to the cell. The eventual final use of this scrubber may not be necessary as current tests of electrode stability have shown some promising results; although the cause of the cathode deterioration is in the process of being established. Previous published data does indicate that deterioration in performance is not directly associated with CO_2 contamination.

The electrical system design and stack controller design are progressing with assistance from external consultants. The current design includes a high level of monitoring of all system flows, pressures, temperatures, electrolyte condition, etc suitable for prototype evaluation. It is felt that final mass produced stack systems will need fewer sensors and monitors. The IP for the controller, which will be chip based, is held by AFC Energy and the prototype is expected to be ready in October 2007.

6. Conclusions

The electrochemical testing of cathodes and anodes and their long-term performance has been investigated for several different single electrodes at room temperature. The performance achieved at room temperature of the cathode with active carbon electrocatalyst is sufficiently encouraging to suggest that the cell performance target of the full size stack (100 mA cm^{-2}, 0.65 V) is on track. As yet there is no evidence to suggest that the presence of carbon dioxide in the air is a problem for cell performance. A real problem of the AFC is the normal long-term stability of the cathodes; the decrease of the electrochemical performance is presently quite high and ideally should be reduced. Although the degradation mechanisms in the AFC components are quite well understood from published data; it is important that the cause of degradation should be established for the AFC Energy cathodes. Therefore a direction of research for the developing of long-term stable electrodes is clearly needed. Ideally the cathode should be benchmarked against a Pt/C catalyst and potentially an Ag/C catalyst which may be more expensive than the activated carbon, but possibly more stable.

The performance achieved for the nickel based anodes to date is quite good and shows stable behaviour. Performance is starting to approach the best reported in the literature. However, the aspect of anode development is at a relatively early stage and existing performance data was achieved with un-optimised electrodes. Further improvements can be expected by reducing the electrocatalyst particle size and optimising catalyst loading, which is proposed by AFC Energy, and also by a slight increase in the partial pressure of hydrogen. To date the AFC Energy team have made some significant progress in the testing of the DSE concept and successful operation of the DSE has been demonstrated using low cost materials for a period of approximately 8 months. The Scimat substrate and the coating methods for seed layer conducting layer and electrocatalyst layers have been successfully demonstrated. The use of electroplating in the manufacture is suitable for mass production, as is catalyst spraying.

Alternative lower cost substrate material has been identified and improvements in electrode construction that potentially reduce cost of manufacture have been identified. A suitable scale up programme for evaluating single electrodes and stacks has been proposed and test equipment as well as electrode manufacturing facilities is under design and planning. This programme will enable cells to be tested at the higher temperatures of operation of 65°C. It should be remembered that typically, electrochemical performance falls with increase in scale; largely attributed to in-homogeneities in electrode structure and problems of uneven flow and mass transport distribution and current distribution. Consequently performance achieved for the small single electrodes need to be better than those set for the full scale prototype; for example a stable power density of 120 mW/cm^2 could be a target. The condition of the catalyst(s) will be investigated after its operation, to assess any potential damage due to the electrochemical activity: to assess the soundness of the binding between the conductor and the catalyst and the wetting of the catalyst, to see if after operation the characteristics of the 'three phase zone' have changed.

The cell stack design is well advanced and development of control and monitoring of the fuel cell system is in hand. From the studies carried out to date and the proposal for the next stages of R&D, there is reason to be optimistic about the future success of the AFC Energy stack development. The low cost feature of the electrode makes the AFC Energy fuel cell technology attractive against it competitors.

The characteristics of alkaline fuel cells: high electrochemical conversion efficiency, low material cost, cheap electrolyte, no membranes, quick start and operation at low ambient temperature, good performance at ambient pressure, low system cost, system simplicity, and simple water and heat management and tolerance to CO traces make them an attractive option for power generation. AFC Energy has developed a new alkaline fuel cell electrode technology that appears to approach the performance levels of current AFCs using ambient air. The performance has been achieved using a low cost activated carbon as the cathode catalyst as opposed to a Pt or other more expensive catalyst component. The dry side electrode design dispenses with the traditional and expensive Ni support screens and uses a low cost hydrophilic substrate as the support for a series of metal layers that support the catalysts. The DSE design offers advantages in operation regarding protection of catalyst from electrolyte erosion and in cell stand by mode. The DSE design has been achieved using low cost cell materials that are readily available and which can be fabricated using known and available manufacturing methods. In the future commercialization of low temperature fuel cell technology, cost and materials will be major issues. The AFC Energy fuel cell is in an excellent position to achieve high production volumes and low cost and to become the fuel cell technology of choice in some potentially large and lucrative markets. The AFC Energy fuel cell technology would appear suited to the residential and light commercial sector markets.

7. Glossary and Further Information

7.1 Glossary of terms

Alkaline fuel cell (AFC)	A fuel cell based on an alkaline potassium hydroxide as conducting electrolyte.
Balance of plant	Components in a fuel cell system that enable operation of the fuel cell stack. This includes pumps, heat exchangers and controllers.
Bipolar plates	The component that electrically connects the individual cells in a polymer electrolyte fuel cell.
Bipolar connection	A method of connecting the cells of a cell stack in series.
Catalyst loading	The amount of catalyst incorporated in a fuel cell per unit area. Typical units are mg/cm^2.
Current density	The term used to define the current output from a fuel cell based on the electrode cross sectional area.

Dry Side Electrode (DSE)	The DSE consists of an inert porous support onto which is deposited a porous metallic conducting layer to which the required catalyst layer can then be deposited.
Direct methanol fuel cell (DMFC)	A fuel cell based on a polymer electrolyte membrane which uses methanol directly as the fuel.
Electrocatalyst	A material such as platinum used to catalyse chemical reactions at the electrodes.
Electrochemical cells	Devices in which chemicals react to produce electricity or electricity is used to drive a chemical reaction. Fuel cells are an example of electrochemical cells.
Electrode	An electronic conductor through which an electric current enters or leaves a medium. Chemical change occurs at the interface of the electrode and electrolyte medium. A fuel cell contains two electrodes: an anode where oxidation of a fuel occurs and a cathode where reduction of oxygen occurs.
Gas diffusion electrode	An electrode in a fuel cell formed by bonding a catalyst with an inert plastic binder which enable a three phase zone to be created.
Fluorocarbon membrane/ polymer	A membrane or polymer made from a chemical compound consisting of fluorine and carbon. Nafion™ is a fluorocarbon membrane material.
Membrane	The polymer layer in a PEMFC fuel cell that acts as electrolyte (a medium for the transport of an ion between the two electrodes) as well as a barrier separating the gases in the anode and cathode compartments of the fuel cell.
Membrane Electrode Assembly (MEA)	The heart of the PEMFC, comprising a thin film of ion conducting polymer (the membrane) coated on each side with electrocatalyst layers (the electrodes).
Monopolar or Homopolar	A method of connecting the cells in a stack in series.
Nafion™	A perfluorinated polymer manufactured by Dupont. Nafion™ is used in state-of-the-art PEM fuel cells.
Proton exchange membrane fuel cell (PEMFC)	A type of fuel cell in which the transport of protons (H+) from the anode to the cathode is achieved through a solid, polymer electrolyte (membrane) in its acid form. The electrolyte is a called a proton exchange membrane (PEM). The fuel cells typically run at low temperatures ($<80^{\circ}C$).
Polypropylene	A hydrocarbon polymer used to make the dry side electrode porous support.
Polarisation curve	A term used to define the fuel cell voltage and current density characteristics.
Power density	A term used to define the output of a cell based on the cross sectional area of the electrodes. Typical units are mW/cm^2.
PTFE	Polytetrafluoroethylene (PTFE) is a fluorocarbon polymer made of a carbon backbone chain with two fluorine atoms attached to each carbon atom. It is better known by the trade name Teflon™.
R&D	Research and development.
Solid oxide fuel cell (SOFC)	A fuel cell operating at high temperature which uses a ceramic oxide ion conducting electrolyte.

Stack	Individual fuel cells connected together to form a fuel cell stack.
Three phase zone	The region in the fuel cell electrode where reactant gases reactant on the surface of the electrocatalyst in contact with the electrolyte.
Water Electrolyser	A device that uses energy to convert water to hydrogen and oxygen.

7.2 Further information

Further information on fuel cell technologies and markets can be found in the following references.

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http://europa.eu.int/comm/research/energy/pdf/hlg_vision_report_en.pdf

Fuel Cell Today web site.www.fuelcelltoday.com/index/

Fuel Cells 2000 online fuel cell information centre.www.fuelcells.org

In addition, there are a number of workshops and conferences providing up-to-date information on fuel cell technology developments. These events are usually organised on a biennial basis.

The prominent international conferences last held were:

European Fuel Cell Forum, 28 June-2 July 2004, Lucerne, Switzerland.

www.efcf.com/conferences/index.shtml

Fuel Cells Science and Technology, 6-7 October 2004, Munich, Germany.
www.fuelcelladvances.com
2004 Fuel Cell Seminar, 1-5 November 2004, San Antonio, Texas, USA.
www.fuelcellseminar.com/index

PART IV

FINANCIAL INFORMATION

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Dear Sirs

AFC Energy plc

We report on the financial information set out below. This information has been prepared for inclusion in the Admission Document dated 18 April 2007 for AFC Energy plc (''AFC'' or ''the Company''). This report is required by item 20.1 of Annex 1 of the AIM Rules and for no other purpose.

Basis of Preparation

The financial information set out below is based on the audited financial statements of AFC for the period from incorporation on 9 January 2006 to 31 October 2006 and has been prepared on the basis set out in note 4.1 below after making such adjustments as we considered necessary.

Responsibility

The directors of AFC are responsible for preparing the financial information on the basis of preparation set out in note 4.1 to the financial information and in accordance with International Financial Reporting Standards.

It is our responsibility to compile the financial information set out in our report from the financial statements, to form an opinion on the financial information and to report our opinion to you.

Basis of Opinion

We conducted our work in accordance with the Statements of Investment Circular Reporting Standards issued by the Auditing Practices Board. Our work included an assessment of evidence relevant to the amounts and disclosures in the financial information. The evidence included the period ended 31 October 2006. It also included an assessment of significant estimates and judgements made by those responsible for the preparation of the financial statements underlying the financial information and

whether the accounting policies are appropriate to the Company's circumstances, consistently applied and adequately disclosed.

We planned and performed our work so as to obtain all the information and explanations which we considered necessary to provide us with sufficient evidence to give reasonable assurance that the financial information is free from material misstatement, whether caused by fraud or other irregularity or error.

Opinion

In our opinion, the financial information gives, for the purposes of the Admission Document dated 18 April 2007, a true and fair view of the state of affairs of AFC as at 31 October 2006 and of its losses and cash flows for the period then ended in accordance with the basis of preparation and in accordance with International Financial Reporting Standards and the accounting policies set out in note 4.1.

Declaration

For the purposes of paragraph (a) of Schedule Two of the AIM Rules, we are responsible for this report as part of the AIM Admission Document and declare that we have taken all reasonable care to ensure that the information contained in this report is, to the best of our knowledge, in accordance with the facts and contains no omission likely to affect its import. This declaration is included in the AIM Admission Document in compliance with Schedule Two of the AIM Rules.

The financial information included herein comprises:

- a statement of accounting policies;
- income statement, balance sheet, cash flow statement;
- notes to the income statement and the balance sheet.

1. Income statement

For the period from the date of incorporation on 9 January 2006 to 31 October 2006

	Notes	*Period ended 31 October 2006* £
Operating expenses		
Administrative expenses	4.2	(617,158)
Loss from operations		(617,158)
Investment income	4.3	14,013
Finance costs		(27)
Loss before tax		(603,172)
Taxation	4.4	60,679
Loss for the period	4.8	(542,493)

2. Balance sheet

As at 31 October 2006

		31 October 2006	
	Notes	£	£
Non-current assets			
Intangible assets	4.5		287,051
Property, plant and equipment	4.6		152,184
			439,235
Current assets			
Trade and other receivables	4.7	114,735	
Cash and cash equivalents		396,244	
			510,979
Total assets			950,214
Current liabilities			
Trade and other payables	4.8	(76,226)	
Total liabilities			(76,226)
Net assets			873,988
Equity			
Share capital	4.9		70,000
Share premium account	4.10		1,334,935
Other reserves	4.12		11,546
Revenue reserves	4.11		(542,493)
Total equity			873,988

3. Cash flow statement

For the period from the date of incorporation on 9 January 2006 to 31 October 2006

		Period ended 31 October 2006	
	Notes	£	£
Cash flows from operating activities			
Loss from operations			(617,158)
Adjustments for:			
Depreciation of property, plant and equipment	4.6		32,023
Amortisation of intangible assets	4.5		12,131
Share based payments	4.12		11,546
			(561,458)
Increase in receivables			(54,056)
Increase in payables			76,226
Net cash from operating activities			(539,288)
Cash flows from investing activities			
Purchase of intangible assets	4.5	(299,182)	
Purchase of property, plant and equipment	4.6	(184,207)	
Interest received	4.3	14,013	
Net cash used in investing activities			(469,376)
Cash flows from financing activities			
Proceeds from issue of share capital		1,404,935	
Interest paid		(27)	
Net cash used in financing activities			1,404,908
Net increase in cash and cash equivalents			396,244
Cash and cash equivalents at beginning of period			—
Cash and cash equivalents at end of period			396,244

4. Notes to the Financial Statements

4.1 *Accounting policies*

The following accounting policies have been applied consistently in dealing with items which are considered material in relation to AFC's financial statements.

