



*information*

Sassenage, May 2004

Press release

**1,800 hours operation for "Roller Pac" Hydrogen Fuel Cell  
on the STMicroelectronics site at Agrate near Milan in Italy**

*At the beginning of 2003 Air Liquide was selected by STMicroelectronics (NYSE:STM) in the framework of a project partially financed by European Union, PVFC-Sys (photovoltaic fuel cell system, Proj.nr. ERK5 – CT1999-00017), in agreement with the Consortium (Coordinator Ecole des Mines de Paris/ARMINES, partners: STMicroelectronics, Vanderborre Hydrogen System, Trivea, Transenergie, ISET), to supply an innovative and environmentally-friendly energy production system.*

The PVFC-Sys project consists of combining a photovoltaic field with an electrolyser and a fuel cell. The photovoltaic cell produces electrical energy which, in turn is converted to hydrogen by electrolysis. The hydrogen is easily stored and then used to power the fuel cell. This combination provides high-quality, clean and silent energy since the fuel cell only produces water. Upstream of the chain, the hydrogen used to power the cell is also clean since it is obtained by electrolysis.

Currently this highly reliable, "green", and the only "Zero emission" technology, represents a possible solution for the future to meet the expectations for an alternative energy source, to produce high quality energy. **Air Liquide's involvement in the PVFC-Sys project highlights its expertise in hydrogen technologies coupled with the know-how of its subsidiary Axane in fuel cells in addition to its commitment regarding sustainable development.**

Air Liquide Electronics and Axane closely cooperated with the semiconductor manufacturer to build and operate this new installation on its site in Italy. **The ROLLER PAC fuel cell, with a power of 2 kW, has been operational since December 2003. Since the fuel cell was put into service, it has been operating continuously for nearly 1,800 hours, which is a significant success!**

The fuel cell was utilized to provide the electricity for a room dedicated to this project by STMicroelectronics at Agrate - Italy.

This field experience clearly demonstrated the ability of the fuel cell to satisfy the energy requirements for an operational company beyond the various experiments on this subject that have been performed in laboratory conditions to date.

Commenting on this new development, Christophe Fontaine, Vice President of the Air Liquide Electronics Division declared: **"This operation strengthens our already well-established links with our customer STMicroelectronics and demonstrates the benefits of hydrogen in all high-quality, clean energy production systems. Encouraged by the success of this first step, we are already working with our customers to duplicate this installation on other industrial sites."**

Renato Di Stefano, Agrate Site General Services Director at STMicroelectronics added: **"ST's involvement in this pilot project based on renewable energy is just one example of the Company's long-standing commitment to environmental protection. With the support of Air Liquide we have demonstrated the feasibility of the PVFC system at our Agrate site, showing that systems powered by renewable energy sources are efficient and reliable."**

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*Present in 65 countries, Air Liquide is the world leader in industrial and medical gases and related services. The Group offers innovative solutions based on constantly enhanced technologies. These solutions, which are in line with Air Liquide's commitment to sustainable development, help to protect life and enable our customers to manufacture many indispensable everyday products. Founded in 1902, Air Liquide has more than 31,900 employees. The Group has successfully developed a long-term relationship with its shareholders built on confidence and transparency and guided by the principles of corporate governance.*

Since the publication of its first consolidated financial statements in 1971, Air Liquide has posted **strong and steady earnings growth**. Sales in 2003 totaled 8,394 million euros, of which sales outside France accounted almost 80%. Air Liquide is listed on the Euronext Paris stock exchange and is a component of the CAC 40 and EuroStoxx 50 indexes (ISIN code FR 0000120073).

#### **About Axane**

In less than 3 years, **AXANE**, a young French company specialized in the development of PEM type fuel cells **created in May 2001** by the international Air Liquide Group, has successfully designed and developed a new generation of fuel cells that offers enhanced performance, increased reliability and simplified maintenance.

**This new fuel cell design, based on EVOPAC™** proprietary technology developed by AXANE, was successfully proven in the spring of 2002 during the Polar Ice Cap Mission conducted by Dr. Jean-Louis Etienne

Axane is positioning itself to target three markets that are likely to provide broad commercial outlets in the short term: - Portable multi-application generators (500 W to 5 kW), - Stationary applications (more than 2 kW), - Mobile applications for small hybrid vehicles (2 kW to 5 kW).

The first industrial applications are forecast for 2004, with an initial focus on the portable generators market.

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**Images available on request**