

## 2008 ANNUAL REPORT

AIR LIQUIDE,  
THE WORLD LEADER  
IN GASES  
FOR INDUSTRY,  
HEALTH AND  
THE ENVIRONMENT

**ERA** (Iəɹə) n. - 1615; Lat. *æra* "number, figure" 1 • A fixed point in time from which a series of years is reckoned => epoch... 2 • A generally long period of time reckoned from a particular date or event... 3 • A period of time in which a new order prevails. => age, epoch, period.

**AIR** (ɛə) n. - 14<sup>th</sup> century; Lat. *aer* 1 • The gaseous mixture that living beings breathe; the atmosphere...  
• A gaseous mixture of constant composition in a pure state (by volume, 21% oxygen, 78% nitrogen, 1% argon and other rare gases), often loaded with impurities (water vapor, carbon dioxide, ozone, etc.), that is colorless, odorless, transparent...

# VISION MISSION PROFILE

# Vision

Our activities lie at the heart of the most important challenges facing the planet. To meet these challenges, Air Liquide develops innovative technologies and sustainable solutions, optimizing the use of air and the planet's natural resources, enabling progress and preserving life.

# Mission

Anticipate the challenges facing our current and future markets worldwide and deliver sustainable progress for our customers, employees and shareholders, thanks to innovation, know-how and performance over the long term.

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**13.1 billion euros  
in revenue**

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**43,000 employees  
in 75 countries**

**Air Liquide is the world leader in gases for industry, health and the environment**, and is present in over **75 countries** with **43,000** employees.

Oxygen, nitrogen, hydrogen and rare gases have been at the core of Air Liquide's activities since its creation in 1902. Using these molecules, Air Liquide continuously reinvents its business, anticipating the needs of current and future markets. The Group innovates to enable progress, to achieve dynamic growth and a consistent performance.

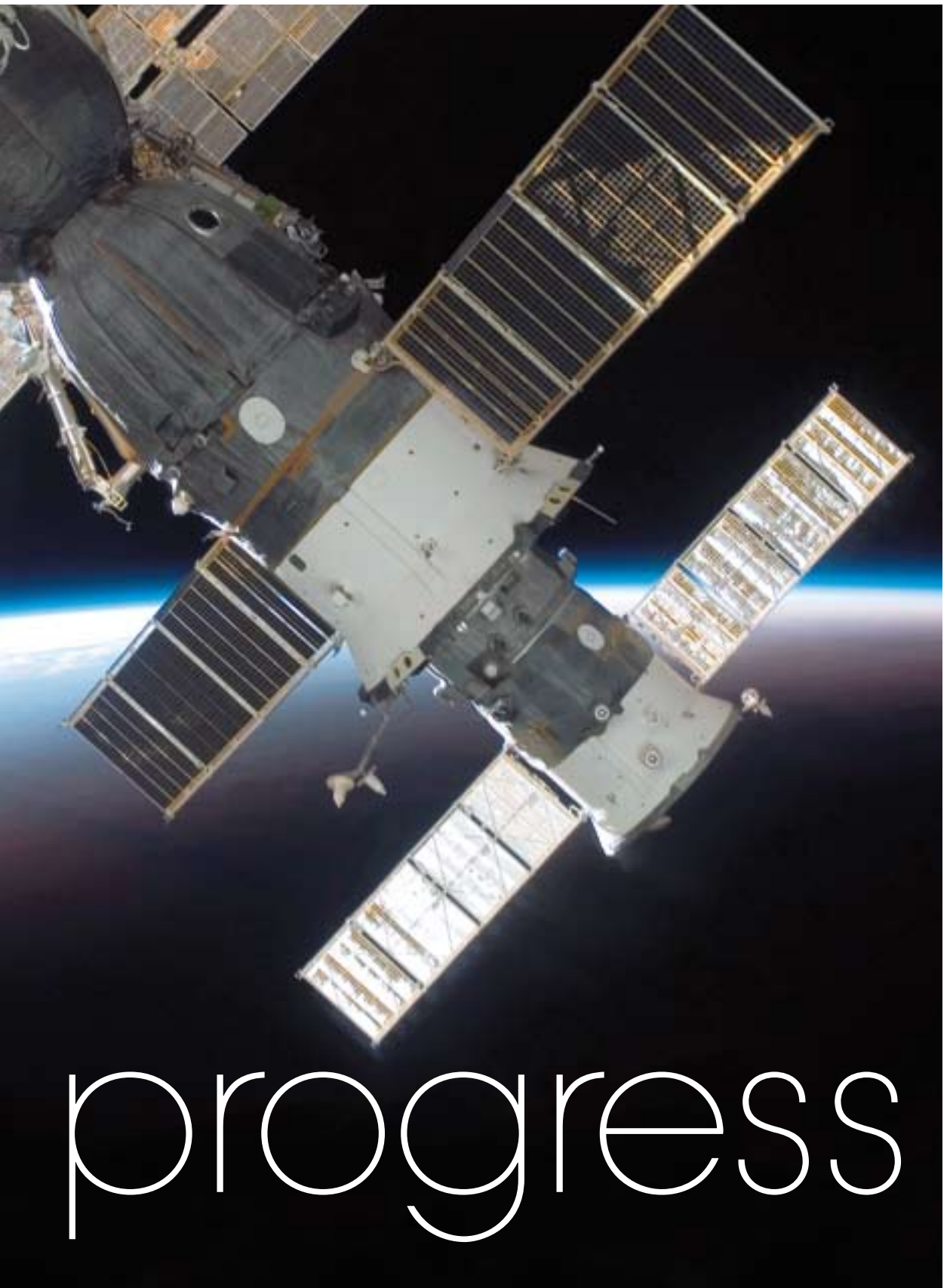
Air Liquide combines many products and technologies to develop valuable applications and services not only for its customers but also for society. **Innovative technologies** that curb polluting emissions, lower industry's energy use, recover and reuse natural resources or develop the energies of tomorrow, such as hydrogen, biofuels or photovoltaic energy... Oxygen for hospitals, homecare, fighting nosocomial infections...

**A partner for the long term**, Air Liquide relies on employee commitment, customer trust and shareholder support to pursue its vision of sustainable, competitive growth.

The **diversity** of Air Liquide's teams, businesses, markets and geographic presence provides a solid and sustainable base for its development and strengthens its ability to push back its own limits, conquer new territories and build its future.

**Air Liquide explores the best that air can offer to preserve life, staying true to its sustainable development approach.**





## LEADERSHIP IN ACTION

Close to its customers, Air Liquide demonstrates an outstanding mastery of its business, constantly reinventing it to move markets forward and enable progress.







## THE LONG-TERM PARTNERSHIP

Dynamic growth and steady performance underlie Air Liquide's development:

- Customers are guaranteed sustained commitment,
- Shareholders are offered long-term value creation,
- Employees are engaged in a process of career opportunities and professional development over the long term.





# future

## THE TECHNOLOGICAL POWERHOUSE

With a deep knowledge of its customers' businesses and the ability to combine products and technologies, Air Liquide develops high value-added applications and services for customers and for society.







# connection

## THE STRENGTH OF DIVERSITY

The exceptional diversity of its customers, businesses and teams coupled with its broad international scope guarantee Air Liquide's reliable and sustainable development and allow it to constantly explore new markets, push back its own limits and build its future.



BECAUSE OUR  
LIFE KEEPS  
CHANGING,  
EVOLVING...

...

AIR LIQUIDE  
IS ENTERING  
A NEW ERA





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# MESSAGE FROM BENOÎT POTIER

**In 2008, Air Liquide continued to display sustained growth momentum, despite the economic slowdown at the end of the year. Its revenue rose to €13.1 billion, an increase of 11% compared to last year, with net profit rising to 10.8%. These good results, notably during the fourth quarter, show the Group's resilience in the face of the difficult economic context.**

All of our activities generated growth in 2008, in each of the Group's geographic regions. 19 new production units started up, half of which are situated in emerging economies, notably the Middle East and China. In addition, the Group continued its growth in hydrogen markets, signed new contracts for supplying oxygen and consolidated its position as leader in photovoltaic energy, a booming sector. Furthermore, Air Liquide has made major technological advances in the fields of oxycombustion, biofuels, and medical gases. I would like to acknowledge the contribution of the Group's 43,000 employees, whose commitment has enabled us to achieve these solid results.

In 2008, 6,000 new employees joined Air Liquide, and we continued our policy of industrial investments: €1.9 billion were invested by the Group. This figure is up 40% from 2007, setting a solid growth foundation for the years ahead.

These achievements fall within the scope of our company program, ALMA. Launched at the beginning of 2008, ALMA is the means of achieving our ambition of being the world's recognized leader in gases for industry, health and the environment. The goal of this program is to mobilize all the Group's teams, present in 75 countries, around the shared objectives leading to competitive long-term growth.

Our success in 2008 demonstrates the robustness of Air Liquide's business model, which draws on a diverse and balanced customer portfolio, both in terms of geography and sectors of activity. It is also based on a mix of products and applications which has broadened considerably over the past ten years, as well as long-term contractual relations with its customers, based on investments. The result is that 80% of Air Liquide's revenue today comes from long-term growth sectors, which are less affected by economic fluctuations.

While Air Liquide's share price has not completely escaped the general trends of the markets, it has nonetheless showed better resistance than the French CAC 40 index. This bears witness to the confidence of our individual and institutional shareholders, and I would like to thank them for that.

In 2009, priority will be given to cash management, increased efforts in cost containment, and greater selectiveness in our investments. In this way, we aim to secure and finance growth in our revenue and net profit. We are therefore approaching 2009 with determination and confidence in the strength of our model, which should enable us, once the effects of the economic slowdown have been absorbed, to pursue a growth rate in line with our medium-term objectives.



**Benoît Potier,**  
Chairman and CEO



**ALMA reaffirms our ambition to be the recognized leader in our industry.**

### Large Industries

#### Soxal develops key hydrogen business in Singapor.

Neste Oil's renewable Diesel plant will be supplied with hydrogen.



### Electronics

#### Air Liquide to triple its silane production capacity in Japan.

A world scale unit will be built to meet the growing demand of the market.

### Electronics

#### Two key successes in TFT-LCD in Taiwan.

The Group will supply the new fabs of the island's main players with ultra pure gases and ultra pure nitrogen.

January

February

March

April

May

### Engineering and Construction

#### Two new contracts for oxygen production units in South Korea and China.

Air Liquide will design and build two air separation units with a production capacity of over 3,000 tonnes of oxygen per day.

### Healthcare

#### First anesthesia with LENOXe™ in France.

LENOXe™, an Air Liquide innovation, is composed of xenon, a gas present in very small quantities in the air, which offers remarkable anesthetic properties.

### Group

#### Creation of the Air Liquide Foundation.

It focuses its international action on three areas: the environment, health and local development.

### Industrial Merchant

#### €110 million investment in new production capacities in Europe.

Air Liquide invests in Germany and Portugal in two production units for liquefied air gases (oxygen, nitrogen, and argon).

### Electronics

#### Acquisition of Edwards Chemical Management Division.

This acquisition strengthens the Group's position in the high purity fluid equipment and installation sector.

# 2008 HIGHLIGHTS





### Industrial Merchant

#### Acquisition of the Pure Helium company in the Middle East.

This acquisition opens up promising opportunities for expansion in this region.



### Other activities

#### Successful partnership with KSTAR in South Korea.

Air Liquide, a partner in the project, designed, built and put into operation the system of helium liquefaction and distribution.

June

July

September

October

### Large Industries

#### Investment of world-scale hydrogen unit to serve Rotterdam/Antwerp basin (Northern Europe).

As well as the supply to clients' sites in Rotterdam, the unit will be connected to Air Liquide's Northern European hydrogen network which includes eight units and more than 900 km of pipeline.



### Group

#### Launch of the Horizon Hydrogen Energy (H2E) program.

This program brings together around Air Liquide twenty partners in the field of hydrogen energy.

### Electronics

#### Multiple contracts for Photovoltaic industry in Asia and Europe.

The Group confirms its position as the #1 gas supplier to this industry.

### Healthcare

#### First medical acquisition in India.

Air Liquide has acquired Electrocure Systems, a company specializing in medical equipment for respiratory care.



November

December



### Group

#### New technological steps in oxycombustion.

As part of a technological partnership with the Australian joint-venture Callide Oxyfuel Services, Air Liquide will provide an air separation unit (ASU) with an oxygen production capacity of 660 tonnes per day and a CO<sub>2</sub> cryogenic purification unit.

As of December 31, 2008, the Board of Directors is comprised of twelve members appointed by the General Shareholders' Meeting, including five foreign members (German, English, Dutch, American).

**MEMBERS** are chosen for their skills, their integrity, their independence of mind and their determination to take into account the interests of all shareholders.

**THE COMPOSITION** of the Board of Directors reflects diversity and complementarity of experience, nationalities and cultures, including a significant number of executive managers or former executive managers; the Board of Directors looks for persons possessing skills in the following areas: marketing, services, industry, finance, health, research and technology.

In 2008, the Board of Directors met seven times with an effective attendance rate or attendance rate by telephone of 96.4%.