Accounting convention

The financial statements have been prepared in accordance with International Financial Reporting Standards (IFRSs).

The financial statements have been prepared on the historical cost basis. The principal accounting policies adopted are set out below.

Patents

Patents are stated at cost less amortisation. Amortisation is provided to write off the cost of the asset over the useful lives of the assets concerned on the following basis:

Patents	5 per cent per annum straight line

Property, plant and equipment

Property, plant and equipment are stated at cost less depreciation. Depreciation is provided at rates calculated to write off the cost of fixed assets, less their estimated residual value, over their expected useful lives on the following bases:

Fixtures, fittings and equipment	Over one to three years straight line
Leasehold improvements	Over the life of the lease.

Leases

Leases are classified as finance leases whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee. All other leases are classified as operating leases.

Deferred taxation

Deferred tax is accounted for using the liability method and as such all timing differences between the company's profits chargeable to tax and its results as shown in the financial statements are recognised. These timing differences arise from the inclusion of gains and losses for tax purposes in different periods from those in which they are recognised in the financial statements. Deferred tax assets are only recognised to the extent it is probable that the future taxable profits will be available against which deductible temporary differences can be utilised. Deferred tax is measured on a non-discounted basis at rates of tax expected to apply in the periods in which the timing differences are expected to reverse.

Equity compensation benefits

The Company issues equity-settled share-based payments to certain employees which must be measured at fair value and recognised as an expense in the income statement with a corresponding increase in equity. The fair values of these payments are measured at the dates of grant using option-pricing models, taking into account the terms and conditions upon which the awards are granted. The fair value is recognised over the period during which employees become unconditionally entitled to the awards, subject to the Company's estimate of the total number of awards which will lapse, due to employees leaving the Company prior to vesting. The total amount recognised in the income statement as an expense is adjusted to reflect the actual number of awards that vest.

4.2 Loss from operations

	2006 £
The loss from operations is stated after charging:	
Amortisation of other intangible assets	12,131
Depreciation of property, plant and equipment	32,023
Auditors' remuneration	20,000

4.3 Investment income

	2006 £
Bank interest	14,013

4.4 Taxation

	2006 £
Research and development tax credit	60,679
Factors affecting tax credit for the period	
Loss on ordinary activities before taxation	(603,172)
Loss on ordinary activities multiplied by the standard rate of corporation tax in the UK of 30%	(180,952)
Expenses disallowed	8,668
Research and development tax credit	15,171
Depreciation in excess of capital allowances	(6,249)
Losses carried forward	102,683
	120,273
Research and development tax credit	60,679

The company has estimated losses of £340,000 available for carry forward against future trading profits.

4.5 Intangible assets

	Patents £
Cost	
Purchase consideration	300,000
Related costs	19,986
Amount attributed to tangible assets	(20,804)
At 31 October 2006	299,182
Amortisation	
Charge for the period	12,131
At 31 October 2006	12,131
Carrying value	
At 31 October 2006	287,051

On 27 January 2006 the company agreed to purchase certain equipment and intellectual property rights from Eneco Limited for £425,000 on deferred terms and the allotment of 70,000 shares in the company. This agreement was subsequently amended to accelerate the payments but reduce the overall consideration to £300,000 and the shares owned by Eneco Limited were sold to the existing shareholders of the company.

4.6 Property, plant and equipment

	Leasehold improvements £	*Fixtures, fittings and equipment* £	*Total* £
Cost			
Acquisitions (see note 4.5)	—	20,804	20,804
Additions	62,208	101,195	163,403
At 31 October 2006	62,208	121,999	184,207
Depreciation			
Charge for the period	9,090	22,933	32,023
At 31 October 2006	9,090	22,933	32,023
Carrying value			
At 31 October 2006	53,118	99,066	152,184

4.7 Trade and other receivables

	2006 £
Other receivables	114,735

4.8 Trade and other payables

	2006 £
Trade payables	40,976
Taxation and social security payable	12,333
Other payables	22,917
	76,226

4.9 Share capital

	2006 £
Authorised	
70,000,000 ordinary shares of 1p each	700,000
Allotted, called up and fully paid	
7,000,000 ordinary shares of 1p each	70,000

During the period the company issued 560,000 ordinary shares of 1p at par and 140,000 ordinary shares of 1p for a consideration of £10 per share. A bonus issue of 6,300,000 ordinary shares of 1p were issued to shareholders for nil consideration in proportion to their existing holdings.

On 23 March 2007 pursuant to resolutions of the shareholders of the Company, the authorised share capital was sub-divided from 100,000,000 ordinary shares of £0.01 each into 1,000,000,000 ordinary shares of £0.001 each.

Subsequent to the year end, warrants over 1,550,000 ordinary shares were granted at an exercise price of £0.1 per share and further warrants over 2,489,980 ordinary shares were also granted on 16 February 2007 at an exercise price of £0.223 per share. Details of share options are included within paragraph 4.16 of this report.

4.10 Share premium account

	2006 £
Balance at 9 January 2006	—
Premium arising on issue of equity shares	1,397,935
Bonus issue	(63,000)
Balance at 31 October 2006	1,334,935

4.11 Revenue reserves

	2006 £
Balance at 9 January 2006	—
Loss for the period	(542,493)
Balance at 31 October 2006	(542,493)

4.12 Statement of changes in equity

	Share Capital £	*Share premium account* £	*Revenue reserves* £	*Other reserves* £	*Total* £
Balance at 9 January 2006	—	—	—	—	—
Changes in equity for the period					
Loss for the period	—	—	(542,493)	—	(542,493)
Total recognised income and expense for the period	—	—	(542,493)	—	(542,493)
Share based payments	—	—	—	11,546	11,546
Issue of equity shares	7,000	1,397,935	—	—	1,404,935
Bonus issue	63,000	(63,000)	—	—	—
Balance at 31 October 2006	70,000	1,334,935	(542,493)	11,546	873,988

The other reserves represent the amount charged to the income statement in respect of the grant of Enterprise Management Incentive options.

4.13 Deferred taxation

There is no recognition of the deferred tax asset in relation to trading losses since there is insufficient evidence to determine that they are recoverable. Deferred tax assets that the Company has not recognised are as follows:

	2006 £
Accelerated capital allowances	26,218
Tax losses available	(102,683)
Deferred tax asset not recognised	(76,465)

4.14 Financial commitments

At 31 October 2006 the Company was committed to making the following payments under non-cancellable operating leases in the year to 31 October 2007:

	2006 £
Operating leases which expire from 2 to 5 years	23,400

4.15 Capital commitments

At 31 October 2006 the company had capital commitments as follows:

	2006 £
Contracted for but not provided in the financial statements	—

4.16 Share-based payments

Share option and contingent share award schemes

The Company operates an equity-settled share option scheme (the "Scheme") for certain employees. The Company granted options over 490,000 shares on 5 July 2006. An option over 70,000 shares lapsed during the period as a result of an employee leaving the Company. The vesting period of the shares is three years and options expire ten years from the date of the grant. There were options over 420,000 shares outstanding at 31 October 2006 at an exercise price of £1 per share. As a result of the share subdivision subsequent to the year end the number of these options was increased to 4,200,000 and the exercise price decreased to £0.1 per share. In February 2007 options were granted over a further 2,979,660 shares at an exercise price of 22 pence per share.

Information for awards granted during the period

The weighted average fair value of the options over 490,000 shares granted during the period, as estimated at the date of grant, was £122,500. The fair value of options granted to employees during the period was measured on the basis of the exercise price of AFC Energy plc's shares on the date of grant.

The Company recognised an expense of £11,546 in respect of equity settled share-based payments in the period to 31 October 2006 in accordance with International Financial Reporting Standard 2.

4.17 Directors' emoluments

The remuneration of the directors is set out below

	2006 £
Emoluments for qualifying services	55,372

4.18 Staff costs

The average monthly number of employees (including executive directors) was:

	2006 *Number*
Research and administration	8

	2006 £
Their aggregate remuneration comprised:	
Wages and salaries	250,618

4.19 Control

At the date of this report in the Directors opinion there is no controlling party.

4.20 Related Party Transactions

As referred to in Note 4.5, in January 2006 the company acquired for £300,000 certain assets from Eneco Limited, a company in which Gerard Sauer was a director and shareholder.

4.21 Post balance sheet events

On 23 March 2007 pursuant to resolutions of the shareholders of the Company, the authorised share capital was sub-divided from 100,000,000 ordinary shares of £0.01 each into 1,000,000,000 ordinary shares of £0.001 each.

4.22 Auditors

The auditors for the period ended 31 October 2006 were Jeffreys Henry LLP, Finsgate, 5-7 Cranwood Street, London EC1V 9EE.

Yours faithfully

Jeffreys Henry LLP

PART V

INTELLECTUAL PROPERTY REPORT

ipsolutions

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The Directors
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15-17 Grosvenor Gardens
London SW1W 0BD

18 April 2007

Our Reference: PATS/H/577

Dear Sirs,

Intellectual Property Report on AFC Energy plc (the "Company")

1. Background

This report has been prepared for inclusion in the admission document ("Admission Document") being prepared in connection with the application for admission of the entire issued and to be issued share capital of the Company to trading on the Alternative Investment Market of the London Stock Exchange Plc ("AIM").

IP Solutions provides intellectual property consultancy services and patent agent legal services. It originated from the staff of the Patents Department of AEA Technology plc, previously of UKAEA. This report has been prepared by me, Peter Mansfield, a Chartered Patent Attorney and a European Patent Attorney. Since qualifying I have had over 20 years experience of patent drafting and of patent validity and infringement assessments. In carrying out the searches I have been assisted by Dr D Segal and Mr M Alphandary who are searchers and technical analysts with backgrounds in chemical research and chemical engineering across a wide range of industries.

None of the principals of IP Solutions has any financial interest in the Company over and above the fees for professional work done. The fees charged for the preparation of this report are based on our usual rates of charging.

IP Solutions has no involvement of the preparation of the Admission Document for the Company other than the preparation of this report.

2. IP Protection

Intellectual property includes unregistered intellectual property such as know-how, ideas, reputation, concepts, and styles, and registered intellectual property such as trade marks, registered designs, and patents. This report focuses only on the intellectual property owned by the Company which is defined by patent applications.

Patents can provide a monopoly for novel concepts in products, processes and improvements to existing technology.

In order to gain a patent the invention must be new and inventive at the date of filing the patent application at the Patent Office, or of its priority date.

Granting a patent does not guarantee validity, nor that the invention can be produced and marketed without infringing the rights of others.

3. Invention and Patent Portfolio

The patent applications relate to fuel cells, in which electricity is generated by supplying reactants (such as hydrogen and air) to two electrodes, the electrodes being separated by an electrolyte. In particular they relate to alkaline fuel cells. These typically use aqueous potassium hydroxide as the electrolyte. Alkaline fuel cells were developed into a practical power unit in around 1950, and were subsequently developed further, being used in some space missions. More recent technical developments on fuel cells have mostly concentrated on other types of cell, in particular those using solid polymer electrolytes.

Patent applications for the inventions were originally filed at the UK Patent Office as shown in the table below, and the inventions are referred to by the same titles subsequently in this Report.

Number	*Status*	*Filed*	*Descriptive Title*
GB 06 04596.7	Application	7 March 2006	Hydrophilic electrode
GB 06 04597.5	Application	7 March 2006	Negative pressure
GB 06 04598.3	Application	7 March 2006	Releasable electrodes
GB 06 04802.9	Application	9 March 2006	Master/slaves monitor
GB 06 08440.4	Application	27 April 2006	Microprocessor control

The first substantive stage for these applications was searching by the UK Patent Office, and in each case we received copies of the UK Patent Office searches (these being received after we had carried out our own searches). These applications were filed last year. In respect of each invention one would expect that a "final" patent application would be filed (whether as a UK, a European or a PCT (international) application) before the anniversary of the above-mentioned UK filing date, claiming priority from the previous patent application on that invention, and that this may include additional details.

