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## **PRESS RELEASE**

### **GASHUB POWER STRIKES DEAL WITH IMRE AND EXPLOIT TECHNOLOGIES TO SPEED GROWTH IN FUEL CELLS TECHNOLOGY**

SINGAPORE – GasHub Power Pte Ltd (GasHub), a leading local gas engineering and gas piping company signed a Research Collaboration Agreement (RCA) with the Institute of Materials Research and Engineering (IMRE), a research institute of the Agency for Science, Technology and Research (A\*STAR). GasHub and IMRE will jointly develop prototype fuel cells using IMRE's novel research and proprietary technology which produces higher quality membranes with better conductivity and efficiency. IMRE's technology makes use of hydrocarbons instead of the conventional fluorine-based membranes, which makes the membranes not only cheaper to produce but environmentally friendly and biodegradable.

GasHub also signed a Licensing Agreement with Exploit Technologies Pte Ltd (ETPL), the commercialisation arm of the A\*STAR to enable GasHub to use IMRE's proprietary proton-exchange membrane (PEM) technology to manufacture fuel cell as well as fuel cell systems and products in the region.

IMRE's proprietary fuel cell technology resides in the use of the high-performance PEM. The PEM, a thin polymer film, is essentially the heart of the fuel cell as it allows the transfer of protons to complete the electrical circuit and produce electricity. The by-products of this electrochemical reaction are water and heat.

### **IMRE-GasHub Research Collaboration Agreement (RCA)**

The research collaboration will see joint-development of prototype fuel cells that will integrate IMRE's patented PEM and fuel cell stack know-how, and GasHub's highly conductive graphite plate technology. The prototype will be evaluated and tested for commercialisation. This Agreement between IMRE and GasHub involves the fabrication of three fuel cell prototypes: two 330W output and one 3kW output fuel cell stack for an undisclosed application in computing.

### **Licensing Agreement with ETPL**

The Licensing Agreement is an excellent example of how A\*STAR can help local private industry exploit key technologies strategic to their growth. Through this commercialisation endeavour, ETPL will provide GasHub the competitive edge to accelerate its fuel cell technology development process and shorten its time-to-market of its cutting edge products and services. The Agreement will allow GasHub the use of IMRE's proprietary PEM technology to manufacture fuel cell and fuel cell systems in the region. Additionally, the Agreement will also include the element of technical consultancy and support to ensure a successful technology transfer.

"Fuel cell technology is an increasingly attractive alternate source of electricity. Our technology know-how to fabricate a high performance and efficient fuel cell from scratch holds potential for cleaner and more efficient sources of power", said Prof Chua Soo Jin, Deputy Director (Industry) of IMRE.

"This collaboration is a strong testimony of how the private sector can work with quality research institutes such as IMRE to fulfill their technology milestones and hence bridge the gap to commercialisation. Working with IMRE is potentially one of the best model for GasHub in its quest to evolve promising technologies for green energy solutions." said Mr Roger Khoo, Chief Executive Officer, GasHub Power Pte Ltd.

Fuel cells are already in use worldwide to power machines ranging from cars to distributed power systems, with miniature versions powering household appliances and electronic devices such as televisions, laptops, video cameras and handphones.

Encl.

Annex 1: How does a Fuel Cell work?

Annex 2: Backgrounder on partner organisations

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## How does a Fuel Cell work?