CORPORATE  
GOVERNANCE



A •



B •



C •



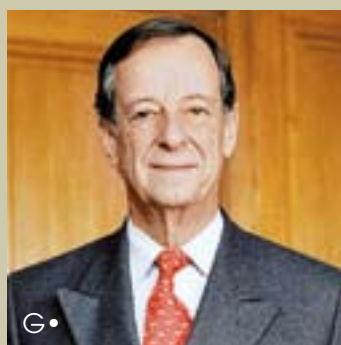
D •



E •



F •



G •



H •



I •



J •



K •



L •

## The Board of Directors

### A • Benoît Potier

Chairman  
and Chief Executive Officer  
Expiration date of term: 2010

### B • Sir Lindsay Owen-Jones

Vice-Chairman  
of the Board of Directors  
Chairman of the Appointments  
Committee  
Chairman of the Remuneration  
Committee  
Expiration date of term: 2009\*

### C • Thierry Desmarest

Director  
Expiration date of term: 2009\*\*

### D • Alain Joly

Director  
Expiration date of term: 2009\*\*

### E • Professor Rolf Krebs

Director  
Expiration date of term: 2012

### F • Gérard de La Martinière

Director  
Chairman of the Audit and  
Accounts Committee  
Expiration date of term: 2011

### G • Cornelis van Lede

Director  
Expiration date of term: 2011

### H • Béatrice Majnoni d'Intignano

Director  
Expiration date of term: 2010

### I • Thierry Peugeot

Director  
Expiration date of term: 2009\*\*

### J • Paul Skinner

Director  
Expiration date of term: 2010

### K • Jean-Claude Buono

Director  
Expiration date of term: 2012

### L • Karen Katen

Director  
Expiration date of term: 2012

\* Renewal not requested

\*\* Renewal of term proposed to the Shareholders' Meeting of May 7, 2009

# The Board of Directors

## Role of the Board of Directors

The Board of Directors **determines the major orientations** of the Company's activities. Accordingly, it examines and approves the Group's **major strategic orientations**.

It ensures the implementation of these orientations by Executive Management.

Subject to the powers expressly attributed to Shareholders' Meetings by law and in accordance with the corporate purpose, the Board deals with any issues concerning the smooth running of the Company and manages corporate business pursuant to its decisions.

The internal regulations stipulate that the **specific powers** legally attributed to the Board of Directors include in particular the choice of executive officers, the determination of the terms and conditions governing the remuneration and performance of their duties, the convening of the Shareholders' Meeting, the determination of the agenda and draft resolutions, the preparation of the financial statements and annual Management Report, the drafting of its operating procedures (formation of committees, distribution of directors' fees etc.).

The Board also exercises the **powers granted to it by the Shareholders' Meeting**, particularly with regard to the granting of stock options or the conditional allotment of shares to employees, issues of marketable securities, or share buyback or employee savings programs.

## Functioning of the Board of Directors

### Informing the directors

The internal regulations define the methods of informing the directors. They specify, in particular, that prior to Board meetings, a file of meeting documentation dealing with key items on the agenda is sent out to Board members. The Chairman and Chief Executive Officer, assisted, if need be, by the Senior Executive Vice-Presidents, presents to the Board of Directors a quarterly report on the Company's management, the draft annual and interim financial statements and the various issues requiring the Board's authorization or approval.

### Conduct of meetings

The internal regulations define the frequency of meetings and the rules of convening meetings and participation by video-conference or telecommunications.

## Formation of Committees

The internal regulations define the purpose and operating procedures of the three committees set up.

### Training measures

The internal regulations stipulate that training relating to the Company's businesses is offered to directors, particularly through site visits or meetings with senior management executives. More particularly, information on the Group's accounting, financial and operational specificities is offered to members of the Audit and Accounts Committee.

## Appraisal of the Board of Directors

The internal regulations stipulate that:

*"The Board will ensure that an evaluation is carried out periodically of its composition, its organization and its functioning as well as those of its committees. An update will be made by the Board on this topic once a year and a formal evaluation will be carried out under the authority of the Chairman of the Board of Directors every three years."*

## The Board's work in 2008

The Board dealt with a variety of matters related to the following areas:

### 1. Monitoring of the Group's day-to-day Management

- Reviewing the quarterly activity reports and the annual and interim financial statements.
- Reviewing the minutes of Committee meetings.
- Making decisions, in particular with respect to the investments necessary for the Group's development.
- Reviewing the report on ongoing acquisitions, disposals or major projects.
- Reviewing corporate documents.
- Preparing the Annual Shareholders' Meeting.

### 2. Monitoring of the Group's main strategies

### 3. Functioning of the corporate governing bodies

(Code of corporate governance, Executive Management, Board of Directors)

For more information, refer to the section entitled "Corporate Governance" in the Reference Document available on our website [www.airliquide.com](http://www.airliquide.com) or by request.



## Board Committees

### The Audit and Accounts Committee

#### Pursuant to the internal regulations:

"The purpose of the Committee is to prepare the decisions to be taken by the Board of Directors by examining the following issues and reporting on them to the Board:

#### By receiving reports:

jointly and separately, in order to compare and combine different points of view, from:

- the Finance, Administration and Legal Departments;
- the Internal Audit Management;
- the external auditors.

#### Concerning the following points:

- existing organization and procedures in the Group;
- their actual functioning;
- how the financial statements and the accounts are drawn up.

#### In order to reach:

by comparing and combining the points of view collected and using their business judgment based on professional experience, a reasonable judgment concerning:

1. Accounts and accounting principles used (their conformity in relation to the reference standards, a fair and complete reflection of the Group's situation, transparency, readability, consistency over time);
2. Existence and functioning of control organizations and control procedures adapted to the Group, making it reasonably possible to identify and manage the risks incurred and to report on them;
3. Organization of the internal audit function, the plans for assignments and actions in the internal audit field, the findings of these assignments and actions and the recommendations and ensuing measures taken;
4. Choice and renewal of the external auditors, review of the tendering process, opinion on the selection of external auditors and the rotation of audit partners, review of proposed fees, information on the overall fees paid indicating the amount of fees paid for non-audit services."

### The Appointments Committee

#### Pursuant to the internal regulations, the purpose of the Appointments Committee is to:

##### "1. Concerning the Board of Directors:

- make proposals to the Board of Directors for renewal and appointment of directors. The Committee looks for new members on the basis of its evaluation of the needs and developments expressed by the Board of Directors;
- make proposals to the Board of Directors for the creation and composition of Board committees;

- periodically evaluate the structure, size and composition of the Board of Directors and submit to it recommendations regarding any potential change;
- the Committee periodically reviews the criteria applied by the Board to classify a director as independent; once a year, it examines, on a case-by-case basis, the situation of each director - or each candidate for the duties of directors in light of the criteria applied and makes proposals to the Board of Directors.

##### 2. Concerning the Chairman and Chief Executive Officer or the Chief Executive Officer, as the case may be:

- examine, as necessary and, in particular at the time of expiration of the term of office concerned, the renewal of the term of office of the Chairman and Chief Executive Officer, or the terms of office of both the Chairman and of the Chief Executive Officer. It also examines, if necessary, the question of whether or not it is appropriate to continue to combine these duties (or to separate them);
- examine the changes in these duties and provide for solutions for their renewal, where applicable;
- examine periodically developments with regard to the Senior Executive Vice-Presidents, hear the Chairman and Chief Executive Officer (or the Chief Executive Officer) on the needs and the potential proposals for their replacement;
- more generally, ensure that it is kept informed by the Chairman and Chief Executive Officer (or the Chief Executive Officer) of planned changes in Executive Management resources (and, in particular, the Executive Committee)."

### The Remuneration Committee

#### Pursuant to the internal regulations, the purpose of the Remuneration Committee is to:

- examine the performance and all the components of remuneration including share options, or other forms of deferred remuneration, pension plans and, in general, the conditions of employment of the Chairman and Chief Executive Officer or both the Chairman and the Chief Executive Officer as well as the Senior Executive Vice-Presidents and make the corresponding recommendations to the Board of Directors;
- propose, where applicable, the remuneration of the Vice-Chairman or Vice-Chairmen;
- examine the remuneration and retirement policy applied to Executive Management (Executive Committee);
- examine the proposals by Executive Management concerning the granting of share options and other incentive systems related to the share price to other Group employees and propose their granting to the Board of Directors;
- examine and propose to the Board of Directors the allocation of directors' fees among Board members."



# EXECUTIVE MANAGEMENT & EXECUTIVE COMMITTEE



**A • Benoît Potier**  
Chairman and Chief Executive Officer  
Born in 1957 - French

**B • Klaus Schmieder**  
Senior Executive Vice-President  
Born in 1948 - German

**C • Pierre Dufour**  
Senior Executive Vice-President  
Born in 1955 - Canadian

**D • Jean-Pierre Duprieu**  
Senior Vice-President  
Asia-Pacific and Electronics  
Born in 1952 - French

**E • Jean-Marc de Royere**  
Senior Vice-President,  
Healthcare  
Born in 1965 - French

**F • François Darchis**  
Senior Vice-President  
Industrial Merchant,  
Engineering and Construction,  
R&D, Technologies  
Born in 1956 - French

**G • Guy Salzgeber**  
Vice-President  
Director European Industrial  
Business  
Born in 1958 - French

**H • Ron LaBarre**  
Vice-President, Large Industries  
World Business  
Born in 1950 - American

**I • Fabienne Lecorvaisier**  
Vice-President, Finance  
and Administration  
Born in 1962 - French

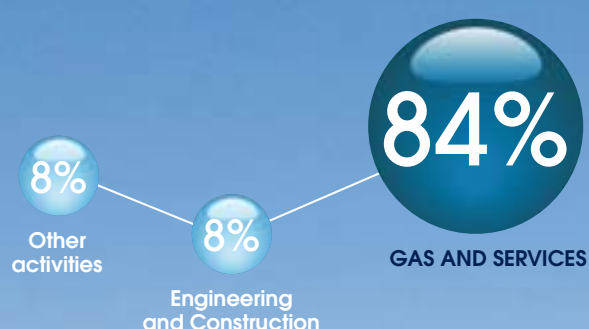
**J • Augustin de Roubin**  
Vice-President, Human  
Resources  
Born in 1953 - French

# AIR LIQUIDE IN FIGURES 2008

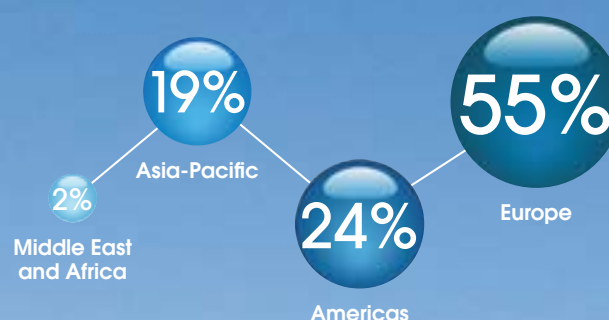
## CONSOLIDATED INCOME STATEMENT (SUMMARIZED)

	In millions of euros
Revenue	13,103.1
Operating income recurring before depreciation and amortization	2,941.8
Operating income recurring	1,949.0
Operating income	1,918.8
Net profit (Group share)	1,220.0
Basic earnings per share (in euros)	4.70
Diluted earnings per share (in euros)	4.67

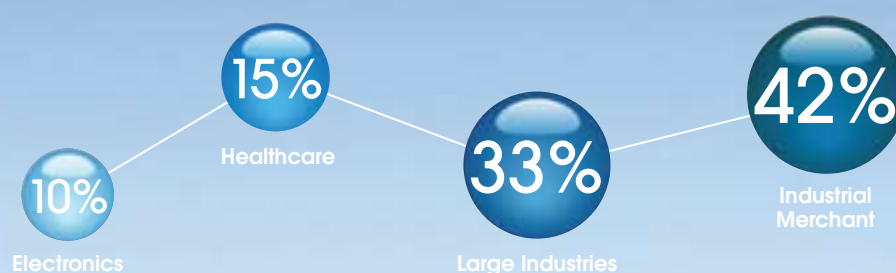
## GROUP REVENUE BY ACTIVITY



## GAS AND SERVICES REVENUE BY GEOGRAPHICAL AREA



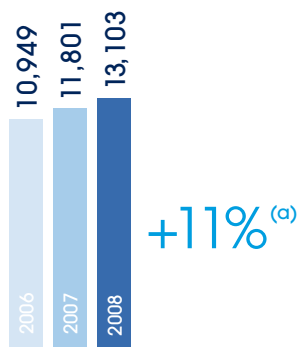
## GAS AND SERVICES REVENUE





**REVENUE**

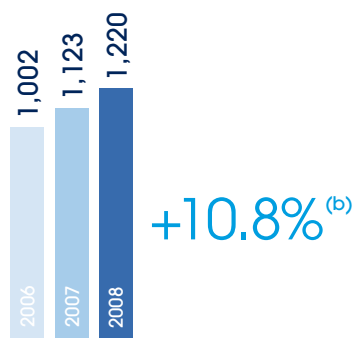
In millions of euros



(a) As published.

**NET PROFIT (GROUP SHARE)**

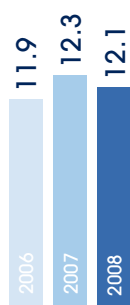
In millions of euros



(b) At constant exchange rates.

**ROCE - Return on capital employed after tax**

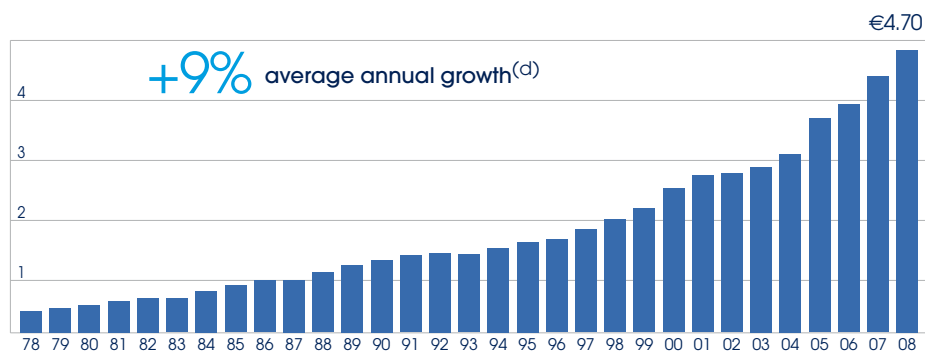
In %

**INDUSTRIAL INVESTMENTS**

2008/2007 % change

**BASIC EARNINGS PER SHARE ADJUSTED<sup>(c)</sup> OVER 30 YEARS**

In euros



(c) Adjusted to account for bonus share allocations and stock split.

(d) The data presented over 30 years were calculated using accounting standards in force at the time.