That "final" patent application will be published 18 months after the above-mentioned UK filing date (i.e. no earlier than 7 September 2007 for those filed on 7 March 2006), and substantive examination by the relevant patent office examiners would then be initiated over the next few months. The actual date that the various examination procedures start depends on many factors, including current backlog of cases of the examiner assigned to examine the application. If the PCT route is adopted, then the international phase would end no later than a year after that publication, and examination by the UK or European examiner would be initiated after that date. It is unlikely, therefore, that examination would be completed any earlier than September 2009.

Usually objections are related to prior art as discussed below under Patentability. Infringement is not an issue raised by examiners. Once any objections raised by the examiners are overcome, the applications should proceed to grant.

It will be appreciated that the reviewed patent applications are still at an early stage. Before the anniversary of the original UK filing date the applicant has an opportunity to make amendments,

modifications and additions to the specifications to overcome any perceived inadequacies before the "final" patent applications are filed, and this has been (or is being) done.

4. Patentability

We have carried out extensive searching of the prior art in relation to each invention, using various databases, and using keywords and patent classification codes where appropriate. The documents found in this manner were first reviewed by the searcher to select those that appeared most pertinent. I have then reviewed all the selected documents, and identified those of closest relevance in assessing patentability of each claim in each patent application. I have also reviewed the citations from the UK Patent Office searches.

Since this is a review to assess validity, the pertinent documents include patent applications and granted patents however old they may be, and also include non-patent publications such as journal articles, or advertisements.

This review was done to predict likely examiner's objections and the likelihood of the applications being granted, and potential objections that might be raised by a third-party in an opposition, or in a claim for invalidity.

Patentability Conclusion

The original UK patent applications ("Cases") appear to have been drafted with broad claims to draw the Patent Office searches.

We identified a number of items of prior art that would be likely to pose challenges to the validity of the UK patent applications in their original form. However, those applications were at an early stage and could be amended to specify claims that are narrower than those originally on file, and which would probably be patentable.

We believe that there are potentially patentable aspects to the technology invented by AFC Energy. We have, since February 2007, been engaged to update the patent specifications, expanding and updating the specifications as intimated above. International (PCT) patent applications have therefore now been filed for four of the inventions, all based on and claiming priority from the original UK patent applications that were filed in March 2006; these are shown in the following table. The PCT applications incorporate additional features developed by AFC Energy since the original filing date. We expect to file an updated patent application for the Microprocessor Control invention next month. In our opinion these PCT applications are to potentially patentable inventions. The newly filed patent applications are as follows:

Descriptive Title	*Filing date*	*Patent Application No.*
Hydrophilic electrode	6 March 2007	PCT/GB2007/050104
Negative pressure	7 March 2007	PCT/GB2007/050105
Releasable electrodes	7 March 2007	PCT/GB2007/050106
Master/slaves monitor	9 March 2007	PCT/GB2007/050117

5. Claims for Third Parties — General

We have not been asked to do a substantive evaluation of any other parties' patent rights for freedom-to-operate purposes.

In summary, as of the date of this report we are unaware of, and have not been engaged to give substantive attention to or represent the Company in connection with, any possible unasserted or asserted intellectual property claims by any third party, including patent infringement claims.

6. Other Intellectual Property Rights

During the course of developing its products and processes, it is likely the Company has and will develop other intellectual property rights not discussed here. We are unaware of any other actual or potential

third party claims asserted against the Company relating to these other kinds of intellectual property rights.

7. Limitations and Disclaimers

No assurance can be given as the validity of any patent application. An invalid patent cannot be enforced.

8. Comment and responsibility

We both give and confirm that we have not revoked our written consent to the inclusion of our name and this report in the Admission Document in the form and context in which it appears and accept responsibility for our report accordingly.

Yours faithfully,

Peter Mansfield
CPA, EPA

IP SOLUTIONS

PART VI

ADDITIONAL INFORMATION

The Company and the Directors, whose names appear on page 7 of this document, accept individual and collective responsibility for the information contained in this document including individual and collective responsibility for compliance with the AIM Rules. To the best of the knowledge and belief of the Directors (who have taken all reasonable care to ensure that such is the case), the information contained in this document is in accordance with the facts and does not omit anything likely to affect the import of such information.

Jeffreys Henry LLP whose office is located at Finsgate, 5-7 Cranwood Street, London EC1V 9EE accept responsibility for the information contained in Part IV of this document. To the best of the knowledge of Jeffreys Henry LLP (which has taken all reasonable care to ensure that such is the case) the information contained in Part IV of the document is in accordance with the facts and does not omit anything likely to affect the impact of such information.

1. Incorporation and general

(a) The Company was incorporated in England on 9 January 2006 under the name of Investment Transitions Limited with registered number 05668788, as a private company with limited liability under the Act. Its name was changed to DFC Energy Limited on 28 February 2006. The Company changed its name to AFC Energy Limited on 6 June 2006 and was re-registered as a public company on 15 June 2006. Its registered office is at Finsgate, 5-7 Cranwood Street, London EC1V 9EE. Its principal place of business is at Unit 71.4, Dunsfold Park, Cranleigh, Surrey GU6 8TB. Telephone number 01483 266830. It is domiciled in England;

(b) The principal legislation under which the Company operates is the Act and the regulations made thereunder. The liability of the members and the Company is limited; and

(c) As at the date of this document, the principal activities of the Company are that of the design and development of processes and components for application in alkaline fuel cells.

2. Share capital

(a) *Authorised share capital of the Company*

The authorised share capital of the Company on incorporation was £1,000 divided into 1,000 ordinary shares of £1 each. On 26 January 2006, pursuant to resolutions of the shareholders of the Company:

(i) the authorised share capital was sub-divided from 1,000 ordinary shares of £1 each into 100,000 ordinary shares of £0.01 each;

(ii) the authorised share capital was increased to £7,000 by the creation of 600,000 ordinary shares of £0.01 each; and

(iii) the Directors were empowered (pursuant to section 95(1) of the Act) to allot equity securities (as defined in section 94(2) of the Act) for cash as if section 89(1) of the Act did not apply to such allotment, such power being limited to the allotment of 699,900 ordinary shares of £0.01 such power being expressed to expire five years after the passing of this resolution.

On 2 May 2006, pursuant to resolutions of the shareholders of the Company:

(i) the authorised share capital was increased to £1,000,000 by the creation of 99,300,000 ordinary shares of £0.01 each; and

(ii) for the purposes of section 80 of the Act the Directors were generally and unconditionally authorised to allot relevant securities (as defined by that Section) up to a maximum nominal amount equal to the nominal amount of the authorised but unissued share capital as at the

date of the passing of the resolution such authority to expire five years after the passing of the resolution unless previously renewed, revoked or varied in any way.

On 23 March 2007, pursuant to resolutions of the shareholders of the Company:

(i) the authorised share capital was sub-divided from 100,000,000 ordinary shares of £0.01 each into 1,000,000,000 Ordinary Shares; and

(ii) the Directors were empowered pursuant to section 95 of the Act to allot equity securities (as defined in section 94 of the Act) for cash as if section 89(1) of the Act did not apply to such allotment, such power being limited to the allotment of equity securities up to an aggregate nominal amount of £925,500 such power to expire on the earlier of the next annual general meeting of the Company or 28 February 2008.

Accordingly, at the date of this document the authorised share capital of the Company is £1,000,000 divided into 1,000,000,000 Ordinary Shares.

(b) *Issued share capital of the Company*

The issued share capital of the Company on incorporation was one ordinary share of £1 fully paid, which was registered in the name of Howard White. Since incorporation, the issued share capital of the Company has been changed as follows:

(i) on 26 January 2006, the one issued ordinary share of £1 in the share capital of the Company was sub-divided into 100 ordinary shares of £0.01 each;

(ii) on 26 January 2006, the issued share capital of the Company was increased from £1 to £4,900 by the issue of 489,900 ordinary shares of £0.01 each;

(iii) on 27 January 2006, the issued share capital of the Company was increased by £700 by the issue of 70,000 ordinary shares of £0.01 each;

(iv) on 3 April 2006, the issued share capital of the Company was increased to £7,000 by the issue of 140,000 ordinary shares of £0.01 each;

(v) on 2 May 2006, the issued share capital of the Company was increased to £70,000 by the issue of 6,300,000 ordinary shares of £0.01 each pursuant to a bonus issue; and

(vi) on 23 February 2007, the issued share capital of the Company was increased to £74,499.82 by the issue of 449,982 ordinary shares of £0.01 each.

Accordingly, at the date of this document, the issued share capital of the Company is £74,499.82 divided into 74,499,820 Ordinary Shares.

(c) As at the date of this document, the following options to subscribe for Ordinary Shares have been granted to employees and Directors under the Executive Schemes and remain outstanding:

	Number of Ordinary Shares under option	*Date of Grant*	*Exercisable from*	*Exercisable until*	*Exercise price per share*
Howard White	700,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Gerard Sauer	700,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Otto Carlisle	560,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Jon Sansom	420,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Alex Blake	420,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Amitava Ray	420,000	5 July 2006	6 July 2009	4 July 2016	£0.10
James Austin	420,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Dominic John	420,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Christine Jones	140,000	5 July 2006	6 July 2009	4 July 2016	£0.10
Howard White	744,990	16 February 2007	17 February 2010	15 February 2017	£0.22
Gerard Sauer	2,234,670	16 February 2007	17 February 2010	15 February 2017	£0.22

Note: Following the sub-division of capital referred to in paragraph 2(a) above, the number of shares subject to the above options and the exercise price were adjusted in accordance with the rules of the Executive Schemes. HMRC's approval was obtained to the adjustments before they were made. The information in the above table shows the options as adjusted.

(d) By a warrant instrument dated 23 February 2007, the Company has issued warrants to Brian Wilson, Michael Mangan, Neville Harris, Paul Wedge, Andrew Parsons and Terry Cooper to subscribe for up to an aggregate of 1,550,000 Ordinary Shares at a subscription price of £0.10 per ordinary share. These warrants are exercisable one year from the date of Admission and expire three years from the date of grant.

(e) By a warrant instrument dated 23 February 2007, the Company has issued warrants to NWCF LLP, Adrian Pepper, Tim Yeo, Mark Way and Roger Powley to subscribe for up to an aggregate of 2,489,980 Ordinary Shares at a subscription price of £0.223 per ordinary share. These warrants are exercisable one year from the date of Admission and expire three years from the date of grant.

(f) At the date of this document the Company does not have any subsidiaries.

(g) The authorised but unissued share capital of the Company following the Placing, will be £912,317, representing approximately 91.2 per cent. of the Company's authorised share capital, which the Directors will be authorised to allot pursuant to the authority referred to in paragraph a (ii) above. No such shares are proposed to be issued other than pursuant to the Placing.

(h) Save for the allotments referred to in paragraph 2(b) above, since incorporation no capital of the Company has been allotted for cash or for a consideration other than cash and no such shares are proposed to be issued other than pursuant to the Placing.

(i) Save as disclosed in paragraph 2(c), 2(d) and 2(e) above and the grant of options under the Executive Schemes, no share or loan capital of the Company is proposed to be issued or is under option or is agreed conditionally or unconditionally to be put under option.

(j) No shareholder of the Company has different voting rights with respect to the Ordinary Shares and the Ordinary Shares will, on Admission, rank *pari passu* in all respects and will rank in full for all dividends and other distributions thereafter declared, made or paid on the ordinary share capital of the Company.

(k) The Ordinary Shares are in registered form and capable of being held in uncertificated form. None of the Ordinary Shares are being marketed or made available in whole or in part to the public in conjunction with the application for Admission.

(l) The currency of the issue is pounds sterling.

(m) The Company does not have in issue any securities not representing share capital.

(n) No shares of the Company are currently in issue with a fixed date on which an entitlement to a dividend arises and there are no arrangements in force whereby future dividends are waived or expressed to be waived.

(o) No commissions, discounts, brokerages or other special terms have been granted by the Company in connection with the issue or sale of any shares or loan capital of the Company since incorporation.

(p) Other than pursuant to the Placing, none of the Ordinary Shares have been sold or are available in whole or in part to the public in conjunction with the application for Ordinary Shares to be admitted to AIM.

(q) The Placing Shares will rank *pari passu* in all respects with existing Ordinary Shares including in relation to voting rights and the right to receive all dividends or other distributions, declared, paid or made after Admission.

3. Memorandum and Articles of Association

The principal objects of the Company, which are set out in clause 4 of its Memorandum of Association, are to act as a general commercial company.

The Articles of Association of the Company contain, *inter alia*, provisions to the following effect:

(a) *Voting rights*

Subject to paragraph (f) below, and to any special terms as to voting upon which any shares may for the time being, be held, on a show of hands every member who (being an individual) is present in person or (being a corporation) is present by its duly appointed representative shall have one vote and on a poll every member present in person or by representative or proxy shall have one vote for every Ordinary Share in the capital of the Company held by him. A proxy need not be a member of the Company.