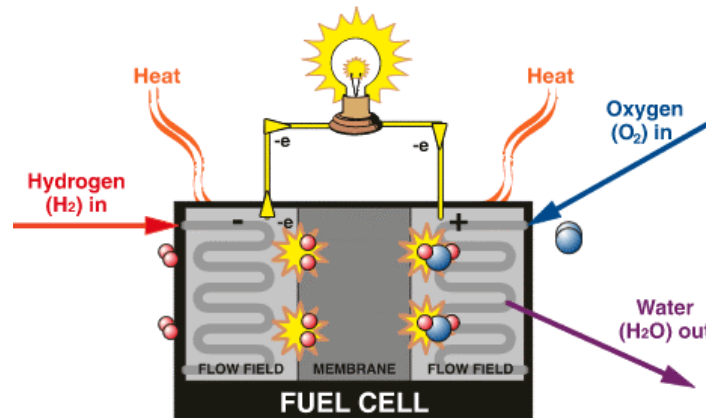


Figure 1. Schematic of PEMFC

- 1) In principle, a fuel cell operates like a battery. Unlike a battery, a fuel cell does not run down or require recharging but will produce energy in the form of electricity and heat as long as fuel is supplied. Water is also a by-product of this reaction.
- 2) A fuel cell consists of two electrodes sandwiched around an electrolyte (in this case the membrane).
- 3) Oxygen passes over one electrode and hydrogen over the other.
- 4) Hydrogen fuel is fed into the "anode" of the fuel cell. Oxygen (or air) enters the fuel cell through the cathode.
- 5) Through catalysis, the hydrogen atom splits into a proton and an electron, which take different paths to the cathode.
- 6) The proton passes through the electrolyte. The electrons create a separate current (creating electricity) that can be utilised before they return to the cathode, to be reunited with the hydrogen and oxygen in a molecule of water.

## ANNEX 2

### **About GasHub Pte Ltd**

GasHub Pte Ltd is a leading gas engineering and gas piping company in Singapore, actively involved in both private and public sector projects. The company's growth strategy is defined by its vision to be a "key enabler of green energy solutions globally". To achieve its vision, GasHub seeks to be one of the early developers of customised fuel cell power for commercial and industrial product integration that will provide greater client-value, a global market and sustainable revenue streams. With its current state fuel cell technology primed at power density of between 35W to 3000W, the company sees great potential in a virtually unlimited market where its niche market is. In July 2003, GasHub Power, an emerging icon in the PEM fuel cell industry, was incorporated as the commercial arm of GasHub Pte Ltd to focus on accelerating development and commercialisation of its fuel cell technologies. (Website: [www.gashub.com.sg](http://www.gashub.com.sg))

### **About Agency for Science, Technology and Research (A\*STAR)**

A\*STAR's mission is to foster world-class scientific research and talent for a vibrant knowledge-based Singapore. A\*STAR is organised into four arms: two research councils, the Biomedical Research Council (BMRC) and the Science and Engineering Research Council (SREC), a Corporate Planning and Administration Division (CPAD) and the agency's commercialisation arm, Exploit Technologies Pte Ltd. The two research councils fund and oversee twelve public research institutes in areas such as bioinformatics, genomics, molecular biology, bioengineering, bioprocessing technology, chemical sciences, materials, high performance computing, information technology and communications, manufacturing technology, microelectronics and data storage. A\*STAR actively supports industry through manpower training, secondments, joint R&D and technology transfer. (Website: [www.a-star.edu.sg](http://www.a-star.edu.sg))

The **Institute of Materials Research and Engineering (IMRE)** was established in 1996 to create materials knowledge, develop human capital and to transform technology through innovative research. IMRE undertakes research in selected fields of materials science and engineering, including optoelectronics, nanomaterials, chemicals and polymers. Our new innovations and discoveries are constantly being explored to help further the applications of advanced materials and processes. (Website: [www.imre.a-star.edu.sg](http://www.imre.a-star.edu.sg))

**Exploit Technologies Pte Ltd (ETPL)** is the commercialisation arm of A\*STAR. Our charter is to identify, protect and exploit promising intellectual property (IP) created by the research institutes (RIs) under A\*STAR. This includes facilitating the IP management process (i.e. the protection of inventions through patents and copyrights etc), analysing the strength of our IPs and the market that they could serve, and working with companies to commercialise the technologies. (Website: [www.exploit-tech.com](http://www.exploit-tech.com))