**DIVIDEND**In euros<sup>(e)</sup>

(e) Proposed to the May 7, 2009 Annual General Meeting.

# STRATEGIC ERA

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**Air Liquide** has pursued a development strategy for many years, one which is based on creating long-term value.

At the beginning of 2008, the Group affirmed its ambition to be the world's recognized leader in industrial, health and environmental gases.

This leadership will stem from the Group's ability to:

- increase its market share in key sectors and geographic regions,
- create and develop new markets thanks to innovative applications based on new technologies,
- ensure high financial performance and a steady return on investment for shareholders,
- assume its social, societal and environmental responsibilities.



TO BE THE  
RECOGNIZED  
LEADER  
IN OUR  
INDUSTRY





# A STRATEGY FOR ACHIEVING AN AMBITION

In order to achieve this ambition, Air Liquide launched the ALMA program at the beginning of 2008. The program will enable the Group to accelerate its growth and improve its competitiveness in the coming years.

## → The Group's main strategic initiatives

- **Building leadership positions** in key markets and expanding its presence in emerging economies.
- **Driving innovation** to offer its customers groundbreaking and competitive solutions.
- **Increasing efficiency** by capitalizing on its expertise in technology, acquisitions and logistics in all the regions where it operates.
- **Developing our talents** to meet the needs of operational units and World Business Lines with competent and motivated teams.

## → Medium-term financial objectives

- Increasing average annual revenue growth to between 8% and 10% through a sustained, selective investment program.
- Reducing costs by 600 million euros.
- Maintaining a profitable return on capital employed (ROCE) after tax between 11% and 12%.

## → Projects that directly improve performance

- The **Growth** project, which concerns the acceleration of development.
- The **Capital** project, which aims to reduce the capital intensity of investments.
- The **Goal** project, which enables continuous efforts in cost containment.

ALMA also includes transformational projects to give all teams the momentum necessary to develop the Group's practices:

- The **Business Models** project, which identifies opportunities for creating value, notably in emerging economies, and optimizes the Group's traditional models.
- The **HR Development** project, which builds up the skills and motivation of the Group's teams.
- The **Integral** project, which improves modes of operation and collective and individual work practices (such as working in project mode and documenting Group policies and sharing them among all employees).
- The **Allegro** project, which enriches the Group's communications with its stakeholders to increase understanding of its activities and strategies, and ensures that the Group's image matches its new ambition.



# 4 STRATEGIC THEMES

## BUILDING LEADERSHIP POSITIONS

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Present in more than 75 countries, Air Liquide constantly demonstrates its ability to meet its customers' diverse needs and to open up new markets.

Throughout 2008, while strengthening its leadership in mature economies, the Group actively pursued its development in emerging economies. Out of 19 unit start-ups launched during the year, 10 were situated in emerging economies (Russia, Bulgaria, China and the Middle East).

The Group's momentum was strong in the Middle East, with the completion of five projects in Kuwait, Qatar, Egypt and Oman, and the acquisition of Pure Helium, an important distributor in the region.

To reinforce its presence in Russia, the Group carried out several other acquisitions there related to the Industrial Merchant World Business Line. These operations followed on the success of Russia's first air separation unit (ASU) outsourcing, undertaken for the steelmaker Severstal.

After the acquisition of Celki in China in 2007, Air Liquide established for the first time a position in the Indian health market by buying Electrocure Systems, a company specializing in medical equipment for respiratory care.

## DRIVING INNOVATION

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Air Liquide relies on its strong capacity for innovation to develop groundbreaking, competitive solutions that enable the transformation of its customers and markets.

The Group works to produce solutions and processes that respect the environment and preserve life. Therapeutic gases are an important area of research for the Group.

The launching of LENOXe™, the first anesthetic based on xenon, has been very well received by the German and French medical communities. The Group is currently introducing the anesthetic in Italy and Spain. The low level of side effects makes it particularly attractive for operating on the elderly or patients with chronic illnesses.

In 2008, Air Liquide was chosen to lead the Horizon Hydrogen Energy (H2E) innovation program, which aims to develop a permanent, competitive hydrogen energy sector in Europe. The program represents a global investment of 200 million euros over seven years.

Finally, joint research programs for developing technologies for clean combustion (using large quantities of oxygen) and for capturing and storing CO<sub>2</sub> were established in Australia, the United States and Europe.

## DELIVERING EFFICIENCY

To improve its efficiency and better manage its costs, Air Liquide is capitalizing on its expertise in technology, procurement and logistics in all the regions where it operates.

The Capital optimization projects involve:

- undertaking design according to set cost objectives ("Design-to-cost") and standardizing principal production units, making it possible to reduce the investment cost of a significant number of upcoming projects by 15 to 20%,
- establishing framework purchasing agreements for the procurement of industrial equipment, resulting in negotiated price reductions as high as 15%,
- redeploying and improving the rotation of certain assets, notably trucks, tanks and cylinders.

The Goal programs are based on three main objectives:

- reducing energy consumption,
- optimizing logistics, in particular by installing telemetry on customers' tanks, and improving industrial and administrative processes,
- pooling and renegotiating principal purchasing contracts.

These projects, deployed across the Group, were complemented and reinforced in 2008 by more than 1,000 local initiatives and the creation of Efficiency Project Managers in 85% of the Group's entities.

## DEVELOPING OUR TALENTS

Recruiting, training, mobility... more competent and motivated teams are and will continue to be one of the foundations of the Group's growth and its leadership.

The Group's growth and its long-term performance require competent and motivated teams. Moreover, in the medium-term and regardless of the economic context, the Group must integrate many employees to support its growth.

It is therefore essential to identify the skills and profiles required and set up the processes necessary to recruit, train and develop all employees' skills.

The creation of Air Liquide University is part of this strategy to promote training and skills development. The University will ensure that the Group's culture is conveyed through its programs and organization. It will also enable employees to share their knowledge and expertise, thus contributing to the Group's performance.



# 5 DRIVERS

## ENERGY

### CONTRIBUTING TO A TRANSFORMATION WITHIN THE ENERGY INDUSTRY

Energy is one of today's main issues. Increases in demand, notably in emerging economies, have accelerated the depletion of fossil resources, which are damaging to the environment when used in large quantities. In this context, it's important to change our methods of producing and consuming energy. Air Liquide has decided to actively contribute to this evolution.

#### → Saving energy

Air Liquide is developing for its customers a large range of solutions, which economize energy resources at different stages of the chain: production, distribution, use. The Group's 18 cogeneration units simultaneously produce steam and electricity, with an energy performance 15-30% higher than that of separate units. Air Liquide also supplies the cryogenic cooling system for the LIPA (Long Island Power Authority) superconductor cable. This cable, the longest and most powerful in the world, transports electricity without losing energy. Inaugurated in the state of New York (USA) in 2008, it can supply up to 300,000 homes with electricity.

The Group also contributes to energy saving measures by producing rare gases (argon, krypton, etc.) used to improve energy efficiency in the housing sector.

#### → Developing new fuels

Hydrogen supplied by the Group allows refiners to treat low-quality oil: a way to make the most of remaining oil resources and those which have yet to be exploited. In addition, Air Liquide is actively involved in the development of new fuels. The Group is working on technologies which will enable the production of second generation biofuels, elaborated using the non-edible part of plants. Air Liquide will construct a pilot unit at the Karlsruhe Institute for Technology (KIT, in Germany) to demonstrate that the industrial production of these biofuels is feasible.

#### → Innovating with alternative energies

For several years, Air Liquide has used its expertise to help develop the energy of the future. These new energy sources are non-polluting or near non-polluting, and the aim is to produce them cheaply and easily. Hydrogen is considered today to be a major alternative to fossil fuels: it can be produced from several sources (natural gas, biomass, water electrolysis). Air Liquide has also reinforced its position as the leading supplier of the photovoltaic industry.

## Gasification: steering toward alternative energies

In today's environment, alternative energy as a means to reduce the dependency on depleting oil resources is essential. Gasification, a process mastered by Air Liquide, is used to transform various natural resources into synthesis gas. This gas is then converted into fuel or chemical products. The Group accompanies its customers during every step of the fabrication process of these products, by supplying technologies tailoring the processes to the procedures and providing either the production units or the gases associated with gasification.



### Gasification: how it works

Synthesis gas can be produced from various carbonated feedstock: natural gas, coal, heavy oil residues (such as asphalt) and biomass, preferably non-edible (wood, straw,

etc.). These energy sources undergo a high-temperature oxidation process – gasification – during which they are converted into synthesis gas (syngas), a mixture of hydrogen and

carbon monoxide. Synthesis gas obtained in this way can be transformed into different products: synthesis hydrocarbons, second generation biofuels, chemical products, etc.



### Expertise along the chain



Since the integration in 2007 of the engineering company Lurgi, a pioneer in gasification technologies, the Group has widely expanded its know-how in this area.

A long-standing leader in supplying oxygen, the gas which is necessary for the oxidation phase of the feedstock, Air Liquide is now also present along every part of the chain. This includes the gasification procedure as well as the purification of the synthesis gas and the adjustment of its composition according to its future application.

Finally, the synthesis gas is converted into different products: synthesis hydrocarbons (using the Fischer-Tropsch procedure), products for the chemical industry (methanol, ammonia) or even second generation biofuels. For several years, the perfect synergy has been demonstrated in South Africa. Both Air Liquide and Lurgi served Sasol, a company from the energy sector. Air Liquide delivered air separation units to provide oxygen, while Lurgi provided the gasification technology used to produce

liquid hydrocarbons from coal. This collaboration can still be seen today in the development of technologies for the advancement of second generation biofuels on the Karlsruhe site in Germany.



## 5 DRIVERS

# ENVIRONMENT

## PRESERVING OUR ATMOSPHERE

The constant rise in worldwide industrial production has brought about mounting energy needs. For the moment, these needs are mostly met by the use of fossil fuels (coal, petroleum, natural gas). Their use leads to many destructive consequences: climate change, respiratory diseases, etc. Actively engaged in sustainable development, Air Liquide invests 60% of its Research and Development (R&D) budget in solutions aiming to preserve the environment and life.

### → Reducing industrial emissions

The Group offers its customers solutions for productive and environmentally friendly industrial processes. For example, the oxygen used in the industrial manufacture of steel or glass reduces CO<sub>2</sub> and nitrogen oxide (NO<sub>x</sub>) emissions and improves the quality of the final products. In addition, the hydrogen supplied by the Group is employed by refiners for the desulfurization of hydrocarbons.

Implementing this procedure eliminates sulphur oxide (SO<sub>x</sub>) emissions, which are produced by burning fuels and are partly responsible for acid rain. This hydrogen reduced SO<sub>x</sub> emissions by 770,000 tonnes in 2008, an amount greater than the total SO<sub>x</sub> emissions for a country with the size of France.

Finally, Air Liquide is developing CO<sub>2</sub> capture and storage technologies as an alternative to it being released into the atmosphere. The Group intervenes across the whole chain (concentration, purification, transport and injection of CO<sub>2</sub> in the subsoil), and more particularly in the development of oxycombustion technologies. Using oxygen instead of air in industrial furnaces produces more concentrated CO<sub>2</sub> emissions, which are easier to capture.

This technique has been successfully adapted to the energy sector, for example in coal-fired power plants. The Group partners on many projects to test the full range of these technologies currently underway at sites across Europe, the United States and Australia.

### → Producing energies that do not pollute

In 2008, Air Liquide confirmed its position as the world-leading supplier to the photovoltaic industry (a continuously growing sector) by signing several industrial gas supply contracts with cell manufacturers, including HelioSphera in Greece and Sunpower in the Philippines.

Air Liquide is involved in the development of hydrogen as a vector of clean energy. The advantage of this energy is that it locally releases only water into the atmosphere. The launch of the H2E (Horizon Hydrogen Energy) project in October 2008 reflects the Group's commitment to developing innovative technologies for the production and storage of hydrogen as well as the industrialization of fuel cells.



## Photovoltaics: a dazzling solution

Scientists have long dreamed of transforming sunlight into energy. Today, this dream is a very real technology. Having grown more than 35% annually for the last five years, the photovoltaic industry has one of the most rapid expansion rates in the world. This phenomenal growth is an outstanding opportunity for Air Liquide.

### A privileged partnership

Transforming the sun's energy into electricity is complex. There are two main processes for manufacturing solar cells.

In the first process, Silicon, which constitutes cells, is purified and then transformed into crystalline-Silicon ingots, which are sliced into wafers. Once exposed to dopant gases to enhance its semiconductor properties and after several chemical processes, these ingots are made into photovoltaic cells.

The second process, called "thin film", consists of placing thin layers of Silicon, capable of receiving and storing photons, on glass.

Both processes fall under Air Liquide's area of expertise, since they require large amounts of ultra pure gases: nitrogen, hydrogen, monosilane, dopants and/or fluorinated gases for cleaning.

To better meet the photovoltaic industry's needs, Air Liquide has developed a number of innovative solutions. Launched in 2006, the ALUX™ offer features turnkey, flexible solutions in gases, equipment and related services. The Group has also set up R&D programs to reduce the cost of the energy produced by photovoltaic cells, and develop more environmentally friendly manufacturing processes.

In 2008, Air Liquide invested more than 60 million euros in on-site generation of carrier gases and in logistics assets to facilitate transportation of speciality gases to customer sites worldwide.

### Brilliant projects

The photovoltaic industry is constantly advancing and developing new innovations. Thanks to strong R&D and customer support programs, Air Liquide has successfully solidified its position as the world leader in gases and services in this emerging sector, which continues to rapidly expand even as it consolidates.

In 2008, Air Liquide strengthened its relationships with solar market leaders, including: Q Cells SE, the number one producer of Solar cells in the world (with sites in Germany and Malaysia); REC Group,

the global leader in Silicon materials production (with sites in Norway, the United States and Singapore); and Sunpower, the industry leader in high-conversion efficiency Solar cells.

The Group also secured around ten major long-term contracts this year, notably in Asia, including ambitious manufacturing projects such as Best Solar and Sunwell-CMC to produce thin film cells in Nanchang, China, and in Taiwan.