(b) *Variation of rights*

If at any time the capital of the Company is divided into different classes of shares all or any of the rights or privileges attached to any class of shares in the Company may be varied or abrogated with the consent in writing of the holders of three-fourths in nominal value of the issued shares of that class or with the sanction of an extraordinary resolution passed at a separate general meeting of the holders of the shares of that class. At every such separate general meeting (except an adjourned meeting), the quorum shall be two persons holding or representing by proxy one-third in nominal value of the issued shares of that class.

(c) *Alteration of capital*

The Company may by ordinary resolution increase its share capital, consolidate and divide all or any of its share capital into shares of a larger nominal value, sub-divide all or any of its shares into shares of a smaller nominal value and cancel any shares not taken, or agreed to be taken, by any person.

The Company may, subject to the Act, by special resolution reduce or cancel its share capital or any capital redemption reserve or share premium account.

Subject to and in accordance with the provisions of the Act, the Company may purchase its own shares (including any redeemable shares), provided that the Company shall not purchase any of its shares unless such purchase has been sanctioned by an extraordinary resolution passed at a separate meeting of the holders of any class of shares convertible into equity share capital of the Company.

(d) *Transfer of shares*

A member may transfer all or any of his shares: (1) in the case of certificated shares by instrument in writing in any usual or common form or in such other form as may be approved by the Directors; and (2) in the case of uncertificated shares, through CREST in accordance with and subject to the CREST Regulations and the facilities and requirements of the relevant system concerned. The instrument of

transfer of a certificated share shall be executed by or on behalf of the transferor and, if the share is not fully paid, by or behalf of the transferee. The Directors may in their absolute discretion refuse to register a transfer of any share which is not fully paid, provided that dealings in the shares are not prevented from taking place on an open and proper basis. Subject to paragraph (f) below, the Articles contain no restrictions on the free transferability of fully paid shares provided that the transfer is in respect of only one class of share and is accompanied by the share certificate and any other evidence of title required by the Directors and that the provisions in the Articles relating to the deposit of instruments for transfer have been complied with.

(e) *Dividends*

(i) The Company may by ordinary resolution in general meeting declare dividends provided that no dividend shall be paid otherwise than out of profits and no dividend shall exceed the amount recommended by the Directors. The Directors may from time to time pay such interim dividends as appear to the Directors to be justified.

(ii) Subject to the rights of persons, if any, holding shares with special dividend rights, and subject to paragraph (f) below, all dividends shall be apportioned and paid *pro rata* according to the amounts paid or credited as paid on the shares during any portion or portions of the period in respect of which the dividend is paid. No amount paid or credited as paid in advance of calls shall be regarded as paid on shares for this purpose.

(iii) All dividends unclaimed for a period of 12 years after the payment date for such dividend shall if the Directors so resolve be forfeited and shall revert to the Company.

(f) *Suspension of rights*

If a member or any other person appearing to be interested in shares held by such shareholder has been duly served with notice under section 212 of the Act and is in default in supplying to the Company within 14 days (or such longer period as may be specified in such notice) the information thereby, required, then (if the Directors so resolve) such member shall not be entitled to vote or to exercise any right conferred by membership in relation to meetings of the Company in respect of the shares which are the subject of such notice. Where the holding represents more than 0.25 per cent. of the issued shares of that class, the payment of dividends may be withheld, and such member shall not be entitled to transfer such shares otherwise than by an arms length sale.

(g) *Return of capital*

Subject to any preferred, deferred or other special rights, or subject to such conditions or restrictions to which any shares in the capital of the Company may be issued, on a winding-up or other return of capital, the holders of Ordinary Shares are entitled to share in any surplus assets *pro rata* to the amount paid up on their Ordinary Shares. A liquidator may, with the sanction of an extraordinary resolution of the Company and any other sanction required by the Companies Acts, divide amongst the members *in specie* or in kind the whole or any part of the assets of the Company, those assets to be set at such value as he deems fair. A liquidator may also vest the whole or any part of the assets of the Company in trustees on trusts for the benefit of the members.

(h) *Pre-emption rights*

There are no rights of pre-emption under the articles of association of the Company in respect of transfers of issued Ordinary Shares.

In certain circumstances, the Company's shareholders may have statutory pre-emption rights under the Act in respect of the allotment of new shares in the Company. These statutory pre-emption rights would require the Company to offer new shares for allotment by existing shareholders on a *pro rata* basis before allotting them to other persons. In such circumstances, the procedure for the exercise of such statutory pre-emption rights would be set out in the documentation by which such shares would be offered to the Company's shareholders.

(i) *Borrowing powers*

The Directors may exercise all the powers of the Company to borrow money and to mortgage or charge its undertaking, property and assets both present and future (including uncalled capital) and, subject to section 80 of the Act, to issue debenture stock or any other securities whether outright or as collateral security for any debt, liability or obligation of the Company or any third party. The aggregate amount at any one time owing by the Company and all its subsidiaries in respect of monies borrowed by them or any of them (exclusive of monies borrowed by the Company or any of its subsidiaries from such companies) shall not at any time without the previous sanction of the shareholders in general meeting exceed an amount equal to £10,000,000.

(j) *Annual General Meeting*

An annual general meeting is to be held once every year at such time and place as may be determined by the Directors. Annual general meetings should be held within a period of not more than 15 months after the holding of the last preceding annual general meeting. Annual general meetings are called on 21 days' notice in writing, exclusive of the day on which notice is served or deemed to be served and of the day on which the meeting is to be held, and is to be given to all members on the register at the close of business on a day determined by the Company, such day being not more than 21 days before the day that the notice of meeting is sent. The annual general meeting may be called on shorter notice providing all members entitled to attend and vote thereat agree. The Company may specify in the notice of meeting a time, not more than 48 hours before the time fixed for the meeting, by which a person must be entered into the register in order to have the right to attend or vote at the meeting.

(k) *Extraordinary General Meetings*

Extraordinary general meetings may be called whenever the directors think fit or when one has been requisitioned in accordance with the Act. An extraordinary general meeting at which it is proposed to pass a special resolution or a resolution of which special notice has been given to the Company shall be called on 21 days' notice in writing. Any other extraordinary general meeting is to be called on 14 days' notice in writing exclusive of the day on which it is served or deemed to be served and the day on which it is to be held. An extraordinary general meeting can be called on shorter notice if a majority in number of the members having a right to attend and vote at the extraordinary general meeting, being a majority together holding not less than 95 per cent. in nominal value of the shares giving that right, consent. Two members present in person or by proxy and entitled to vote shall be a quorum for all purposes.

(l) *Directors*

Save as provided in the Articles, a director shall not vote as a director in respect of any contract, transaction or arrangement or proposed contract, transaction or arrangement or any other proposal whatsoever in which he has any interest which (together with any interest of any person connected with him) is to his knowledge a material interest (otherwise than by virtue of an interest in shares or debentures or other securities of or otherwise in or through the Company), and if he shall do so his vote shall not be counted, nor in relation thereto shall he be counted in the quorum present at the meeting.

A director shall (in the absence of some other material interest than is indicated below) be entitled to vote (and be counted in the quorum) in respect of any resolution relating to any of the following matters namely:

(i) the giving of any security, guarantee or indemnity in respect of money lent or obligations incurred by him or by any other person at the request of or for the benefit of the Company or any of its subsidiary undertakings or its parent company (if any) or any other subsidiary undertaking of any such parent company; or

(ii) the giving of any security, guarantee or indemnity in respect of a debt or obligation of the Company or any of its subsidiary undertakings for which the director himself has assumed responsibility in whole or in part under a guarantee or indemnity or by the giving of security; or

(iii) an offer of shares or debentures or other securities of or by the Company or any of its subsidiary undertakings or its parent company (if any) or any other subsidiary undertaking of any such parent company for subscription or purchase in which offer he is or is to be or may be entitled to participate as a holder of securities or in the underwriting or sub-underwriting of which he is to participate; or

(iv) any other company in which he or any person connected with him is interested, directly or indirectly, and whether as an officer or shareholder or otherwise howsoever, provided that he and any persons connected with him are not to his knowledge the holder (otherwise than as a nominee for the Company or any of its subsidiary undertakings or its parent company (if any) or any other subsidiary undertaking of any such parent company) of or beneficially interested in one per cent., or more of any class of the equity share capital of such company (or of any third company through which his interest is derived) or of the voting rights available to members of the relevant company (any such interest being deemed for the purpose of this Article to be a material interest in all circumstances); or

(v) an arrangement for the benefit of the employees of the Company or any of its subsidiary undertakings which does not award him any privilege or benefit not generally awarded to the employees to whom such arrangement relates; or

(vi) the purchase and/or maintenance of any insurance policy for the benefit of directors or for the benefit of persons including directors.

Fees may be paid out of the funds of the Company to directors who are not managing or executive directors at such rates as the Directors may from time to time determine provided that such fees do not in the aggregate exceed the sum of £150,000 per annum (exclusive of value added tax if applicable) or such other figure as the Company may by ordinary resolution from time to time determine.

Any director who devotes special attention to the business of the Company, or otherwise performs services which in the opinion of the Directors are outside the scope of the ordinary duties of a director, may be paid such additional remuneration as the Directors or any committee authorised by the Directors may determine.

The Directors (including alternate Directors) shall be entitled to be paid out of the funds of the Company all their travelling, hotel and other expenses properly incurred by them in connection with the business of the Company, including their expenses of travelling to and from meetings of the Directors, committee meetings or general meetings.

A director may hold any other office or place of profit under the Company (other than the office of auditor) in conjunction with his office of director for such period and on such terms (as to remuneration and otherwise) as the Directors may determine, and no director or intending director shall be disqualified by his office from entering into any contract, arrangement, transaction or proposal with the Company either with regard to his tenure of any other such office or place of profit or as vendor, purchaser or otherwise, nor shall any such contract, arrangement, transaction or proposal or any contract, arrangement, transaction or proposal entered into by or on behalf of the Company in which any director or any person connected with him is in any way interested (whether directly or indirectly) be liable to be avoided, nor shall any director who enters into any such contract, arrangement, transaction or proposal or who is so interested be liable to account to the Company for any profit realised from any such contract, arrangement, transaction or proposal by reason of such director holding that office or of the fiduciary relationship thereby established, but his interest shall be disclosed by him in accordance with the Act.

The remuneration and other terms and conditions of appointment of a director appointed as managing director or to any other executive office or employment under the Company shall from time to time (without prejudice to the provisions of any agreement between him and the Company) be fixed by the Directors, and may (without limitation) be by way of fixed salary, lump sum, commission on the dividends or profits of the Company (or of any other company in which the Company is interested) or other participation in any such profits or otherwise or by any or all or partly by one and partly by another or others of those modes.

Any statutory provision which, subject to the provisions of the Articles, would have the effect of rendering any person ineligible for appointment as a director or liable to vacate office as a director on account of his having reached any specified age or of requiring special notice or any other special formality in connection with the appointment of any director over a specified age shall not apply to the Company.

(m) *Committees of Board*

The Company has established a remuneration committee, an audit committee and an AIM Rules compliance committee under the terms of reference, with a formal list of matters specifically reserved for the decision of the full Board.

(n) *Retirement*

Directors are subject to retirement by rotation. At each AGM, directors who were not elected/re-elected at either of the two previous AGMs will retire from office. This number should be included in the required one third of directors who must retire at each AGM. The directors to retire so far as to ensure that a one third proportion is met shall include any director who wishes to retire and not offer himself for re-election, and those at the date of the AGM have been longest in office since their last re-election or appointment. In the case of those who became or were last re-elected directors on the same day those to retire shall (unless they otherwise agree among themselves) be determined by lot.

The same rules relating to retirement by rotation, resignation and removal of directors apply to the chief executive. In addition, executive directors are not exempt from retirement by rotation.

Section 293 of the Act, which states that no director may be appointed/reappointed if they are over the age of 70, does not apply to the Company. However, if a resolution is proposed to appoint/reappoint anyone as a director who is, or will within the subsequent six months be 70 or over, the notice convening the meeting should contain a statement to that effect.

(o) *Alternates*

Any director may at any time appoint any other director or any other person approved by the Directors to be his alternate director and may at any time terminate such appointment. Any such appointment or termination shall be in writing and shall be effective when it is delivered to the registered office of the Company or to a meeting of the Directors.

An alternate director is entitled to receive notice of all meetings of the Directors and, if the Directors decide, of all meetings of any committee of which the director appointing him is a member; entitled to attend and vote as a director at any such meeting at which the director appointing him is not personally present; generally at any such meeting entitled to perform all functions of the director appointing him as a director; and at any such meeting entitled to one vote for each director for whom he acts as alternate director (in addition to his own vote if he is himself a director) but can be counted only once for the purpose of determining whether a quorum is present.

(p) *Number of directors*

The Company must have not less than three and not more than ten directors. Notwithstanding this, the Company may by ordinary resolution from time to time increase or reduce any limits on the number of directors and may also determine in what rotation such increased or reduced number is to go out of office and may make any appointments required for making any such increase.

(q) *Quorum*

The quorum necessary for the transaction of the business of the Directors may be fixed by the Directors and unless so fixed at any other number shall be two (one of whom may be an alternate director provided that he is not also a director). No business shall be transacted at any general meeting unless a quorum of two members is present, in person or by proxy.

4. Share option schemes

The AFC Energy plc 2006 Share Option Scheme and the AFC Energy plc 2007 Share Option Scheme

The Company adopted the AFC Energy plc 2006 Share Option Scheme on 5 July 2006 and adopted the AFC Energy plc 2007 Share Option Scheme on 16 February 2007. Following Admission the Company does not intend to grant any further options pursuant to the AFC Energy plc 2006 Share Option Scheme. The principal terms of the Executive Schemes are as follows:

(i) *Status of the Executive Schemes*

The Executive Schemes are designed to permit the Company to grant qualifying enterprise management incentive ("EMI") share options within the meaning of Schedule 5 of the Income Tax (Earnings and Pensions) Act 2003 over Ordinary Shares. The Executive Schemes, however, also permit the Company to grant options which are not qualifying EMI options.

(ii) *Eligibility*

In order to qualify for participation in the Executive Schemes, an individual must be employed by the Company or one of its subsidiaries (the "Group").

After Admission, no option may be granted to an employee at a time when such a grant would be in breach of the AIM Rules.

(iii) *Administration*

The Executive Schemes are governed by their rules and are administered by the Board or a committee of the Board (the "Committee"). The Committee will have absolute discretion in selecting the persons to whom options under the Executive Schemes are to be granted and (subject to the limits set out below) in determining the number and terms of options to be so granted. No person is entitled as of right to be granted an option.

(iv) *Option Price*

The holder of an option under the Executive Schemes will be entitled to acquire Ordinary Shares at a price per Ordinary Share to be determined by the Committee at the time when the option is granted. On or after Admission the price payable per Ordinary Share to exercise an option to subscribe for Ordinary Shares cannot be less than the greater of the nominal value of an Ordinary Share and its market value at the date of grant and the price payable per Ordinary Share to exercise an option to purchase Ordinary Shares cannot be less than the market value of an Ordinary Share as at the date of grant. Options to subscribe for Ordinary Shares granted prior to Admission may be granted with an exercise price per Ordinary Share which is not less than the nominal value of such shares.

(v) *Grant periods*

Normally options may be granted under the Executive Schemes during the period of 42 days commencing on any of the following: (a) prior to Admission, any day selected at the discretion of the Committee; (b) the date of Admission; (c) the dealing day immediately following the date of the preliminary announcement of the annual results of the Company in any year or the date of the announcement of the half year results of the Company in any year; (d) the dealing day immediately following the date on which the AIM Rules or any statute, regulations or order made thereunder or any governmental directive effective for the time being to prevent the grant of options shall cease to have effect. The Board also has an absolute discretion to grant options at any other time where the circumstances are considered to be exceptional so as to justify such grant.

No consideration is payable for the grant of an option.

No options may be granted more than ten years after the date of adoption of the Executive Schemes.

(vi) *Performance Conditions and Vesting*

The Committee may, at the time of grant of an option, determine that the exercise of such option is subject to the achievement of objective performance conditions. If an option becomes exercisable before the end of a performance period as a result of the occurrence of any of the events specified in paragraph (vii) below then the option may be exercised to the extent that the Committee is satisfied that the performance conditions have been satisfied on such modified basis as they reasonably think fit over the period commencing on the start of the performance period and ending on the date of the occurrence of the relevant event.

If an option is subject to a vesting schedule, it shall only vest in accordance with the provisions of such vesting schedule. An option will only ever be exercisable if, and to the extent to which, it has vested. If an option is not subject to a vesting schedule, it shall be deemed to have vested immediately upon the grant of such option.

(vii) *Exercise and lapse of options*

Generally, options may only be exercised during a stated option period by a person who remains a director or employee (to the extent that they have vested where the options have been granted subject to a vesting schedule). In respect of any option, the option period will commence on the day following the third anniversary of the date of grant. The option period will normally end on the tenth anniversary of the date of grant (although the Committee can, at the time of grant of an option, provide that the option period ends on an earlier date).

No option may be exercised at a time when such exercise would be in breach of the AIM Rules.

If an option holder ceases to be employed within the Group due to death, ill-health, injury, disability or retirement or by virtue of the transfer of his employment outside the Group or the sale of the Company by whom he is employed outside the Group (or in any other exceptional circumstance as determined by the Committee in its absolute discretion), all options then held by the option holder may be exercised (to the extent that they have vested where the options have been granted subject to a vesting schedule). In all other cases other than death or where the Committee has exercised its discretion to allow the exercise of options, the option exercise may occur within 40 days following the date of cessation of employment. In the case of death, the exercise may occur within 12 months from the date of death and in the case where the Committee has exercised its discretion to allow the options to be exercised, such exercise may occur during such period determined by the Committee. If not so exercised during the periods, the options shall lapse save that in the case of cessation of employment for any reason other than death or other than where the Committee has exercised its discretion to allow an option holder to exercise his options following cessation of employment, the Committee may allow the option to remain capable of exercise during such period following cessation of employment (greater than the 40 day period previously referred to) as it, in its sole discretion determines.

If an option holder ceases to be employed within the Group in any other circumstance, all options then held by him shall lapse immediately save where the Board uses its discretion.

In the event of an amalgamation, reconstruction, take-over or voluntary winding up of the Company, all options may be exercised (to the extent that they have vested where the options have been granted subject to a vesting schedule) within a stated time period (or otherwise lapse).

As a condition of exercise of an option, an option holder must indemnify the Company or any member of the Group for any liability to income tax, employee's National Insurance contributions or employer's National Insurance contributions arising as a result of the exercise of the option.

Options will not be transferable.

(viii) *Issue of shares*

Ordinary Shares will be allotted and issued or transferred within 30 days of the exercise of an option. Ordinary Shares allotted will rank in full for all dividends or other distributions payable by reference to a record date occurring on or after the date of allotment of such shares. Ordinary Shares transferred on the exercise of an option shall be transferred without the benefit of any rights attaching to the shares by reference to a record date preceding the date of exercise. In all other respects the Ordinary Shares so issued or transferred shall be identical and rank *pari passu* with the fully paid registered Ordinary Shares in issue on the date of exercise.

(ix) *Limits applying to the Executive Schemes*

On or after Admission, no option may be granted if immediately following the grant of such option the aggregate nominal value of Ordinary Shares in the Company issued or then capable of being issued pursuant to options granted under the Executive Schemes within the immediately preceding period of ten years and issued or then capable of being issued pursuant to options granted or rights obtained in such ten year period under any other share option or profit sharing scheme approved by the Company would exceed 10 per cent. of the nominal value of the ordinary share capital of the Company at that time in issue. For the purpose of this limit Ordinary Shares subject to options granted prior to Admission are excluded from account.

(x) *Individual Limits*

On or after Admission, the total market value (at the date of grant) of Ordinary Shares over which an individual may be granted options under the Executive Schemes in any financial year of the Company will not exceed one times the individual's rate of remuneration (excluding bonuses, commissions and benefits in kind) at the date of grant.

Any option granted prior to Admission will not be subject to the limit referred to in the preceding paragraph and will be left out of account when applying such limit.

(xi) *Variations in share capital*

In the event of any variation of or increase in the share capital of the Company, the number of shares subject to options and/or the option price may be adjusted by the Committee.

(xii) *Amendments*

The Committee will have the power to amend the rules of the Executive Schemes. However, the rules cannot be altered to affect adversely any subsisting options (other than to benefit the administration of the Executive Schemes, take account of a change in legislation or to obtain or maintain favourable tax, exchange control or regulatory treatment for any option holder or a member of the Group) without such consent of the option holders as would be required under the provisions of the Company's articles of association if the options constituted a single class of capital.

5. Directors' and other interests

The names of the Directors of the Company are set out under "Directors, Secretary and Advisers" on page 7 of this document.

(a) The interests of each Director and those of any person connected with them within the meaning of section 346 of the Act ("Connected Person"), all of which are beneficial, in the share capital of the Company which (i) have been notified to the Company pursuant to section 324 or 328 of the Act, or (ii) are required to be entered into the register maintained under section 325 of the Act, or (iii) are interests of a Connected Person which would, if the Connected Person were a Director, be required to be disclosed under (i) or (ii) above, and the existence of which is known or could with reasonable diligence be ascertained by the Director are as follows:

	At the date of this document		*Following the Placing*	
	Number of Ordinary Shares	*% issued share capital*	*Number of Ordinary Shares*	*% issued share capital*
Gerard Sauer	1,600,000	2.15	1,600,000	1.82
Harry Epstein	7,000,000	9.40	7,000,000	7.98

(b) The Directors and are also interested in unissued Ordinary Shares under share options held by them pursuant to the Executive Schemes, all of which were granted for nil consideration, as follows:

	Exercise Price	*Ordinary Shares*	*Latest exercise date*
Howard White	£0.10	700,000	4 July 2016
	£0.22	744,990	15 February 2017
Gerard Sauer	£0.10	700,000	4 July 2016
	£0.22	2,234,670	15 February 2017

Note: Following the sub-division of capital referred to in paragraph 2(a) above, the number of shares subject to the above options and the exercise price were adjusted in accordance with the rules of the Executive Schemes. HMRC's approval was obtained to the adjustments before they were made. The information in the above table shows the options as adjusted.

(c) The Directors are also interested in unissued Ordinary Shares under warrants held by them pursuant to warrant instruments dated 23 February 2007, all of which were granted for nil consideration as follows:

	Exercise Price	*Ordinary Shares*
Brian Wilson	£0.10	350,000
Michael Mangan	£0.10	350,000
Tim Yeo	£0.223	1,117,490

(d) Save as disclosed above, no Director has any interest in the share capital or loan capital of the Company or any of its subsidiaries nor does any person connected with the Directors (within the meaning of section 346 of the Act) have any such interests, whether beneficial or non-beneficial.

(e) Save as disclosed in this document, no Director has any interest, direct or indirect, in any assets which have been or are proposed to be acquired or disposed of by, or leased to, the Company and no contract or arrangement exists in which a Director is materially interested and which is significant in relation to the business of the Company.

(f) The Directors have held the following directorships, other than in the Company, and/or been a partner in the following partnerships within the five years prior to the date of this document:

Tim Yeo

Current directorships/partnerships:

Anacol Holdings Limited
General Securities Register, Limited
ITI Energy Limited
Locana Corporation (London) Limited
Univent plc

Previous directorships/partnerships over the past five years:

Conservatives For Change Limited
Genus plc

Gerard Sauer

Current directorships/partnerships:

None

Previous directorships/partnerships over the past five years:

Eneco Limited
Fuel Systems Limited
Hadenblaid Limited

Howard White

Current directorships/partnerships:

Carbon Capture & Sequestration Limited
Classband Management Limited

Previous directorships/partnerships over the past five years:

Gibor Limited
Stanelco plc

Simon Walters

Current directorships/partnerships:

Ash Court Community Limited
Aspen Village Limited
Blackberry Hill Limited
DFM Limited (t/a FD Solutions)
Forest Healthcare Limited
Neville Porter plc
Oak Tree Common Limited

Previous directorships/partnerships over the past five years:

Andrew Lynton Property Limited
Andrew Lynton (Beaconsfield) Limited
Betterware Limited
Betterware Investment Limited
Craigwell Developments Limited
Dawcastle Limited
Focalstudy Limited
Hermia Properties Limited
Loco Restaurants Limited
Net FM (UK) Limited
Pentamain Limited
Tamefield Limited
Uxbridge Properties Limited
Wood Hall Farm Limited
Wood Hall Land & Properties Limited
Wood Hall Securities Limited
Wood Hall Stud Limited

Michael Mangan

Current directorships/partnerships:

None

Previous directorships/partnerships over the past five years:

Electra Vehicle Association of Great Britain Limited

Brian Wilson

Current directorships/partnerships:

Amec Nuclear Holdings Limited
Celtic plc
Irvine Bay Urban Regeneration Company
Mangersta Limited
Scottish Resources Group Limited
The Parkmead Group plc

Previous directorships/partnerships over the past five years:

Arches Retail Company Limited
Arches Theatre
Core Technical Services Limited
Narec Development Services Limited
New and Renewable Energy Centre Limited
Virtual Utility Limited

Harry Epstein

Current directorships/partnerships:

None

Previous directorships/partnerships over the past five years:

Seyton Inc.

(g) (i) On its acquisition by The Talbex Group Limited in 1976, Tim Yeo was appointed a director of London Plastic Packaging Limited ("LPP") and was a director when it went into insolvent liquidation in 1976. LPP was dissolved on 7 March 2000.