More than half of the crystalline-Si solar cell manufacturers, and over

40% of the Thin Film solar cell production fabs worldwide are now Air Liquide customers.



## 5 DRIVERS

# EMERGING ECONOMIES

## GUIDING THE GROWTH OF NEW MARKETS

Emerging economies are most often characterized by industrial expansion coupled with increasing gas needs, within an economy favorable to investment. Whether having established presence in these countries long ago or more recently, the Group projects in the coming years 50% of its investments will take place in these world regions.

### → Growing gas needs

Heavy industries (metallurgy, oil, chemicals, etc.), which drove mature economies' development in the past, are booming in emerging countries today. The result: the market for industrial gases is rapidly expanding in regions such as the Middle East, where Air Liquide recently invested more than 220 million euros.

This dynamic can also be seen in China, where local Large Industries' clients are increasingly outsourcing their gas needs.

Thanks to its ten oxygen and hydrogen production units (started or under construction) in this country, Air Liquide can meet this demand better than ever. Lastly, the Group is working on standardizing its production units. Standardized production units, which are more compact, easily assembled and rapidly delivered to clients, are essential to the local and global growth of Air Liquide's activities.

### → Diversified gas needs

In addition to the Large Industries WBL, emerging economies require gases in other sectors, such as health, automotive, food and beverage, and electronics. Air Liquide provides these sectors with specialty gases, welding gases, carbon dioxide, etc. In Latin America, the Industrial Merchant WBL represents 57% of the Group's revenue there. This WBL is also booming in Central and Eastern Europe. In Asia, the Group also meets the needs of the photovoltaic industry, a rapidly developing sector. It has signed around ten long-term contracts with the region's main thin cell manufacturers. In the health sector, in 2008 the Group acquired Electrocure Systems, an Indian company specializing in medical equipment for respiratory care.



## Expanding in the Middle East

The Middle East is a high potential geographic zone for the Group. Stimulated by oil revenue, the region's economies have double figure growth rates and increasing industrial gas needs.



### A booming market

The Group has been in Lebanon since 1928, and it has reinforced its presence in the Middle East especially during the first decade of the 21<sup>st</sup> century.

Air Liquide is now present in Egypt (since 2002), Qatar (2004), Oman (2005), Kuwait (2006), Saudi Arabia and the United Arab Emirates (2008), where the Group set up its Middle East headquarters. These entities comprise more than 400 employees.

The region's industrial gas market has an annual growth rate of more than 20% as a result of the increasing gas demands of industrial sectors, notably oil, chemicals, metallurgy and food.

Despite this potential, the region only represents a small portion of the Group's global revenue. The Middle East is therefore one of the geographic zones slated for strategic development by the ALMA program.

### A wealth of projects

Air Liquide has already invested 220 million euros in the Middle East over the last five years, establishing the Group's influence and supporting its customers' growth in the region's main industrial sites.

In 2008, Air Liquide acquired Pure Helium, a leading international supplier of helium and argon located in Dubai (United Arab Emirates) and present in Saudi Arabia, Egypt and India.

The Group's subsidiaries also signed contracts with key local industrial companies. Shuaiba Oxygen, a Kuwaiti Air Liquide subsidiary, has been supplying a major new petrochemical site with oxygen, nitrogen and compressed air. This Kuwaiti production unit also produces argon distributed throughout the Arabian Peninsula to meet the welding industry's high gas needs.

GASAL, an Air Liquide subsidiary in Qatar, put two new air separation units in operation in July 2008. The first unit, located at Ras Laffan, a coastal city, will supply a petrochemical production unit. The second, situated in the industrial park of Mesaleed, will supply the Qatar Steel mill with oxygen and four other clients with nitrogen by pipeline.

ALSIG, an Omani subsidiary of the Group, launched two new production units in 2008, one at Muscat for a refinery, and another at Sohar for Oman Aromatics, a chemicals customer. Air Liquide now has long-term contracts to supply five companies on the port of Sohar via pipeline.

Finally, in rapidly expanding Egypt, a new CO<sub>2</sub> production unit was put into place at Aboukir to meet the needs of the fast growing carbonated beverage market.



## 5 DRIVERS

# HEALTH

### IMPROVING THE QUALITY OF LIFE

Industrialized countries are seeing aging populations and an accompanying desire for improved quality of life. This has led to an increase in demand for Group products and medical services. The field of health thus provides strong growth opportunities for Air Liquide. In hospitals and at home, more and more patients benefit from the wide range of Group services.

#### → In hospitals: controlled, adapted therapies

Today's European leader, the Group's Healthcare WBL is expanding on the American, African and Australian continents, and more recently in Asia. In both mature and emerging economies, the market is experiencing strong growth. Air Liquide supports this demand by providing the world's hospitals with medical gases, hygiene products and related medical equipment. These products ensure that medical procedures go smoothly, especially in the sensitive areas that are the operating rooms, emergency care and intensive care units. Gases are used, for example, for anesthesia, assisted ventilation and easing certain pains. Air Liquide is spearheading the fight against nosocomial infections, conducting highly effective research to develop targeted products for the skin, hands, instruments and surfaces.

#### → At home: better living each day

First used in Europe in the 1980s, homecare offers a better quality of life to patients suffering from chronic illnesses, especially respiratory diseases. Less expensive for communities, homecare has rapidly developed since then. Strongly positioned in the homecare market, the Group is constantly expanding its activity in the sector by developing new services and making acquisitions.

#### → Research and Development

In addition, the Group is continuing its research efforts in gases, more efficient medical equipment, specific packaging for gases, and new solutions to combat the risk of infection. In partnership with renowned doctors, Air Liquide is studying new medical applications for gases.

## Pro'Inspire: side by side with COPD patients

According to the World Health Organization, chronic obstructive pulmonary disease (COPD) will be the third leading cause of death worldwide by 2020. Orkyn', Air Liquide's French subsidiary specializing in homecare, innovates and now offers the first ever homecare for COPD patients. The results: better quality of life for patients and less expensive care management for the community.



### COPD: an illness on the rise

Better known as "smoker's cough," COPD will become one of the world's largest epidemics in the next few years. It is caused not only by tobacco smoke and air pollution, but also by population aging, since the disease arises more frequently with age.

For the last 20 years, the number of COPD patients has steadily increased. Today, COPD affects more than 44 million people globally, including 10% of western countries' adult population. This incurable disease prevents normal breathing and blocks the flow of oxygen to the body. Patients are quickly prescribed an oxygen therapy, a long-term treatment that is indispensable for survival.

Less than one COPD patient out of two, however, adheres to his/her oxygen therapy.

To support these patients and help them follow their treatment plans, Air Liquide developed the Pro'Inspire program, a complete homecare. For the Group, the benefits are twofold. By offering a care management system outside the hospital, Air Liquide enables patients to benefit from a better quality of life, while at the same time reducing costs for the community.

Pro'Inspire has seven priorities: encouraging patients to observe treatment plans, motivating them to engage in physical activity, educating them to recognize the signs of COPD aggravation, giving them information on atmospheric pollution, monitoring their medication and weight, and providing them with personal assistance to stop smoking.

The program is based on the permanent commitment of the Group's dedicated teams—medical directors, pharmacists, nurses, dieticians and medical technology consultants. Their objective is to ensure that patients scrupulously follow their medical treatment in order to improve their living conditions, increase their autonomy and reduce their risk of hospitalization.

Because a more positive treatment experience enables patients to continue to enjoy life, Air Liquide is committed to serving COPD patients through this ambitious program.



## 5 DRIVERS

# HIGH-TECH

### PUSHING THE FRONT LINE OF PROGRESS

Developing more and more specialized technologies fulfills two objectives: it improves everyday life via more powerful, compact technologies that cost less; and it drives scientific progress and knowledge advancement. Air Liquide has joined forces with researchers and scientists to create innovative solutions to meet these objectives.

#### → Developing cutting-edge technologies

The Group is working with the electronics industry to manufacture increasingly powerful, tiny chips. It has produced a range of new molecules called “advanced precursors,” custom-made for semiconductor manufacturers’ new industrial processes. To meet their specific needs, Air Liquide has also developed specific implementation and transportation equipment, ensuring the correct use of these products. Using its expertise, Air Liquide is developing state-of-the-art gas processing technologies to advance its business and serve new needs. Its developments in hydrogen energy are proof of this commitment. The Group’s engineers, for example, are designing high-pressure hydrogen distribution stations. Highly technical, these are the highest performing stations available today and have been selected by several automotive manufacturers. The Group is thus helping create technologies that shape our daily lives, or will do in the very near future.

#### → Driving science forward

Gas offers infinite possibilities in every form. For many years, the Group, via its Advanced Technologies activities, has contributed to major European space and scientific programs with its expertise in very low temperature cryogenics systems (using liquid or superfluid helium). Air Liquide has created cooling systems reaching temperatures close to absolute zero for the Herschel and Planck space telescopes, which will be jointly launched by Ariane 5 in 2009. Managed by the European Space Agency (ESA), the Herschel and Planck missions’ objective is to better understand the universe’s formation and evolution from the Big Bang to the present day, specifically by detecting the oldest radiation emitted by the Universe. In theoretical research, the Group’s expertise in superfluid helium significantly contributed to the construction of the LHC (Large Hadron Collider), the new particle accelerator of the CERN (European Organization for Nuclear Research). Emitted in 2008, the first particle beam already represents a decisive step forward in the project.

## Hydrogen energy: on the road to sustainable transportation

Faced with the planet's growing energy needs, the forecast exhaustion of fossil fuels and these fuels' environmental impact, developing alternative energies is necessary. In this context, hydrogen is a particularly promising energy carrier, especially for the transportation sector.

### Steering a course for tomorrow

Fuel cells generate electricity from a reaction between hydrogen and the oxygen in the air. It makes possible today what was only a utopia yesterday: clean energy that emits only water.

The last few years have witnessed spectacular advances in this field. Significant progress still needs to be made, however, before attractively priced fuel cell vehicles can be marketed to meet public demand. Besides, a large-scale hydrogen infrastructure needs to be developed for supplying these future vehicles, and a regulatory framework adapted to hydrogen energy applications needs to be deployed.

Because of its hydrogen expertise, Air Liquide has committed itself to hydrogen energy development for many years.

### H2E: leading the way

Air Liquide is going to lead the Horizon Hydrogen Energy (H2E) program, which aims to build sustainable and competitive hydrogen energy solutions. In some European markets, hydrogen and fuel cells already meet certain energy needs, such as those of captive vehicle fleets, portable generators or emergency energy supplies.

Financed by OSEO (French agency for innovation support), H2E introduces innovative technologies into the heart of society. This ambitious program partners Air Liquide with 20 leaders from the hydrogen field, including SMEs, industrial groups and public laboratories. It will continue until 2015, the forecast release date for the first commercial hydrogen vehicles.

### Air Liquide's prime position

Air Liquide is mobilizing its teams to devise critical innovations in all aspects of the hydrogen energy field: hydrogen production, storage, distribution and fuel cells.

The Group has already set up almost 40 hydrogen distribution stations around the world, where drivers can fill up their hydrogen vehicles. These innovative stations store hydrogen at extremely high pressures (up to 700 bar) and feature rapid fill up speeds (less than five minutes), all while maintaining security and ease as with a classic fuel.



FOR MORE INFORMATION ON THE GROUP'S HYDROGEN ENERGY ACTIVITIES: [WWW.PLANETE-HYDROGENE.COM](http://WWW.PLANETE-HYDROGENE.COM)



# ERA

OF SUSTAINED  
PERFORMANCE  
FOR OUR  
SHAREHOLDERS

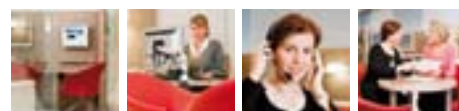


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**Since its founding** in 1902, Air Liquide has enjoyed successful growth thanks to its relationship with individual shareholders and institutional investors based on mutual trust. Individual shareholders represent the majority of Air Liquide's equity and today hold 38% of the company's capital. This is close to four times greater than the average for other CAC 40 companies.

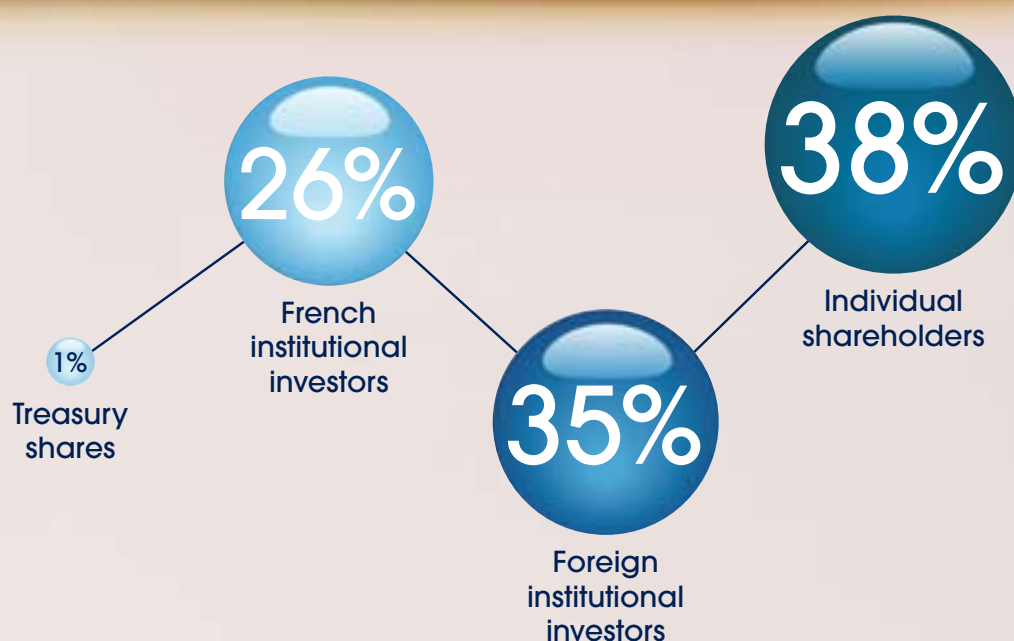
In order to highlight the close and lasting relationship maintained with its shareholders, Air Liquide has officially stated its commitment in the Shareholders' Charter. It is based on four fundamental values:

- demonstrating consideration and respect for all shareholders,
- offering return on, and increasing the value of, your investment over the long term,
- listening to you and keeping you informed,
- providing personalized services through Shareholder Services.