(ii) Gerard Sauer was a director of Green Light Tuning Limited which was the subject of a Company Voluntary Arrangement (CVA) approved on 3 October 1997. The Supervisor of the voluntary arrangement stated in his report that the company and director co-operated in full and complied with their obligations with regard to the CVA. However, creditors did not receive payment in full. The Company was dissolved on 14 March 2000.

(iii) Gerard Sauer was a director of Eneco Limited when the company was put into administration on 10 April 2006 with an estimated deficiency as regards creditors of £907,817. Eneco Limited remains in administration as at the date of this document.

(h) Save as disclosed in paragraph 5(g), no Director:

(i) has any unspent convictions in relation to indictable offences; or

(ii) has been bankrupt or the subject of an individual voluntary arrangement, or has had a receiver appointed to any asset of such Director; or

(iii) has been a director of any company which, while he was a director or within 12 months after he ceased to be a director, had a receiver appointed or went into compulsory liquidation, creditors voluntary liquidation, administration or company voluntary arrangement, or made

any composition or arrangement with its creditors generally or with any class of its creditors; or

(iv) has been a partner of any partnership which, while he was a partner or within 12 months after he ceased to be a partner, went into compulsory liquidation, administration or partnership voluntary arrangement, or had a receiver appointed to any partnership asset: or

(v) has had any public criticism and/or sanction by statutory or regulatory authorities (including designated professional bodies); or

(vi) has been disqualified by a court from acting as a director of a company or from acting in the management or conduct of the affairs of any company.

(i) So far as the Directors are aware, no person, directly or indirectly, jointly or severally, exercises or could exercise control over the Company.

(j) So far as the Directors are aware, there are no arrangements the operation of which may at a later date result in a change of control of the Company.

(k) Save as disclosed in paragraph 5(a) to (c) above, and as set out below, the Company is not aware of any person who is directly or indirectly interested in three per cent. or more of the issued share capital or voting rights of the Company or could directly or indirectly, jointly or severally exercise control over the Company:

	At the date of this document		*Following the Placing*	
	Number of Ordinary Shares	*% issued share capital*	*Number of Ordinary Shares*	*% issued share capital*
Age of Reason Foundation[1]	22,602,420	30.34	22,602,420	25.78
Eturab Trade Corporation	8,000,000	10.74	8,000,000	9.12
Allbest Nominees Limited	4,000,000	5.37	4,000,000	4.56
Adam White	3,500,000	4.70	3,500,000	3.99
Credit Suisse Client Nominees (UK) Limited	2,957,480	3.97	2,957,480	3.37
Geoffrey Young	2,324,210	3.12	2,324,210	2.65

[1] Mr Ben White, the adult son of Mr Howard White, a Director, is the primary beneficiary of The Age of Reason Foundation which holds 22,602,420 Ordinary Shares in AFC Energy representing 30.34 per cent. of the issued share capital.

(l) None of the Company's major holders of shares listed above has voting rights which are different from other holders of Ordinary Shares.

(m) There are no loans made or guarantees granted or provided by any member of the Company to or for the benefit of any Director.

(n) No Director is or has been interested in any transaction which is or was unusual in its nature or conditions or significant to the business of the Company and which was effected by the Company during the current or immediately preceding financial year and remains in any respect outstanding or unperformed. There are no potential conflicts of interest between any duties owed to the Company by the Directors and their private and other duties.

(o) Save as disclosed in paragraph 13 of Part I of this document there are no restrictions agreed by any Director on the disposal within a certain period of time of their holdings in the Company's securities.

(p) Save as disclosed there are no arrangements or understandings with major shareholders, customers, or others pursuant to which any Director was selected.

6. Directors' service contracts

(a) Gerard Sauer was appointed a director of the Company on 29 June 2006. Mr Gerard Sauer has entered into a service agreement with the Company dated 19 February 2007, for an indefinite term on a full time basis, subject to termination upon 6 months' notice by either party. The Agreement provides for an annual salary of £72,500 (however it is agreed that this will increase to £105,000 from the time of Admission), membership of a private medical scheme, permanent health insurance, life assurance cover, participation in a share option scheme, 30 days' holiday per year and up to 8 weeks' sick pay at full salary per year. There is no obligation on the Company to make contributions to a pension scheme.

(b) Howard White was appointed as a director of the Company on 6 January 2006 and has not drawn a salary since his appointment. On 5 March 2007 Mr White entered into a consultancy agreement with the Company via a service company, Classband Management Limited, to provide services as a statutory director and Director of Business Developments for an indefinite term on a full time basis, subject to termination on 6 month's notice by either party. The agreement provides for an annual fee of £100,000, payable monthly. Given that Mr White is not an employee, he will not enjoy the various contractual benefits which Gerard Sauer will receive as an employee.

(c) Simon Walters was appointed a director of the Company on 7 February 2007. Mr Walters is the Company's Finance Director. He has entered into a consultancy arrangement dated 19 February 2007 with the Company via his own company, DFM Limited (t/a FD Solutions), to provide the services. Under this Agreement, Mr Walters will work on a part time basis for one day per month at a rate of £1,200 per month. However, should he be required to work more than the agreed hours he will be paid *pro rata*. As Mr Walters role is intended to be temporary, the Company has agreed a 2 month notice period from either party. Given that Mr Walters is not an employee, he will not enjoy the various contractual benefits which the other statutory directors do as employees.

(d) Tim Yeo MP was appointed a director of the Company on 14 December 2006. His services as a non-executive director and Chairman are provided under the terms of a non-executive letter of appointment dated 20 February 2007 for an indefinite period, subject to termination upon at least 6 months' notice, at a fee of £30,000 per annum.

(e) The Rt. Hon Brian Wilson was appointed a director of the Company on 16 February 2007. His services as a non-executive director are provided under the terms of a non-executive letter of appointment dated 14 December 2006 for an indefinite period, subject to termination upon at least 6 months' notice at a fee of £20,000 per annum.

(f) Michael Mangan was appointed a director of the Company on 19 February 2007. His services as a non-executive director are provided under the terms of a non-executive letter of appointment dated 14 December 2006 for an indefinite period, subject to termination upon at least 6 months' notice at a fee of £20,000 per annum.

(g) Harry Epstein was appointed a director of the Company on 22 February 2007. His services as a non-executive director are provided under the terms of a non-executive letter of appointment dated 14 February 2007 for an indefinite period, subject to termination upon at least 6 months' notice at a fee of £20,000 per annum.

(h) Save as set out in the paragraphs contained in this section 6, there are no service agreements in existence between any of the directors and the Company or any of its subsidiaries which cannot be determined by the employing company without payment of compensation (other than statutory compensation within one year).

7. The Board and corporate governance

Directors' details

Details of the expiration of each Director's current term is provided in paragraph 6 above. Dates of appointment of the Directors are set out in paragraph 6 above.

Corporate Governance

The Board supports the highest standards of corporate governance and bases its arrangement on the Combined Code on Corporate Governance (the "Code") issued by the Financial Reporting Council in June 2006 and intends, following Admission to comply with the Code in so far as the Directors consider appropriate for a company of the size of AFC Energy.

Directors have been made aware of the Code recommendation that, where they have concerns that cannot be resolved about the running of the Company or a proposed action, they should ensure that their concerns are recorded in the Board minutes. Non-executive directors have also been made aware of the recommendation that, on resignation, they should provide a written statement to the Chairman, for circulation to the Board, if they have any such concerns.

The Code attaches importance to Boards having processes for individual and collective performance evaluation. The Board has accordingly reviewed and updated existing processes for evaluating its operation and performance, including committees.

For the individual performance evaluation, executive Directors are assessed by the Remuneration Committee against annual performance targets. The Chairman talks to each non-executive at least annually about a review of their performance, and the senior independent Director leads an evaluation process of the performance of the Chairman in discussion with the other non-executives and taking account of the views of the executives.

Where a non-executive director stands for re-election, the Chairman will confirm to Shareholders whether he is satisfied from formal performance evaluation that the person's performance continues to be effective and to demonstrate commitment to the role.

8. Material contracts

The following contracts are the only contracts, not being contracts entered into in the ordinary course of business, that have been entered into by the Company since incorporation and which are, or may be material or which have been entered into by the Company and which contain any provisions under which any obligation or entitlement which is, or may be, material to the Company as at the date of this document:

(a) Pursuant to an asset transfer agreement dated 27 January 2006 between Eneco (1) the Company (2) and Howard White (3) (the "Asset Transfer Agreement"), Eneco agreed to sell, transfer and assign to the Company with full guarantee certain assets which primarily comprised of the patent applications detailed in Part I paragraph 6 of this document in consideration of the sum of £300,000;

(b) The Company entered into two student placement agreements dated 17 July 2006, each with the University of Surrey (the "University"), one of its students and an academic. Any intellectual property arising out of the collaborations will vest in the Company, with the University having a non-exclusive licence to use such intellectual property for teaching and research for educational purposes only. However, if the Company needs a licence of any of the University's background intellectual property to be able to use the intellectual property which will vest in the Company pursuant to the agreement, it has to negotiate such a licence with the University;

(c) The Company has entered into a memorandum of understanding dated 30 November 2006 ("MoU") with Akzo Nobel. Pursuant to the MoU, a contractual purchase order for the supply of alkaline fuel cells and a system expansion study in collaboration with Akzo Nobel personnel towards a 200kW unit was received by AFC Energy on 22 March 2007. The contract includes the following principal terms:

- Two 3.5kW fuel cell systems to be delivered and installed at the Akzo Nobel Bitterfeld facility by 31 January 2008 and a further two 3.5kW systems by 31 March 2008.
- One 50kW fuel cell system to be delivered and installed at the Akzo Nobel Bitterfeld facility by 31 May 2009. A system expansion study towards developing a 200kW system will also be undertaken in this period in collaboration with Akzo Nobel personnel.

- AFC Energy is to supply the necessary engineering and training support for the fuel cell systems to address safety, maintenance, fault diagnosis, repair and performance monitoring.
- Akzo Nobel is to make monthly pre-payments towards the fuel cell systems for 12 months from December 2006. Akzo Nobel has the right to terminate the contract in full or part, in which case the pre-payments are to be repaid.
- AFC Energy provides a warranty to Akzo Nobel for a period of three years after the successful start-up of each unit, on all parts and labour, including all travel, transport and living expenses.

The basis of design contained in the purchase order envisages that the 50kW unit will form the basis for a larger 200kW unit, itself forming the basis of a larger 1MW unit. The Directors anticipate entering into further collaboration agreements with Akzo Nobel as the project moves forward;

(d) A nominated adviser agreement dated 15 May 2006 between the Company (1) and Nabarro Wells as nominated adviser (2) pursuant to which the Company has appointed Nabarro Wells to act as nominated adviser to the Company for the purposes of AIM for a period of 12 months commencing on the date of Admission. The Company has agreed to pay to Nabarro Wells a fee of £32,500 per annum. The agreement is terminable on six months' notice by either party;

(e) A broker agreement dated 8 November 2006 between the Company (1) and Dawnay, Day as broker (2) pursuant to which the Company has appointed Dawnay, Day to act as stockbroker to the Company for the purposes of AIM for an indefinite period. The Company has agreed to pay to Dawnay, Day a fee of £20,000 per annum. The agreement is terminable on one months' notice by either party;

(f) A placing agreement dated 18 April 2007 between the Company (1), Nabarro Wells (2), Dawnay Day (3) and the Directors (4), pursuant to which Dawnay Day has agreed to use its reasonable endeavours to arrange for placees to subscribe for 13,183,034 Placing Shares at the Placing Price. The agreement is conditional, *inter alia*, upon Admission taking place on or before 24 April 2007 or such later date as Dawnay Day and Nabarro Wells and the Company may agree but in any event not later than 8 May 2007. The Company will pay to Nabarro Wells a fee of £120,000 and to Dawnay Day a commission of 4 per cent. of the aggregate value of the Placing Shares at the Placing Price rising to 5 per cent. of the aggregate value of the Placing Shares at the Placing Price if the aggregate value of the Company's existing issued share capital as it is before Admission at the Placing Price is equal to or exceeds £40,000,000, together with all costs and expenses and VAT thereon where appropriate. The agreement provides for the Company to pay all expenses of and incidental to the Placing and the application for Admission, including the fees and costs of other professional advisers, all costs relating to the Placing, including printing, all road show costs and expenses, advertising and PR expenses, admission fees, accommodation, data and communication charges, research costs, printing costs, courier services and other incidental costs and expenses of the Placing. The Company has also granted warrants to NWCF LLP as detailed in paragraph 8(h), below.

The agreement contains certain warranties given by the Company and the Directors in favour of Nabarro Wells and Dawnay Day as to the accuracy of information contained in this document and an indemnity from the Company in favour of Nabarro Wells and Dawnay Day.

The Directors have each agreed not to dispose of any interest in their Ordinary Shares in the Company for the period expiring on the first anniversary of Admission save in the event of an intervening court order, a takeover offer relating to the Company's share capital becoming or being declared to be unconditional, or the death of the Director or to a member of a Director's family, any trustee of any trust, the beneficiaries of which are a Director and/or members of a Director's family or to a beneficiary of any such trust in accordance with the trust terms.

Nabarro Wells and Dawnay Day may terminate the placing agreement in specified circumstances prior to Admission, principally in the event of a material breach of the placing agreement or of any of the warranties contained in it or where any event of omission relating, to the Group is, or

will be in the opinion of Nabarro Wells and Dawnay Day, materially prejudicial to the successful outcome of the Placing, or where any change in national or international, financial, monetary, economic, political or market conditions is, or will be in the opinion of Nabarro Wells and Dawnay Day, materially prejudicial to the successful outcome of the Placing;

(g) By a warrant instrument dated 23 February 2007, the Company has issued warrants to Brian Wilson, Michael Mangan, Neville Harris, Paul Wedge, Andrew Parsons and Terry Cooper, to subscribe for up to an aggregate of 1,550,000 Ordinary Shares at a subscription price of £0.10 per Ordinary Share up to three years from the date of the warrant instrument. The warrant instrument contains provisions for the amendment of the exercise price in the event of certain changes to the share capital of the company;

(h) By a warrant instrument dated 23 February 2007, the Company has issued warrants to NWCF LLP, Adrian Pepper, Tim Yeo, Mark Way and Roger Powley to subscribe for up to an aggregate of 2,489,980 Ordinary Shares at a subscription price of £0.223 per Ordinary Share. The warrant instrument contains provisions for the amendment of the exercise price in the event of certain changes to the share capital of the company;

(i) By an agreement dated 2 April 2007 (the ''Lock-in Deed'') entered into by various related parties and applicable employees (the ''Locked-in Persons''), the Company, Dawnay Day and Nabarro Wells, the Locked-in Persons have undertaken to the Company, Dawnay Day and Nabarro Wells, not to dispose, for a period of 12 months from Admission (the ''First Period'') of any Ordinary Shares held upon Admission or any interests in Ordinary Shares they hold at Admission or acquire during the First Period (the ''Locked-in Shares'') save in certain limited circumstances. For a further 12 month period after the First Period, each of the Locked-in Persons has agreed only to make disposals of the Locked-in Shares through Dawnay Day (or such replacement broker) subject to being offered terms as to price and rates of commission at least as favourable as those being offered by other brokers at the time.

9. Taxation

The following paragraphs are intended as a general guide only for shareholders who are resident and ordinarily resident in the United Kingdom for tax purposes, holding Ordinary Shares as investments and not as securities to be realised in the course of a trade, and are based on current legislation and UK HMRC practice. Any prospective purchaser of Ordinary Shares who is in any doubt about his tax position or who is subject to taxation in a jurisdiction other than the UK, should consult his own professional adviser immediately.

(a) *Taxation of Chargeable Gains*

For the purpose of UK tax on chargeable gains, the issue of Ordinary Shares pursuant to the Offer will be regarded as an acquisition of a new holding in the share capital of the Company.

To the extent that a shareholder acquires Ordinary Shares allotted to him, the Ordinary Shares so allotted will, for the purpose of tax on chargeable gains, be treated as acquired on the date of allotment. The amount paid for the Ordinary Shares will constitute the base cost of a shareholder's holding. If a Shareholder disposes of all or some of his Ordinary Shares, a liability to tax on chargeable gains may, depending on his circumstances, arise.

(b) *Stamp Duty and Stamp Duty Reserve Tax*

No stamp duty or stamp duty reserve tax will generally be payable on the issue of the Ordinary Shares.

(c) *Dividends and other Distributions*

Dividends paid by the Company will carry an associated tax credit of one-ninth of the cash dividend or ten per cent. of the aggregate of the cash dividend and associated tax credit. Individual shareholders resident in the UK receiving such dividends will be liable to income tax on the aggregate of the dividend and associated tax credit at the dividend ordinary rate (10 per cent.) where their income falls within the basic rate limit or the dividend upper rate (32.5 per cent.) where their income exceeds the basic rate limit.

The effect will be that taxpayers who are otherwise liable to pay tax at only the starting rate or basic rate of income tax will have no further liability to income tax in respect of such a dividend. Higher rate taxpayers will have an additional tax liability (after taking into account the tax credit) of 22.5 per cent. of the aggregate of the cash dividend and associated tax credit. Individual shareholders whose income tax liability is less than the tax credit will not be entitled to claim a repayment of all or part of the tax credit associated with such dividends.

A UK resident corporate shareholder should not be liable to corporation tax or income tax in respect of dividends received from the Company unless that company is carrying on a trade of dealing in shares.

Trustees of most trusts will be liable to account for income tax at the dividend trust rate applicable currently 32.5 per cent. on income received exceeding £1,000. The first £1,000 income arising from 2006-2007 onwards will be chargeable at the dividend ordinary rate.

Persons who are not resident in the UK should consult their own tax advisers on the possible application of such provisions and on what relief or credit may be claimed for any such tax credit in the jurisdiction in which they are resident. These comments are intended only as a general guide to the current tax position in the UK as at the date of this document. The comments assume that Ordinary Shares are held as an investment and not as an asset of financial trade.

If you are in any doubt as to your tax position, or are subject to tax in a jurisdiction other than the UK, you should consult your professional adviser.

(d) *EIS and VCT Status*

The Company has received advance assurance from HMRC that the present activities and organisation of the Company will enable it to count as a qualifying company for the purposes of the EIS Rules, and the Placing Shares should be eligible shares, for the purposes of EIS relief.

These conditions are dependent, among other things, upon the funds raised by the issue of the Placing Shares, for which EIS qualifying status is sought, being used by the Company, as to 80 per cent. within 12 months from the date of issue and the balance during the following 12 months, for the purposes of a qualifying activity carried on wholly or mainly in the UK.

An investor must also qualify as an individual entitled to relief under the EIS Rules.

The EIS allows for the following tax reliefs for individual investors provided investments are held for three years and the EIS relief has not been withdrawn:

- initial income tax relief of 20 per cent.; and
- exemption from capital gains.

The EIS also allows for CGT payable on chargeable gains realised by individuals and certain trustees on a disposal of assets to be deferred where the disposal proceeds are reinvested in eligible shares. To qualify for CGT deferral, a sum up to the amount of the chargeable gain must be invested (usually no more than one year before nor more than three years after the date on which the chargeable gain arises) by subscribing in new ordinary shares of a qualifying trading company or an unquoted company which is the parent of a qualifying trading group. For this purpose, shares quoted on AIM are regarded as unquoted.

A claim for CGT deferral relief is made by the individual investors and/or trustees claiming the relief.

It is similarly the opinion of the Directors and proposed Directors that the placing shares will represent a "qualifying holding" for the purpose of investment by venture capital trusts ("VCT's").

The Directors undertake to use reasonable efforts to maintain the status of the Company as a qualifying company under the relevant legislation for EIS and VCT relief. In the event, however, that circumstances arise or an opportunity arises that would benefit the Company but would jeopardize its status with respect to EIS and VCT tax relief, the Directors will consider the circumstances or the merits of the opportunity and act in the best interests of the Company and the Shareholders as a whole.

Please note that the preceding paragraphs are only a condensed EIS summary and should not be construed as constituting advice which a potential investor should obtain from his or her own investment or taxation adviser before subscribing for Placing Shares.

IT YOU ARE IN ANY DOUBT AS TO YOUR TAXATION POSITION, YOU SHOULD CONSULT AN APPROPRIATE PROFESSIONAL ADVISER WITHOUT DELAY

10. Investments

There are no investments being made by the Company or to be made in the future in respect of which firm commitments have been made.

11. Working capital

In the opinion of the Directors, having made due and careful enquiry, the working capital available to the Company is sufficient for its present requirements, that is for at least the next twelve months from the date of Admission.

12. Litigation

No member of the Company is or has been involved in any governmental, legal or arbitration proceedings and the Directors are not aware of any such proceedings pending or threatened by or against the Company during the 12 months preceding the date of this document which may have or have had in the recent past a significant effect on the financial position or profitability of the Company.

13. Mandatory takeover bids

The City Code applies to all takeover and merger transactions in relation to the Company, and operates principally to ensure that shareholders are treated fairly and are not denied an opportunity to decide on the merits of a takeover and that shareholders of the same class are afforded equivalent treatment. The City Code provides an orderly framework within which takeovers are conducted. The Takeovers Directive was implemented in the UK in May 2006. The Directive applies to takeovers of companies registered in an EU member state and admitted to trading on a regulated market in the EU or EEA. Due to delays in passing the Company Law Reform Bill, the provisions have been implemented into law by means of the Takeovers Directive (Interim Implementation) Regulations 2006 (SI 2006/1183) (the "Regulations").

The UK takeover regime now consists of parallel regimes: a statutory regime governed by the Regulations under which the Panel is appointed as the supervisory body for listed companies (but not AIM companies) and a non-statutory code for other companies such as AIM companies.

The City Code is based upon a number of General Principles which are essentially statements of standards of commercial behaviour. General Principle One states that all holders of securities of an offeree company of the same class must be afforded equivalent treatment and if a person acquires control of a company, the other holders of securities must be protected. This is reinforced by Rule 9 of the City Code which requires a person, together with persons acting in concert with him, who acquires shares carrying voting rights which amount to 30 per cent. or more of the voting rights to make a general offer. "Voting rights" for these purposes means all the voting rights attributable to the share capital of a company which are currently exercisable at a general meeting. A general offer will also be required where a person who, together with persons acting in concert with him, holds not less than 30 per cent. but not more than 50 per cent. of the voting rights, acquires additional shares which increase his percentage of the voting rights. Unless the Panel consents, the offer must be made to all other shareholders, be in cash (or have a cash alternative) and cannot be conditional on anything other than the securing of acceptances which will result in the offeror and persons acting in concert with him holding shares carrying more than 50 per cent. of the voting rights.

There are not in existence any current mandatory takeover bids in relation to the Company.

14. General

(a) Save as disclosed in the financial information on the Company set out in Part IV of this document, there has been no significant change in the financial or trading position of the Company since 31 October 2006, the date to which the audited financial statements of the Company were prepared.

(b) The Company's accounting reference date is 31 October.

(c) Jeffreys Henry LLP of Finsgate, 5-7 Cranwood Street, London EC1V 9EE are the auditors of the Company and has given and has not withdrawn its written consent to the issue of this document with the inclusion in this document of its report and references thereto and to its name in the form and context in which it appears.

(d) Dawnay Day, registered in England and Wales under number 03019293, which is authorised and regulated by the Financial Services Authority, has given and has not withdrawn its written consent to the inclusion in this document of its name in the form and context in which it appears.

(e) Nabarro Wells & Co. Limited, registered in England and Wales under number 1950025, which is authorised and regulated by the Financial Services Authority, has given and has not withdrawn its written consent to the inclusion in this document of its name in the form and context in which it appears.

(f) Each of Keith Scott and Knowledge House of The University of Newcastle upon Tyne, have given and have not withdrawn their respective written consents to the issue of this document with the inclusion in this document of the Independent Technical Expert Reports and reference thereto and to its names in the form and context in which it appears.

(g) Peter Mansfield of IP Solutions has given and has not withdrawn his written consent to the issue of this document with the inclusion in this document of the Patent Report contained in Part V of this document and reference thereto and to his name in the form and context in which it appears.

(h) The Company's Nominated Adviser is Nabarro Wells & Co. Limited, whose principal place of business is Saddlers House, Gutter Lane, London EC2V 6BR.

(i) The Company's broker is Dawnay, Day Corporate Broking (a division of Dawnay, Day Brokers Limited), whose principal place of business is 15-17 Grosvenor Gardens, London, SW1W 0BD.

(j) There are no patents or other intellectual property rights, licences, manufacturing processes or particular contracts which are of fundamental importance to the Company's business, except for the patent applications described in Part V of this document.

(k) There are no arrangements under which future dividends are waived or agreed to be waived.

(l) The financial information set out in this document does not constitute statutory accounts within the meaning of section 240 of the Act.

(m) The Ordinary Shares will only be traded on AIM.

(n) The Company's registrar and paying agent for the payment of dividends is Computershare Limited, The Pavilions, Bridgwater Road, Bristol, BS99 7NH.

(o) The Company paid commissions in respect of new funds raised before Admission. Gerard Sauer, a director of the Company, received £10,990. Warrants to subscribe for new Ordinary Shares, as disclosed in paragraphs 8(g) and (h) of Part VI of this Document, were received by Paul Wedge (350,000), a founder shareholder, and advisers Neville Harris (350,000), Adrian Pepper (200,000), Mark Way (100,000) and Terry Cooper (100,000).