# SHARE OWNERSHIP

AS AT DECEMBER 31, 2008



Air Liquide's **410,000 individual shareholders** represent 38% of the total capital. At the end of 2008, the average individual shareholder portfolio was 214 shares. Among individual shareholders, Air Liquide employees hold 1% of the capital.

No single shareholder holds more than 3.5% of the capital, and the first 10 shareholders hold on average a little less than 2% of the capital.

The loyalty bonus (an additional 10% on dividends and bonus share distribution after two calendar years) and the services provided have made it possible to increase the number of registered shareholders to **152,000** at the end of 2008. New requests for intermediary registered shares have risen by **over 13%** in one year. It's a real sign of growing confidence.

Registered shares account for **33%** of capital, while bearer shares account for **67%**.

# AIR LIQUIDE OUT-PERFORMS THE CAC 40

AS AT DECEMBER 31, 2008

% CHANGE OVER 10 YEARS

CAC 40: **-18%**

Air Liquide: **+38%**

% CHANGE OVER 5 YEARS

CAC 40: **-10%**

Air Liquide: **+24%**

% CHANGE OVER ONE YEAR

CAC 40: **-43%**

Air Liquide: **-29%**

## Which dividend paid in 2009?

A dividend of

**€2.25**

per share proposed at the 2009 General Meeting for the 2008 fiscal year, an increase of 10.3%<sup>(a)</sup> over one year

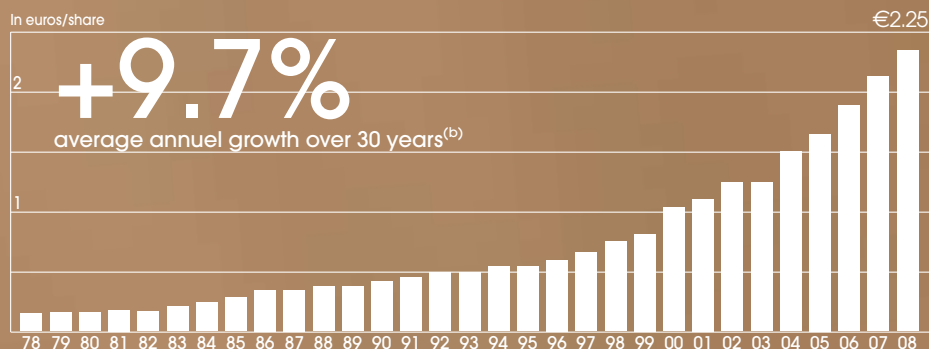
(a) Adjusted to account for the June 2008 allocation of bonus shares.

A distribution of

**49%**

of net profit

## Dividends: 30 years of long-term profitability<sup>(a)</sup>



(a) Adjusted to account for the allocation of bonus shares and the share par value split by two.

(b) Data calculated over 30 years according to current accounting standards.

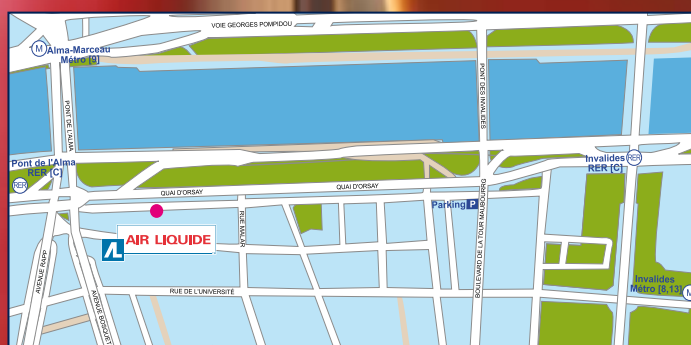
# A SPACE ENTIRELY RESERVED FOR SHAREHOLDERS

IMAGINE A COMFORTABLE LOUNGE,  
A FRIENDLY PLACE WHERE YOU CAN  
FIND ANSWERS TO ALL YOUR QUESTIONS.

This is our Shareholders Reception Lounge, conveniently located in downtown Paris.

This facility dedicated to information and exchange is all yours. You can visit and meet us whenever you like, with or without an appointment. Our team of Air Liquide Advisors is at your service to help you and answer all of your questions.

In an inviting and elegant lounge, you can read information about the Group, or leaf through the financial and wealth management publications. If you prefer, use the Internet workstations at your disposal to manage your account, explore the Group's website, or expand your knowledge of our activities.



To come and see us:

**Shareholders  
Reception Lounge  
Air Liquide**

75, quai d'Orsay  
Paris 7<sup>th</sup> Arrondissement  
Open Monday through  
Friday from 9:00 am  
to 6:00 pm (GMT+1)

Access:

- By commuter train – RER C  
Pont de l'Alma station
- By metro – Invalides  
or Alma-Marceau stations
- By bus – nos. 42, 63, 80,  
or 92, Bosquet-Rapp stop
- By car – pay parking  
La Tour-Maubourg



# ADVISORS AVAILABLE DAILY

**THE MAIN GOAL OF AIR LIQUIDE'S  
SHAREHOLDER SERVICES IS TO SIMPLIFY  
YOUR LIFE.**

Our Advisors provide personalized information adapted to your concerns and questions, be they about the Group, the stock market in general: forms of shareholding, taxation, inheritance, etc.

We're here for you! An ever-growing number of you contact us every day. In 2008, Air Liquide's Shareholder Services received 170,000 telephone inquiries and over 8,000 emails. Over 90,000 hits have been recorded for the Shareholders section of the website, and the Shareholders Reception Lounge has received close to 1,500 visits.

Air Liquide is one of a select few listed companies that manages its own shareholder relations without relying on a third party; in particular it maintains accounts for direct registered shares.

You can also take advantage of personalized assistance by meeting one of our Advisors, or by contacting us through our online form or by telephone.

## To contact us



### Shareholder Services

75, quai d'Orsay  
75321 Paris Cedex 07  
France



Telephone:

**+33 (0) 1 57 05 02 26**

or from France:

**N° Vert 0 800 166 179**



Write to us directly at:

**<http://contact.shareholders.airliquide.com>**

or from the Shareholders section on our website  
**[www.airliquide.com](http://www.airliquide.com)**

# REGISTERED SHARES

## TAKE ADVANTAGE OF THE FACT THAT WE KNOW YOU!

By becoming a registered shareholder, our relationship becomes mutually **advantageous**:

- **you** benefit from the loyalty bonus, and you receive information on the Group directly from us,
- **we** benefit by getting to know you better and forming a close relationship based on trust.

### Direct registered shares offer many advantages.

By following in the footsteps of 56,000 of our shareholders and opting for direct registered shares, your shares will be kept under your name in Air Liquide's registry. You can then manage your Air Liquide shares exclusively through our Shareholder Services and you benefit from free handling and management fees.

### Intermediary registered shares are an ideal solution.

You benefit from the loyalty bonus once you have held registered shares for two years, thus increasing both your dividends and your bonus shares allocations by 10%. By opting for intermediary registered shares, you don't have to change your routines. You keep the same securities account or the same PEA (the French stock savings plan).

## ENJOYING THE ADVANTAGES OF INTERMEDIARY REGISTERED SHARES IS SIMPLE

**If you aren't yet an Air Liquide shareholder**, you can place a purchase order through your bank and, at the same time, submit your "Intermediary registered share transfer request" available on the Group's website.

**If you are already an Air Liquide bearer shareholder**, send your form directly to your bank.

**In both cases**, your bank will transmit your registration request to Air Liquide while continuing to manage your account. The transfer and handling fees for stock held as intermediary registered shares can vary from one bank to another. Ask your regular advisor for more information.



# TO BENEFIT FROM THE LOYALTY BONUS, OPT FOR REGISTERED SHARES!

Your Air Liquide shares are managed  
**by your bank**



Your shares are part of  
a securities account or a PEA



you hold

**bearer shares**  
(by default)



... And you don't benefit from  
the loyalty bonus.

Your Air Liquide shares are managed  
**by Air Liquide**



Your shares can only be placed in a  
securities account; under no condi-  
tions may they be included in a PEA



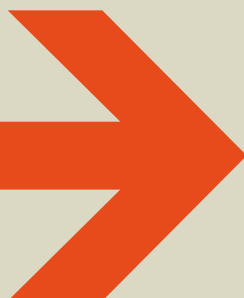
you hold

**direct registered  
shares**



... And you can take advantage  
of the loyalty bonus!

To benefit from  
the loyalty bonus  
and also keep  
your shares  
at your bank, a simple  
and easy solution...



Become an  
**intermediary  
registered  
shareholder.**

The amount of your dividend and the number  
of bonus shares allocations are increased by  
10% after two calendar years. You will receive  
information directly from Air Liquide.



**In your opinion, what makes Air Liquide a long-term investment proposition?**

The industrial gas business has an attractive global supply structure for investors. Additionally, an increasing number of innovations in the application of gases – such as their use in solar cells – are driving long-term growth prospects.

**Do you believe that the Group's development approach is sustainable?**

Yes. For the potential investor, one of the most important factors when placing an investment is seeing the money grow, so a dividend that is on its way up will always be attractive. And, if you look at the growth in its dividend as an indication of Air Liquide's success, there is every reason to believe that this will continue.

**From your point of view, what are the global trends that should provide the Group with the most long-term growth potential?**

Perhaps the most powerful factor driving potential growth for the industry will be global emissions legislation. Governments around the world are actively looking for ways to lower their emissions and meet national and international targets. Gas companies like Air Liquide are extremely well placed to capitalize on this situation thanks to their ability to provide the critical technologies that can make real improvements to the efficiency of industrial processes. Also, gases play a key role in the ongoing growth and development of advanced technology industries such as electronics. As companies develop and manufacture increasingly sophisticated products and devices, they require ever more advanced processes and materials, along with the increased support of industrial gas companies for their manufacturing.

**John Longhurst**

Global Chemicals Analyst, Capital Group International

*At Air Liquide, the economic dimension of sustainable development is focused first and foremost on the company's responsibility to its shareholders. Consideration, remuneration and availability are key elements in the Group's relation with its shareholders.*



**SUSTAINABLE DEVELOPMENT  
IN QUESTION**





### Why did you choose Air Liquide shares for your portfolio?

Air Liquide shares are an investment for the long term. I inherited shares that I've kept and added to over the years. I hope to pass them on to my children and grandchildren so they can benefit, too.

### How would you describe Air Liquide's relationship with its individual shareholders?

It's a relationship of trust. Benoît Potier, Chairman and CEO of the Group, is actively involved in increasing the number of individual shareholders. 2008 was a tough year for every company. Despite that, the percentage of Air Liquide's capital held by individual shareholders increased by 1%. That's really encouraging information. Moreover, the opening of a friendly welcome place for individual shareholders at the company's head office is a great initiative. To my knowledge, Air Liquide is one of the only companies to offer such a service.

### Sustainable Development is essential for Air Liquide. Is it also important for shareholders?

As shareholders, we actively support the Group's Sustainable Development approach. What will happen to the planet if we refuse to act now? The development of hydrogen fuel cells is just one example among many of this commitment.

### In your opinion, what makes Air Liquide a secure investment for the future?

Air Liquide's products are indispensable to most industrial manufacturers. Sales of these products are continually on the rise, which should guarantee the Group's ability to get through difficult times. Air Liquide's international presence, in both mature and emerging economies, is another indicator of stability.

### Marc Serre

Individual shareholder

*In the last 10 years, the growth in value of a portfolio of Air Liquide shares has been +8.1% a year on average, including gross reinvested dividends, bonus shares and loyalty bonuses granted to registered shareholders. The Group's objective is to follow this long-term and transparent policy of comprehensive remuneration for shareholders in order to ensure regular growth in the value of their investment.*

READ THE ENTIRE SUSTAINABLE DEVELOPMENT REPORT  
IN THE REFERENCE DOCUMENT.

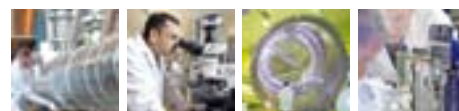
# ERA

OF ACCELERATED  
INNOV  
ATION

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**For over 100 years,** Air Liquide has made innovation central to its strategy. The Group develops cutting-edge solutions to meet environmental and energy challenges, the technologies of tomorrow to keep pace with our evolving lifestyles, and the expertise of tomorrow to broaden our knowledge of matter and the Universe.

Since gas applications for industry, health and the environment have unlimited uses, the Group has made innovation one of its fundamental values. Its goal: shape tomorrow's world.



# RESEARCH AND DEVELOPMENT

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## INNOVATION: THE PRODUCT OF MULTIPLE TALENTS

Within the Group, 1,000 researchers of over 30 nationalities combine their varied skills to create the innovations of tomorrow. These men and women design cutting-edge solutions for the environment and health sectors, as well as for communications technologies. Each day, they not only contribute to accelerating the Group's growth and optimize its industrial practices, but they also shape the world of tomorrow.

### → For a healthier life

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In the health sector, Air Liquide works to develop new solutions to care for patients and give them a true sense of well-being. Aerosol therapy considerably improves their daily lives: they breathe more easily and suffer less. The results of research on these new medical gases are used in hospitals and at home. Air Liquide is also committed to quality nourishment, essential to everyone's well-being. To this end, for example, Air Liquide develops new technologies to improve food-freezing processes.

### → A communicating world

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Cutting-edge technologies are now essential to provide fluid communication to the world. To help design the necessary technology in this industry, the Group's Research and Development teams use and perfect solutions developed for the semi-conductor industry (advanced precursor molecules, ultra pure specialty gases and carrier gases). Their field of research is vast: these specialists work to optimize flat screen monitor manufacturing, improve the performance of optic fibers used in telecommunications, and develop innovative solutions for the photovoltaic industry.

### → Towards a sustainable environment

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Putting innovation to use for the environment is a central priority for Air Liquide, expressed in a variety of fields. Within its production units, the Group has developed several process control tools aimed at lowering energy consumption. Technologies for CO<sub>2</sub> capture and storage are being developed, thus providing an alternative to CO<sub>2</sub> dispersal into the atmosphere and reducing industrial emissions. Furthermore, Air Liquide considers the challenge of energy as a top-priority task. The goal: offer new energies, notably through the development of hydrogen energy and second generation biofuels.

- **€224 million Innovation budget**
- **8 Research Centers**
- **2,640 patented inventions**
- **100 industrial partnerships**
- **120 partnerships with universities and research institutes**



## BUILDING TOMORROW

In 2008, the Group continued its efforts to design and produce ever more efficient and environmentally friendly innovative solutions.

### → The story continues

For a long time, Air Liquide has considered innovation to be a pillar of its sustainable growth. In January 2008, the Group celebrated the 50th anniversary of its Technical Center for Welding Activities (CTAS – Centre Technique des Applications du Soudage), a major center of innovation located in Saint-Ouen-L'Aumône (France).

Committed to the development of environmentally friendly industrial solutions, the Group has also implemented a structure dedicated to the major pilot projects and experiments in this sector. These help demonstrate the technical and financial feasibility of new processes.

### → Partnerships for purer air

In 2008, as one of the leaders of the ULCOS (Ultra Low CO<sub>2</sub> Steelmaking) project, along with the foremost European steelmaker, Air Liquide continued a large-scale experiment in Sweden that began in 2007. The project involves testing a pilot plant for the separation of CO<sub>2</sub> from smokestack gases, a process that avoids their atmospheric dispersal (for example, by stocking them underground).

The Group is also continuing its work on the oxycombustion process that aims to replace the air in industrial furnaces with oxygen. The goals: obtaining more effective combustion and generating less polluting emissions, while facilitating the separation of CO<sub>2</sub>. Air Liquide is testing this process in partnership with Callide Oxyfuel Services (Australia) and Total (France). Moreover, the Group has teamed with the American SME Nitrocision to develop the Nitrojet™ solution: a cleaning system that uses high-pressure liquid nitrogen, cleaning any surface without producing effluents. This innovative process notably allows for the “clean” dismantling of nuclear power plants. In addition, the Group reaffirmed its will to support small and medium-size enterprises by signing the Pacte PME in January 2008. This pact, launched by the French innovation agency OSEO and supported by the French government, aims to promote strong relationships between small structures and large companies.

## Inhalation therapy, a second wind for research

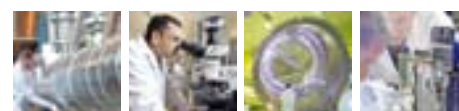
To Air Liquide, innovation also means contributing to people's well-being. The Group therefore supports CIMIT (Center for Integration of Medicine and Innovative Technology) research into inhalation therapy.

### A treatment of the future

A major stake today, the development of inhalation therapies gives hope to many individuals suffering from respiratory diseases. Involving the administration of drugs in gaseous form, these therapies allow patients to breathe more easily while reducing their pain, in addition to helping patients recover more rapidly after surgery. Used in hospitals, they may also be employed at home, promising a real improvement in the daily lives of patients.

### Common values

A non-profit group located in Boston (United States), CIMIT comprises clinicians, scientists, and engineers. Together, they envision innovative technological solutions with direct medical applications to improve patients' quality of life – a concern shared by Air Liquide, a forerunner in the respiratory care market. The Group has thus committed to furthering CIMIT's goals and will lend support to its new research program on inhalation therapy to the tune of 1.5 million dollars.



# ADVANCED TECHNOLOGIES

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## A STEP AHEAD

At the core of innovation, Advanced Technologies teams respond to one of Air Liquide's fundamental values: the development of future technologies. The Group offers a wide variety of expertise and solutions in several advanced fields, from cryogenics and space to environmental protection and new energies.

### → Technology solutions for new markets

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800 employees in Europe, North America, and Asia work within the Advanced Technologies activities. The teams within the division develop a large array of high value-added technologies, and they contribute to the opening of new markets.

Located in Newport, Delaware (United States), Meda develops polymer membranes for gas separation used in the inerting of aircraft fuel tanks, hydrogen purification, and the treatment of gases from wastes.

American Combustion, in Atlanta (United States), offers innovative oxycombustion solutions making metallurgy processes more efficient.

Axane, in Sassenage (France), holds the Group's knowledge and know-how in hydrogen fuel cells. The Advanced Technologies Division (located in France, China, and Japan) designs and produces systems for a number of applications: very low-temperature cryogenics used for hydrogen and helium liquefaction, the production and analysis of ultra pure gases for electronics, production of oxygen and nitrogen aboard aircrafts to enhance their safety, and filling stations for high-pressure hydrogen vehicles.

### → Projects for the future

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Each new project gives shape to the future and opens new development opportunities to Air Liquide. In 2008, the Group provided the cooling system necessary for the longest and most powerful superconductor cable in the world. This cable was connected to the commercial power grid of Holbrook, New York (United States) by the LIPA (Long Island Power Authority) and American Superconductor. This project anticipates the potential advances in energy distribution networks.

In the framework of the PAN-H program (Plan d'Action National sur l'Hydrogène), launched in France by the Agence Nationale de la Recherche, Air Liquide is leading the EolHY project, which will provide, along with hydrogen production, uninterrupted electricity from renewable energy sources and a fuel cell. Involved in the hydrogen energy field for many years, the Group plans and participates in several demonstration programs. In 2008, an Axane fuel cell powering a Bouygues Telecom relay antenna (Balises PAN-H project) logged a record 10,000 hours of continuous functioning without any intervention.

## Air Liquide and CERN: a world premiere

October 21, 2008: a little over a month after a successful first trial, the Large Hadron Collider (LHC), the new particle accelerator of the CERN (the European Organization for Nuclear Research, located in Geneva, Switzerland), was inaugurated by CERN member state representatives. From the outset, Air Liquide has been actively involved in this unprecedented scientific enterprise.

### The most complex scientific instrument ever constructed

The LHC is the world's biggest and most complex scientific instrument. A 27-kilometer ring, the particle accelerator counts 1,700 superconducting magnets that produce magnetic fields 100,000 times more powerful than that of the Earth.

The accelerator was designed to further our knowledge of particle physics and unlock some of the biggest mysteries of basic physics, including the origin of matter, the Big Bang theory, and perhaps the

detection of certain elementary particles never before observed, like the famous Higgs boson.

Air Liquide has participated in this exceptional project since 1995, developing and installing a unique liquid helium distribution and cooling system for this extraordinary scientific instrument.

### A series of challenges

The monumental size and expected performance level of the LHC presented several challenges that Air Liquide teams met with success.

A challenge in the first place technological, requiring the distribution of 100 tonnes of superfluid helium over a distance of 27 kilometers and at the extreme temperature of 1.8 K, or  $-271^{\circ}\text{C}$ , close to absolute zero.

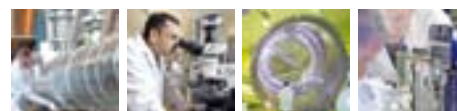
To perform this task, Air Liquide developed the world's longest and most complex cryogenic distribution line.

Secondly, the project represented a real industrial challenge for the Group. The cryogenic mechanism

included 300 connections to the LHC's electromagnets and over 3,000 parts produced in four different European countries.

Lastly, the project constituted a complicated human challenge. Around one hundred Air Liquide employees with twelve different work specialties were mobilized over the period of a decade.

The final assembly was in itself a grand feat as it took place 100 meters underground, with the only entrances spread three kilometers apart.



**Why is innovation for tomorrow one of the four pillars of the Group's sustainable development strategy?**

Air Liquide's strategy aims to develop innovative solutions to answer its clients' present and future needs. In the long run, it's essential to identify and anticipate tomorrow's needs in order to develop long-term solutions.

**What motivated you to choose the number of international patents registered each year as the Group's innovation indicator?**

This indicator reflects the Group's strategy which relies on technological innovation, the source of future growth in mature economies, and new developments in emerging economies.

**How would you describe the Group's performance in patent registration?**

Increased investments in innovation and a proactive intellectual property policy that protects inventions from their earliest stages have led to our performance in this area. Thanks to our unique and innovative products, the Group has also gained a loyal client base.

**Can you cite a recently registered patent that makes an important contribution to sustainable development?**

The Universal Plasma Abatement System (UPAS) is an undeniably prominent invention. It meets environmental challenges posed by the semiconductor industry, where production methods require the use of gases that can harm the environment. Thanks to this plasma-based technology which destroys these gases, the environmental impact in this process is now under control.

**Thierry Sueur**

Vice-President, Intellectual Property, Air Liquide

*The Group applies itself to disseminating innovations within the Group and recognizing innovators. Over the 2005-2009 period, and in the largest number of areas, it aims to file over 500 new patents, valid directly in the Group's four main zones of operations: Europe, the United States, Japan and China.*



**SUSTAINABLE DEVELOPMENT  
IN QUESTION**





**What could oxycombustion bring to the energy sector to facilitate CO<sub>2</sub> capture and storage and hence mitigate greenhouse gas emissions?**

Oxycombustion would allow the electric power generation industry the ability to use coal resources in a clean and efficient way, with more concentrated emissions of CO<sub>2</sub>, a greenhouse gas, which are more easily captured and then stored. It would deliver high performance technology at low cost.

**In Ohio (United States), Air Liquide and Babcock & Wilcox have worked together to demonstrate the retrofit of your 30 MWth Clean Energy Development Facility (CEDF) to coal oxycombustion. What have you learned from this demonstration?**

We learned how to admit, control, mix, and use oxygen in a very safe way. We have gained knowledge about heat transfer and thermo-dynamic fluid flow and about the physical design parameters necessary for our work. We also now understand the operating procedures that will help us develop the large-scale control methodology.

**What are the next steps for coal oxycombustion towards full industrialization of commercial power plants? What would be the timing of a decrease in emissions?**

The next step is to perform a demonstration project that would set up the integrated technology on the larger scale of 300 MWth. In that way, the industry could feel, see, review, and understand the functioning of the technology. It will take us about six years to get such a demonstration plant up and running. We should be able to offer a commercial plant for sale in six to eight years.

**Don Langley**

Vice President and Chief Technology Officer,  
The Babcock & Wilcox Company

*Air Liquide constantly strives to better control its energy consumption and to limit its environmental impact. At constant scope, the Group aims to reduce by at least 400 GWh within five years (2005 to 2009) the Group's annual world consumption of electrical energy by air separation unit.*

READ THE ENTIRE SUSTAINABLE DEVELOPMENT REPORT  
IN THE REFERENCE DOCUMENT.



# ERA

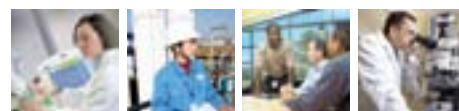
OF SHARING  
DIVERSITY



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**Around the world,** 43,000 employees lend their skills and motivation to Air Liquide. Their specialized knowledge is essential to guide the growth of Group activities.

Employee management thus plays a fundamental role in putting Air Liquide's strategy into practice. Instilling the Group's values and commitments, recruiting and maintaining skills adapted to current needs and future growth, providing employees with a continually safe, stimulating, and satisfying work environment – these are the Group's goals.



# GOLDEN RULES AND SPECIALIZED TOOLS

## A STRONG AND CONSISTENT STRATEGY

### Golden rules

In the countries in which it is present, the Group continually ensures that its employees benefit from standard and unified principles that are in line with its operational practices.

To this end, several “golden rules of Human Resources” summarize its HR policy principles and a set of tools is made available to all managers.

#### THE EIGHT GOLDEN RULES OF HUMAN RESOURCES

- Provide a safe and ethical work environment,
- Select the right people and assign them to the right positions,
- Encourage diversity,
- Measure performance against consistent standards,
- Develop people based on a long-term vision,
- Identify, develop and recognize expertise,
- Regularly train people to improve our performance,
- Pay for performance and contributions.

### Specialized tools

The golden rules set the principles of conduct for the management of human resources within the Group. A set of tools has been made available to managers in all operations and subsidiaries to assist them in:

- applying these principles in total fairness (for example, using the Career Interview, the Performance and Evaluation Interview, the Post Classification system ensuring fair salaries within Air Liquide, etc.),
- managing human resources in compliance with Group strategy (for example, Medium Term Resource Distribution, the Know-AL knowledge exchange program, etc.).

### Precise performance indicators

Lastly, indicators help measure progress in our action plans. Each golden rule is associated with a series of indicators: number of accidents, diversity objectives, number of annual evaluation interviews, number of local specialists, number of days in training, etc.

#### CULTIVATING DIVERSITY

With 43,000 employees spread over 75 countries, Air Liquide has made cultural diversity an asset. The Group pursues all forms of diversity: gender, cultural, ethnic, and professional diversity. To maintain this richness, the Group ensures a high level of ethics, encourages social dialogue, and favors career management on a global level.

### A guide to HR strategy

Air Liquide has drafted a guide for Human Resources Managers and Professionals. Available in all of our entities around the world, the booklet provides a clear and unified vision of Group principles, individual responsibilities, and key performance indicators used to apply our HR strategy.