(p) Except for fees payable to the professional advisers whose names are set out on page 7 of this document or as otherwise set out above and payments to trade suppliers, no person has received whether directly or indirectly, from the Company within the 12 months preceding the application

for Admission, or has entered into any contractual arrangement to receive from the Company, directly or indirectly, any such fees, on or after Admission:

(i) fees totalling £10,000 or more;

(ii) securities of the Company having a value of £10,000 or more calculated by reference to the Placing Price; or

(iii) any other benefit with a value of £10,000 or more at the date of Admission.

(q) The gross proceeds of the Placing of the Placing Shares will be approximately £3.0 million. The total costs and expenses relating to the Placing (including those fees and commissions referred to above) which are payable by the Company are estimated to amount to approximately £0.6 million (excluding VAT). Accordingly, the total net proceeds of the placing of the Placing Shares will be approximately £2.4 million.

(r) The Placing Shares are not being offered generally and no applications have or will be accepted other than under the terms of the Placing Agreement and the placing letters.

(s) Monies received from applicants pursuant to the Placing will be held in accordance with the terms and conditions of the Placing until such time as the Placing Agreement becomes unconditional in all respects.

(t) In making any investment decision in respect of the Placing, no information or representation should be relied on in relation to the Placing, the Company or the Ordinary Shares, other than as contained in this document. No person has been authorised to give any information or make any representation other than those contained in this document and, if given or made, such information or representations must not be relied on as having been authorised. Neither the delivery of this document nor any subscription made under it shall, under any circumstances, constitute a representation or create any implication that there has been no change in the affairs of the Company since the date of this document or that the information in this document is correct as of any time subsequent to the date of this document.

(u) The Placing Price is payable in full on acceptance.

(v) It is expected that definitive share certificates will be despatched by hand or first class post by 1 May 2007 and that Shareholders' CREST accounts will be credited on 24 April 2007.

(w) The Directors are not aware of any environmental issues that may affect the Company's utilisation of its tangible fixed assets.

(x) The Company and the Directors are not aware of any arrangements which may at a subsequent date result in a change of control of the Company.

(y) Save as disclosed in this document, there are no provisions in the Articles which would have the effect of delaying, deferring or preventing a change of control of the Company.

(z) Save as disclosed in this document, so far as the Directors are aware, there are no known trends, uncertainties, demands, commitments or events that are reasonably likely to have a material effect on the Company's prospects for at least the current year.

(aa) Save as disclosed in this document, there are no mandatory takeover bids and/or squeeze-out and sell-out rules in relation to the Ordinary Shares.

(ab) No public takeover bids have been made by third parties in respect of the Company's issued share capital since the Company's incorporation.

15. Documents available for inspection

Copies of the following documents may be inspected at the offices of Eversheds LLP, Senator House, 85 Queen Victoria Street, London EC4V 4JL during usual business hours on any weekday (excluding Saturdays and public holidays) until at least one month from Admission:

(a) the Memorandum and Articles of Association of the Company;

(b) the audited accounts of the Company for the period ended 31 October 2006;

(c) the share option scheme rules referred to in paragraph 4 above;

(d) the Directors' service agreements and agreements with non-executive Directors referred to in paragraph 6 above;

(e) the material contracts referred to in paragraph 8 above;

(f) the written consents referred to in paragraph 14 above;

(g) copy of all other reports, letters, valuations, other documents, expert statements included or referred to in the prospectus;

(h) this document.

Dated: 18 April 2007

DEFINITIONS

The following definitions apply throughout this document, unless the context otherwise requires.

"Act"	the Companies Act 1985, as amended and, where appropriate, the Companies Act 2006;
"Admission"	admission of the entire ordinary share capital of the Company, issued and to be issued, to trading on AIM becoming effective as provided in the AIM Rules;
"Admission Document"	means this Admission Document;
"AIM"	Alternative Investment Market, a market operated by the London Stock Exchange;
"AIM Rules"	the AIM Rules for Companies or the AIM Rules for Nominated Advisers, as the context may require, issued by the London Stock Exchange governing admission to, and the operation of, AIM;
"Akzo Nobel"	Akzo Nobel Base Chemicals B.V. of the Netherlands;
"Articles"	the articles of association of the Company, a summary of certain provisions of which is set out in paragraph 3 of Part VI of this document;
"Audit Committee"	the audit committee of the Board from time to time;
"Board"	the board of Directors for the time being, including any duly constituted committee of the Directors;
"Broker Agreement"	the agreement dated 8 November 2006 between the Company and Dawnay Day relating to Dawnay Day acting as broker to the Company, further details of which are set out in paragraph 8(e) of Part VI of this document;
"City Code"	the City Code on Takeovers and Mergers;
"Company" or "AFC Energy"	AFC Energy plc incorporated and registered in England and Wales with registered number 05668788;
"CREST"	the computerised settlement system, facilitating the paperless settlement of trades and the holding of uncertificated shares administered by CRESTCo Limited;
"CRESTCo"	CRESTCo Limited, the operator of CREST;
"Dawnay Day"	Dawnay, Day Corporate Broking (a division of Dawnay, Day Brokers Limited), 15-17 Grosvenor Gardens, London SW1W 0BD;
"Directors"	the directors of the Company whose full names appear on page 7 of this document;
"EIS Rules"	the rules relating to the Enterprise Investment Scheme as provided for under Chapter III Part VII, ICTA;
"Eneco"	Eneco Limited;
"Executive Schemes"	the AFC Energy 2006 Share Option Scheme and the AFC Energy 2007 Share Option Scheme;
"HMRC"	HM Revenue and Customs, the Inland Revenue and/or HM Customs and Excise, as appropriate;
"ICTA"	the Income and Corporation Taxes Act 1988;

"Independent Technical Experts' Reports"	the report prepared by Knowledge House of the University of Newcastle upon Tyne, a copy of which is reproduced in Part III of this document;
"London Stock Exchange"	London Stock Exchange plc;
"Nabarro Wells"	Nabarro Wells & Co. Limited of Saddlers House, Gutter Lane, London EC2V 6BR;
"Official List"	the official list of the United Kingdom Listing Authority;
"Option"	an option to acquire Ordinary Shares;
"Option Holder(s)"	holder(s) of an option to acquire Ordinary Shares;
"Ordinary Shares"	ordinary shares of £0.001 each in the capital of the Company;
"Panel"	the Panel on Takeovers and Mergers;
"Placing"	the conditional placing of the Placing Shares at the Placing Price pursuant to the Placing Agreement;
"Placing Agreement"	the conditional agreement dated 18 April 2007 between the Company (1), Dawnay Day (2), Nabarro Wells (3) and the Directors (4), relating to the Placing Shares, further details of which are set out in paragraph 8f of Part VI of this document;
"Placing Letter"	the letters of subscription executed by subscribers of Placing Shares pursuant to the terms set out therein and in the Placing Agreement;
"Placing Price"	23 pence per Placing Share;
"Placing Shares"	the 13,183,034 Ordinary Shares to be allotted and issued pursuant to the Placing, such allotment being conditional on Admission;
"Prospectus Directive"	Directive 2003/71/EC of the European Council of Ministers on the prospectus to be published when securities are offered to the public or admitted to trading and amending Directive 2001/34/EC;
"QCA Guidelines"	the Quoted Companies Alliance Corporate Governance Guidelines for AIM Companies;
"Registrar"	Computershare Limited, details of which are set out on page 7;
"Remuneration Committee"	the remuneration committee of the Board from time to time;
"Senior Management"	any senior manager of the Company who is relevant to establishing that the Company has the appropriate expertise and experience for the management of the Company's business;
"Shareholder(s)"	holder(s) of Ordinary Shares;
"Subsidiary undertakings"	has the meaning contained in sections 736 and 736A of the Act;
"UK" or "United Kingdom"	the United Kingdom of Great Britain and Northern Ireland;
"US" or "United States"	The United States of America its possessions and territories and any state of the United States of America and the District of Columbia; and
"US$" or "$" or "United States Dollars"	United States dollars, the lawful currency for the time being of the United States of America.

In this document, the symbols "£" and "p" refer to pounds and pence sterling respectively, and references to € are to the Euro as the European Single Currency.

GLOSSARY OF TERMS

Alkaline fuel cell	A fuel cell based on an alkaline potassium hydroxide as conducting electrolyte
Balance of plant	Components in a fuel cell system that enable operation of the fuel cell stack. This includes pumps, heat exchangers and controllers
Bi-polar plates	The component that electrically connects the individual cells in a polymer electrolyte fuel cell
Bi-polar connection	A method of connecting the cells of a cell stack in series
Catalyst loading	The amount of catalyst incorporated in a fuel cell per unit area. Typical units are mg/cm^2
CHP	Combined Heat and Power
CO	Carbon monoxide
CO_2	Carbon dioxide
Current density	The term used to define the current output from a fuel cell based on the electrode cross sectional area
Dry side electrode (DSE)	The DSE consists of an inert porous support onto which is deposited a porous metallic conducting layer to which the required catalyst layer can then be deposited
Direct methanol fuel cell (DMFC)	A fuel cell based on a polymer electrolyte membrane which uses methanol directly as the fuel
Electrocatalyst	A material such as platinum used to catalyse chemical reactions at the electrodes
Electrochemical cells	Devices in which chemicals react to produce electricity or electricity is used to drive a chemical reaction. Fuel cells is an example of electrochemical cells
Electrode	An electronic conductor through which an electric current enters or leaves a medium. Chemical change occurs at the interface of the electrode and electrolyte medium. A fuel cell contains two electrodes: an anode where oxidation of a fuel occurs and a cathode where reduction of oxygen occurs
Gas diffusion electrode	An electrode in a fuel cell formed by bonding a catalyst with an inert plastic binder which enable a three phase zone to be created
Fluorocarbon membrane/ polymer	A membrane or polymer made from a chemical compound consisting of fluorine and carbon. Nafion^{TM} is a fluorocarbon membrane material
Half cell	A structure that contains a conductive electrode surrounded by a conductive electrolyte
H_2	Hydrogen
Hydrogen economy	An economy in which energy is stored as hydrogen

IP	Intellectual property, including unregistered intellectual property such as know-how, ideas, reputation, concepts and styles and registered intellectual property such as trademarks, registered designs and patents
KOH	Potassium hydroxide
kW or Kilowatt	A unit of electrical power equal to 1,000 watts or 1.341 horsepower
kWh	Kilowatt hour, unit of energy equivalent to one Kilowatt of power expended in one hour
Membrane	The polymer layer in a PEMFC fuel cell that acts as electrolyte (a medium for the transport of an ion between the two electrodes) as well as a barrier separating the gases in the anode and cathode compartments of the fuel cell
Membrane electrode assembly (MEA)	The heart of the PEMFC, comprising a thin film of ion conducting polymer (the membrane) coated on each side with electrocatalyst layers (the electrodes)
micron	1/1,000th of a mm
mm	Millimetre, 1/1,000th of a metre
Molar	A standard measure of concentration of a liquid, gas or solid
Molten carbonate fuel cell	A type of high temperature fuel cell using a molten carbonate salt mixture electrolyte
Monopolar or Homopolar	A method of connecting the cells in a stack in series
MW	A unit of electrical power equal to 1,000 kilowatts
Nafion™	A perfluorinated polymer manufactured by DuPont. Nafion™ is used in state-of-the-art PEM fuel cells
NOX	Nitrogen oxide
O_2	Oxygen
Phosphoric acid fuel cell (PAFC)	A type of low temperature fuel cell
Proton exchange membrane fuel cell (PEMFC)	A type of fuel cell in which the transport of protons (H+) from the anode to the cathode is achieved through a solid, polymer electrolyte (membrane) in its acid form. The electrolyte is a called a proton exchange membrane (PEM). The fuel cells typically run at low temperatures ($<80^{\circ}C$)
Polypropylene	A hydrocarbon polymer used to make the dry side electrode porous support
Polarisation curve	A term used to define the fuel cell voltage and current density characteristics
Power density	A term used to define the output of a cell based on the cross sectional area of the electrodes. Typical units are mW/cm^2
Pt	Platinum
PTFE	Polytetrafluoroethylene (PTFE) is a fluorocarbon polymer made of a carbon backbone chain with two fluorine atoms attached to each carbon atom. It is better known by the trade name Teflon™
ROC	Renewable Obligation Certificates, introduced on 1 April 2002, place an obligation on all licensed electricity suppliers to produce evidence

	that they have sourced a specified proportion of their electricity supplies from renewable energy sources
Solid oxide fuel cell (SOFC)	A fuel cell operating at high temperature which uses a ceramic oxide ion conducting electrolyte
SOX	Sulphur oxide
Stack	Individual fuel cells connected together to form a fuel cell stack
Three-phase zone	The region in the fuel cell electrode where reactant gases react on the surface of the electrocatalyst in contact with the electrolyte
Water electrolyser	A device that uses energy to convert water to hydrogen and oxygen

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