## LONG-TERM SUPPORT FOR OUR EMPLOYEES

"In 1993, I stated on my resumé that my main professional goal was to build a successful international career. A few years later, I can already say that I've achieved my goal! Having joined the Group in 1994, I worked for Air Liquide Canada until 2003: first as Operations Manager, then as Commercial Director, and finally as the Québec Regional Director. I was there until I received a call inviting me to direct the Chilean subsidiary. My response was an excited "Yes," of course! After two years I left Chile to take on the same challenge in Brazil. In 2008 I moved again, this time to Houston (United States). Today, I'm the President of Large Industries for the United States. From a cultural point of view, each of these experiences has been very rewarding. I have also honed my listening and analysis skills, since each country has different approaches to which I had to adapt.

Throughout my career, Air Liquide always gave me a shot at opportunities. I was offered international positions though I had mastered neither Spanish nor Portuguese, and I was entrusted with posts with greater responsibilities even though they did not correspond to my original experience as an engineer. To meet these challenges, I had the support of the teams I met and the contacts I made over the years and throughout my travels. I learned a lot from these experiences, and so did my family. Today, my children speak four languages – what an asset!"



**Roger Perreault**

President, Air Liquide  
Large Industries U.S. LP (United States)

## ENCOURAGING CHANGES IN DIRECTION

"After studying business, I signed on directly with Air Liquide, attracted by the Group's international aspect and enterprising spirit. That was in 1995. Hired for a sales/marketing position for Air Liquide Germany, I later had the chance to move on to a wide variety of posts. In 2000, I joined the European Laboratories & Analyses team in Paris for an e-commerce project; then I entered the HR department as Director of International Development before working more specifically with European technical specialists, and then on commercial efficiency.

In early 2007 I moved again: I became Chief Operating Officer (COO) for the Homecare activity of VitalAire in Germany. Since July 2008, I've held the Managing Director position for this same subsidiary.

Working in the medical sector is an engaging challenge. Services are primarily aimed at three types of customers: doctors, patients, and health insurance agencies. In this continually evolving market, the human factor is key. Our current challenges consist of adapting our business model, integrating acquired companies and identifying new market segments.

When I was offered this operational responsibility, I was immediately interested. That's Air Liquide's talent: throughout my career, the Group has always surpassed my expectations by offering me new opportunities. Added to that is Air Liquide's desire to develop diversity and to put people from different backgrounds together. That gives our teams a real advantage, from the standpoints of creativity and pragmatism."



**Diana Schillag**

Managing Director, Homecare  
VitalAire (Germany)



## HONORING EXCELLENCE

"I was initially attracted to Air Liquide by the people I met when I was deciding on a job nearly six years ago. Everyone was enthusiastic and really enjoyed what they were doing. That's a contagious feeling, and I wanted to be a part of it.

I grew up in Texas and earned my chemical engineering degree in 2003 from Texas A&M University. Following that, I joined the Air Liquide Leading Engineering Excellence (ALLEX) Program. This 21-month rotational training and development program introduces new engineers to all facets of Air Liquide. I worked in various roles in Houston, then spent two years in Dallas as a chemical equipment specialist. I moved to Paris over two years ago, where I have taken on the role of project manager in Human Resources International Development.

My main focus today is our Technical Recognition Program, which centers on the Technical Career Ladder (TCL). The TCL was created in 2003 to recognize our technical contributors, whose innovations and technical competencies are at the heart of our strategic objectives. This system identifies technical experts, whose talent is shared on an international level. Among other Group activities, our experts deliver training, conduct audits and submit patents. The transfer of this knowledge is invaluable to Air Liquide, and I'm proud to be involved in this process."



**Sally Diallo**

Project Manager, Human Resources  
International Development

## THE TCL: EXPERTISE ON A LARGE SCALE

The Group puts innovation and technical expertise at the heart of its strategy. In 2003, Air Liquide launched the Technical Career Ladder (TCL), a career path for the Group's technical experts. The objective: identify, develop and share the technical knowledge within Air Liquide.

### More than 1,000 identified experts, four international levels of expertise

Since its establishment, the TCL has identified more than 1,000 local and international experts. It has been implemented in over 70 Air Liquide entities across the world.

The TCL consists of several expert levels: two local and four international grades (Expert, Senior Expert, Fellow and Senior Fellow). This classification enables the TCL members to be recognized within Air Liquide, and also reflects their authority outside the Group. The TCL members' participation in international technical communities also allows them to continue their expertise, stay up to date on the latest innovations and represent Air Liquide on scientific committees and in professional organizations.

### Incontrovertible technical references

To preserve Air Liquide's competitive advantage, the TCL experts must ensure their unique knowledge is shared internally through audits, training and participation in Know-AL missions, the Group's knowledge transfer program. The TCL is part of the Technical Recognition Program (TRP) launched in 2002, which is the culmination of an initiative begun ten years earlier with the Fellowship Program.

# COMMITTED TO OUR PEOPLE

## START: CAREERS SPANNING THE GLOBE

Air Liquide favors the introduction on an international scale of innovative tools that help identify the skills necessary to the Group's growth, optimize each employee's potential, and promote their expertise and diversity. As the Group prepares for a potential 20,000 new employees in the medium term, these goals will prove essential. Programs such as START, TCL (Technical Career Ladder), Know-AL (international skill transfer) and the Air Liquide University project offer Group employees unique advancement opportunities and dynamic career paths. Geared towards innovation and developing economies, the Group's career opportunities offer ideal conditions for professional growth to the employees of today and tomorrow.

### → Attracting young talent

Since 2001, the START program has helped Air Liquide recruit young professionals newly graduated from the world's top universities who seek to start their careers on an international note.

Upon entering the program, each new employee is assigned an international post corresponding to their skills and meeting the Group's local development needs. Throughout the two to three years of the program's duration, the young employees benefit from personal evaluations and guidance. The experience gives them a chance to advance in an exceptionally motivating environment and sets them on a path to positions of greater responsibility in their home countries.

Both personally and professionally enriching, the experience provides a promising debut to work within the Group, making it possible to form a vast network of contacts. With START, Air Liquide reinforces its appeal as an international employer, in addition to building a true culture of diversity and sharing.

"Having graduated in Thermodynamic Engineering from the Tsinghua University in Beijing in 2006, I was recruited by Air Liquide China and entered the START program. In May 2007, after seven months in Shanghai, I joined the Champigny engineering center in France, a Group hub of technical know-how. There, I worked at the beginning in the Development and Innovation department before joining the Process department, where I now work.

START has given me the chance to live an international professional experience while still fully integrating into each local team. I'm also taking advantage of this opportunity to form lasting bonds with many specialists from a variety of fields. This program is a clear sign that Air Liquide values its employees' skills and provides the means to develop them.

At the end of the program, I would like to return to China, where I hope to use my experiences in France to contribute to the Group's growth in my country."



**Brian Chen**

Process Engineer  
in Champigny-sur-Marne (France)







#### Could you briefly describe your career path for us?

After graduating in 1990 from EM Lyon Business School, I joined the Air Liquide Internal Audit Department of Paris in 1992, then that of Los Angeles. Back in France in 1998, I joined the Industrial Merchant activity. In 2007, I became Managing Director of Air Liquide in Chile, where I moved with my husband and three daughters. Here, I manage our team of 100 employees, 22 of which are women.

#### In general, what do you think about the role of women in the industrial world at large?

We're still a minority. Women generally fill back-office positions, and only rarely do we have management positions, even though our listening skills, energy, and ability to inspire teamwork would be very useful in these positions.

#### As part of its commitment to sustainable development, the Group is looking to more evenly balance responsibilities between men and women. What advantages will this bring?

Basing its model on our varied and diverse world, Air Liquide creates a natural and humane work environment. Greater equality changes the relationships between employees: everyone feels more at home in the company – essential to a bright future!

#### In your responsibilities as Managing Director of a subsidiary, how are you putting this policy into practice?

Fairness lies at the core of my duties. It finds direct expression in salaries: equal pay for equal work. But I also apply fairness in my daily activities. For example, I ensured that women working in administrative and sales positions were provided with work uniforms designed especially for them, which wasn't the case before.

Virginie Cavalli

Managing Director, Air Liquide Chile S.A.

*Air Liquide aims to increase diversity in its managerial population and seeks a better, more equitable division of responsibilities between men and women while placing more emphasis on its many cultures. The Group's objective is to strengthen the position of women, in particular through recruitment of engineers and managers.*



SUSTAINABLE DEVELOPMENT  
IN QUESTION





#### How does the Group's commitment to Sustainable Development find expression at Air Liquide Canada?

For us, Sustainable Development goes hand in hand with diversity: diversity of employee nationalities and professional backgrounds, and equality between men and women. Sustainable Development is also paired with the culture of performance and innovation that we continually seek to improve with several tools. We also encourage the exchange of skills, a key to staying competitive.

#### For your subsidiary, what are the most important social and HR indicators?

We have several statistical indicators such as voluntary turnover (departures from the company), which is quite low for a company in our sector. We also calculate the average training hours for each employee: 23.5 in 2008, a figure that makes us proud! Lastly, programs like ALLEX, training young engineers by rotating them through various positions, better acquaint us with our employees and refine our HR strategy.

#### What does the percentage of employees having had an annual interview reflect about Air Liquide's commitments?

The priority we give to these interviews illustrates our desire to accompany our employees along their career paths within the Group. These interviews help them set goals for advancement. For management, the interviews allow us to implement adequate training plans.

#### How does Air Liquide Canada plan to improve its performance in this area?

Our mission is to listen to our employees by offering training and advancement opportunities that respond to their motivations and, most importantly, by recognizing their daily performance. We're leaders from a technical point of view, but we must also be leaders from a human point of view!

#### Martine Rivard

Vice-President, Human Resources  
Air Liquide Canada

*On every site, in every region, in every unit, the Group's objective is that 100% of employees meet their direct supervisor once a year for a performance evaluation interview and meet a manager from the Human Resources Department about every three years for a career development interview.*

READ THE ENTIRE SUSTAINABLE DEVELOPMENT REPORT  
IN THE REFERENCE DOCUMENT.

# ERA

OF CORPORATE  
CITIZENSHIP

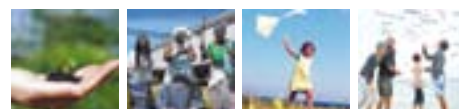
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**Sustainable Development** adapts our concepts of progress and growth to tomorrow's world. Air Liquide has long included this dimension in each of its activities.

The Group's environmental commitment is strong: activities that preserve the environment and life represent 33% of its revenue. In addition, over 60% of its Research and Development budget is directly related to environmental issues (reduced energy consumption, cleaner production, development of tomorrow's energies, etc.).

To meet these challenges, Air Liquide has implemented a specific Sustainable Development model with key dimensions for the company. Using a series of precise indicators, the Group has set measurable goals and regularly monitors its performance.

READ THE ENTIRE SUSTAINABLE DEVELOPMENT REPORT  
IN THE REFERENCE DOCUMENT.



# CORPORATE CITIZENSHIP

## PROTECTING THE ENVIRONMENT AND LIFE

The Group is always striving to better control its energy consumption and reduce its environmental impact. To this end, it uses several precise environmental indicators, notably the measurement of greenhouse gas (GHG) emissions by certain activities.

### → 2008 carbon footprint

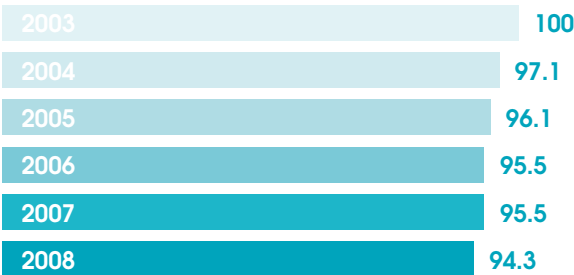
Air Liquide operates 461 production units around the world, over 300 of which are very large units. Among these, more than 80% are air separation units (ASUs), the Group’s core business. ASUs do not directly emit GHGs, in contrast with other Group units, such as cogeneration units, which produce steam and electricity (46% of Air Liquide’s GHG emissions), and HyCO units, which produce hydrogen and carbon monoxide (47% of GHG emissions). Transportation and other sources represent 5% and 2% of emissions, respectively.

Cogeneration technology does emit CO<sub>2</sub> (carbon dioxide), but on a much smaller scale than separate production of steam and electricity. In 2008, the Group’s cogeneration units enabled the reduction of CO<sub>2</sub> emissions discharged into the atmosphere by 575,000 metric tons.

In our HyCO units, energy efficiency per m<sup>3</sup> of gas produced improved by more than 5% over five years. In addition, the Group continually optimizes the logistics of liquid gas delivery. The number and distance of deliveries have thus seen a marked decrease, which correspondingly reduces emissions associated with transportation. The efficiency of liquid gas deliveries has thus improved by almost 4% in five years.

Moreover, 84% of air gases and hydrogen deliveries are made via pipeline or through on-site units. Thus, only 16% of these gases, representing the vast majority of gases delivered by the Group, are transported by trucks.

EVOLUTION OF HYDROGEN AND CARBON MONOXIDE UNITS’ ENERGY CONSUMPTION (PER M<sup>3</sup> OF GAS PRODUCED)



# A COMMITTED COMPANY

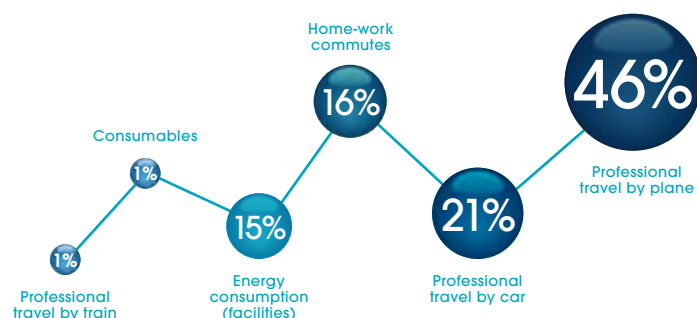
## A HABIT OF SUSTAINABLE DEVELOPMENT

Air Liquide's Sustainable Development approach chiefly concerns the industrial area. The Group is now aiming to extend this approach to employees' activities at their workplace and during their work-related travel. The goal is to analyze CO<sub>2</sub> emissions generated by employees' activities and offer innovative solutions to reduce these emissions.

### → France: sustainable development testing ground

The Group collected data on energy consumption and GHG emissions at six sites in France, representing the Group's different sectors of activity. Through this study, Air Liquide has identified four principal sources of GHG emissions, estimated at 63,000 metric tons of CO<sub>2</sub> for all of the Group's employees in France. For each of these sources (commutes from home to work, professional travel by car and plane, energy consumption in facilities, consumables), the Group is seeking concrete solutions. By itemizing and actively seeking ways to reduce emissions linked to these activities, Air Liquide is pursuing the project outlined by the Grenelle Environnement law<sup>(a)</sup> and the Kyoto protocol that aims to reduce GHG emissions.

### GHG EMISSIONS BY AIR LIQUIDE EMPLOYEES IN FRANCE FOR 2007: 63,000 metric tons of CO<sub>2</sub>



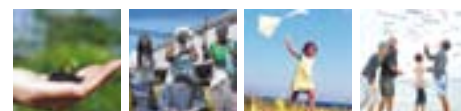
### → Improving the Group vehicle fleet

Air Liquide has estimated the environmental impact of car travel by its employees in France at 13,000 metric tons of CO<sub>2</sub>, or 21% of emissions linked to employees' daily activities. To reduce the environmental impact of car travel, the Group is planning to modernize its vehicle fleet in France (currently about 2,200 cars) by integrating low-emission vehicles. Some Group entities are also beginning to offer hybrid vehicles.

### → Less air travel

Air travel heavily contributes to GHGs in our atmosphere. Air Liquide has begun to evaluate the GHG emissions linked to its employees' air travel, estimated to be the equivalent of 77,000 metric tons of CO<sub>2</sub>. To cut back on air travel, Air Liquide is exploring remote collaborative work solutions, including videoconferences and web conferences.

(a) Grenelle Environnement (France, 2007) was a national roundtable aimed at restructuring environmental policies and making growth compatible with the limits of a finite world.





# RULES OF CONDUCT

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## SHARED ETHICS

Air Liquide has always operated within a strong ethical framework. With 43,000 employees throughout the world, the Group's approach is structured so that its rules of conduct is shared by all.

### → Applying Group policy

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In 2007, Air Liquide appointed a Group ethics officer responsible for its ethics policy. His role is to give advice and assistance to each Group entity on applying its local code of conduct, and to answer any questions from Group employees. The officer will also support prevention mechanisms and handle discrepancies in the application of codes of conduct.

### → Communicating Principles of action

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These principles are contained in a document translated into 16 languages and distributed to all Air Liquide entities in 2007. It states the Group's objectives and the conduct that every employee must adopt with all the stakeholders: customers, employees, suppliers, partners, and local communities.

### → Adapted codes of conduct

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Air Liquide's ethics policy is implemented by its subsidiaries through local codes of conduct, centered on the Group's Principles of action and in line with the customs and regulations of the country. Air Liquide has defined ten fundamental themes that each code of conduct must follow: compliance with laws and regulations, respect for men and women, the environment, competition rules, and laws on insider trading. Other items include the prevention of conflicts of interest, the protection of Air Liquide activities, transparency and integrity of information, internal controls and audits, and the implementation of the code of conduct itself. Furthermore, several of the Group's departments have drawn up guides and codes detailing their operating principles in their specific field. For example, the Procurement department added a specific paragraph on sustainable development, concerning especially environmental protection, safety, working conditions, respect for people, and the rejection of any form of discrimination.

# A Corporate Foundation for Sustainable Development

In 2008, Air Liquide created the Air Liquide Foundation, marking another step forward in the Group's commitment to the environment, health, and local initiatives.

## Three missions

The preservation of life and environmental protection are central to Air Liquide's activities. The Group diligently undertakes its social and human role in all countries in which it is present. This is the true purpose of the Air Liquide Foundation.

The Foundation is chiefly concerned with three intervention areas particularly reflecting the Group's activities and international presence: the environment, health, and local development. It thus encourages scientific research projects aiming to preserve the atmosphere, and research on medical respiration function and exploration (space, diving, sports). Lastly, in order to further anchor the Group in regions where it is present, the Foundation supports Micro-Initiatives, especially in the fields of education, training, and medical emergencies.

The Foundation assists the Institut Pasteur in Shanghai (China) in its researches to identify and prevent respiratory diseases, the number one cause of infant mortality in the world. The goal of this project is to ensure the eventual discovery of new viruses and provide better treatment to patients suffering from acute respiratory infections.

In the realm of Micro-Initiatives, the Foundation supports the non-profit organization Pro-Natura in its agroforestry project in the regions of Kade and Jasikan (Ghana). The project encourages small cocoa producers to combine subsistence farming with the planting of trees on their plots of land, in order to maintain soil fertility, fight against the greenhouse effect and to preserve biodiversity.



## Resources and goals

The Air Liquide Foundation has a budget of nearly 3 million euros over five years to support approved projects by allocating financial, human, and material resources.

The Foundation is directed by a Board of Directors presided over by Benoît Potier, Chairman and CEO of the Air Liquide Group. Composed

of nine members (three of which come from outside the Group), the Board of Directors determines the philanthropic orientations in each of the three intervention areas.

A Project Selection Committee, composed of Group members chosen for their expertise in the Foundation's action areas, assists

the Board of Directors in its functions. The Committee also includes one member representing individual shareholders.

Group employees are also encouraged to sponsor Micro-Initiatives supported by the Foundation.

### THE AIR LIQUIDE FOUNDATION ON THE INTERNET



**AIR LIQUIDE** FONDATION  
D'ENTREPRISE

The website dedicated to the Air Liquide Foundation contains complete information on its missions, its functions, the composition of its Board of Directors and Project Selection Committee, the initiatives that it currently supports, and the process of submitting and selecting sponsored projects. It is also possible to submit a project support request online, in French or English.

<http://www.fondationairliquide.com>

# SAFETY

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## SAFETY: IT'S EVERYONE'S BUSINESS

Zero accident: It's not just a slogan, but a goal shared by all Air Liquide employees. The Group's safety performance continued to improve in 2008, with the frequency rate of serious accidents<sup>(a)</sup> for Air Liquide personnel falling from 2.1 in 2007 to 1.8 in 2008. The Group is encouraging its employees and partners to build on this success by sharing good safety practices and demonstrating visible commitment to safety, everywhere and at all times

### → **IMS: a continuously improving safety management system**

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The Industrial Management System (IMS) combines management procedures, technical standards, and best practices, to ensure that our operations are safe, our impact on the environment is responsibly managed, and we reliably supply our customers around the world with the products they need.

In 2008, 37 new standards and 12 training modules were developed and implemented under the auspices of IMS. In addition, 22 IMS audits were performed by the IMS "Industrial Audit Group". Approximately 40 audits covering 81% of Air Liquide's activities have been performed since the beginning of 2007.

These audits ensure that all operations conform to Group requirements, evaluate the system's effectiveness, and identify good practices developed locally that may be of use to other entities.

Air Liquide is committed to continuously improve and enrich this program. In 2009, our goal is to build on the experience we gained over the past few years.

### → **Strengthening our safety culture**

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Two of Air Liquide's key objectives in 2008 were to increase the awareness of its employees to the importance of a strong safety culture and to strengthen this culture in each of the Group's entities. A safety culture survey was thus successfully conducted during the first semester in every country where the Group is present. The analysis of information collected was used to set goals for improving each entity's safety culture and provided an opportunity to stress the importance of each and everyone's commitment to safety. Workgroups made up of managers and employees in each country prepared action plans to achieve those goals that will be progressively implemented in 2009, an ideal complement to the behavioral safety visit program already launched. To reinforce these efforts, the Group is also preparing a new internal safety communication campaign for roll-out in 2009.

(a) The accident rate represents the number of accidents leading to a stoppage of work greater than or equal to one day within a period of 12 months and for one million hours worked.



## → Behavioral safety visits

Introduced mid-2007, behavioral safety visits (BSV) have since become key moments in the professional lives of our working teams. The goal of a BSV is to directly engage each employee in safety improvement through practice, listening, and exchange. BSV fundamentals: a supervisor, site manager, or subsidiary managing director visits an employee's post and attentively observes his or her work method for a few minutes, then starts a conversation with the employee. The goal of this observation is to analyze the employee's behavior and actions, detect good practices and risky behaviors. The ensuing conversation allows the manager and employee to identify any possible points of improvement, decide upon any immediate, concrete steps to develop safer behavior, and also, if relevant, to reflect on possible long-term measures to take. BSVs are driven by dialogue rather than technical evaluation. In addition to curbing behaviors that could directly or indirectly lead to serious accidents, the BSV provides an opportunity for open communication between managers and employees. In 2008, several thousand BSVs were performed within the Group. In the future, each employee will receive at least one visit per year.

## → Next Steps

In several subsidiaries of the Group, the BSV process has been enhanced since mid-2008 by the Behavioral-Based Safety (BBS) program. In 2009, all employees will be brought into the program through group training sessions. The BBS program relies above all on the participation and interaction of all employees. By observing one's own behavior, as well as the behavior of one's colleagues, each employee becomes sensitive to the impact of his or her actions on his or her own safety and the safety of others. The goal is to better instill safe practices in day-to-day tasks through a continual dialogue within one's team.

"Beginning in 2007, BSV training was offered to all managers. I was trained at that time and started leading BSVs in 2008. Since then, 320 BSVs have been organized. The visits provide a pragmatic approach to safety: that adopting safe behaviors is simply a matter of common sense. For us, the managers, these visits give us a chance to get involved on site.

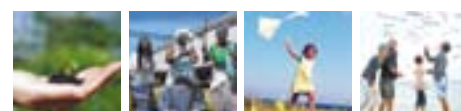
For our employees, they represent a much appreciated opportunity to interact with management and concretely improve their workplace safety. For example, I 'visited' an employee working with hazardous liquids. Despite his protective equipment, he was working in a position that put him at risk being splashed. Together we found a new posture that enabled him to work in a risk free zone.

Statistics confirm the effectiveness of BSVs. In our entity in 2008, we experienced three lost time accidents (LTA) and one non-lost time accident (NLTA). This is two less LTAs and four less NLTAs than in 2007. That gives us real encouragement for continuing with BSVs in the coming months!"



**Susanne Brüggemann**  
Operations Director,  
Air Liquide Electronics Europe

*In every subsidiary, the Group's objective is to reach the "zero accident" target each year. The Group encourages all its employees and subcontractors to share good practices and habits for the purpose of behaving better, everywhere and at all times.*



# ERA

OF PROGRESS  
FOR OUR  
CUSTOMERS

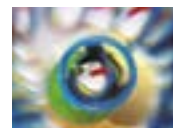


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**Just as air is necessary for life,** gases are essential for industrial processes in a variety of sectors, including energy, metallurgy, food, chemicals, automobile, etc. Used more and more in the medical sector and in new technologies, gases play an important role in improving our daily lives.

A supplier of gases and related services for over a century, Air Liquide delivers to its clients ever more efficient and innovative solutions to enable sustainable progress in the industry and health sectors.

INDUSTRIAL MERCHANT



# GASES FOR EVERY APPLICATION



# €4,609 million revenue

# +6% growth in 2008

## BREAKDOWN OF REVENUE



Managing safety, optimizing production processes and enhancing the quality of products are just some major challenges faced by manufacturers all around the world. The Group's Industrial Merchant World Business Line (WBL) supports these businesses by providing them with the gases that are indispensable for their operations. In 2008, the WBL completed a number of innovative projects and saw a strong growth in its sales.

### → A diversified presence

The Industrial Merchant WBL provides its customers with gases, either pressurized in cylinders, or in liquid state in storage tanks, for use in a wide range of processes, including freezing, water treatment, or the creation of controlled atmospheres. Customers who are active in these fields are grouped in five general domains: Automotive and Manufacturing, Craftsmen and Distributors, Food and Pharmaceuticals, Materials and Energy, Technology and Research. Customers in each of these sectors are present in both mature and emerging economies.

### → Reduced costs

In mature economies, where Industrial Merchant is long-established, Air Liquide is seeking to reduce costs through the deployment of "smart" solutions. As part of the TENOR program, customers' liquid gas tanks are being progressively equipped with tele-monitoring systems, enabling automatic and systematic replenishment as soon as inventory levels diminish. TENOR will also help optimize distribution costs.

### → Greater efficiency

In 2008, the Group designed a new, standardized liquid production unit and launched a new filling station for packaged gases called Floxfill, in Poland. The goal was to reduce costs and time involved in the production, delivery and set-up of such apparatus, as well as optimizing productivity.

In the liquid business, storage tanks and semi-trailers are also being standardized. In the packaged gas business, the roll-out of ergonomically-designed and secure gas cylinders (ALTOP™ and SMARTOP™) forms part of this initiative. The Group has also focused on the tracking of cylinders with the automated tracking system SERVITRAX™, now being implemented in Europe. Computerized readouts enable operators to track cylinders through every step of their use and service life: filling, delivery, maintenance, etc.

### → New successes

Geographically, the Group recorded strong growth in 2008 in emerging economies and in North America, both in packaged gas and liquid.

From a market standpoint, the specialty and laboratory gas market, as well as the Technology & Research sector are also growing strongly, thanks in particular to the acquisition and successful integration of Scott Specialty Chemicals in the United States at the end of 2007.

Lastly, the contract signed in Paris with the IFP (Institut Français du Pétrole) is testament to the Group's reputation and expertise: Air Liquide has been chosen by IFP as its sole provider of gas solutions.

## → TENOR SETS THE TONE FOR BULK LIQUID TRANSPORTATION LOGISTICS

One of the Group's main challenges is to improve supply chain efficiency. To do so, Air Liquide has developed TENOR, a unique logistics system that makes it possible to optimize delivery schedules for liquid products and reduce the carbon footprint associated with logistical operations.

### Taking constraints into account

To plan delivery schedules, TENOR (Transport Efficiency and Operations Research) combines all of the distribution chain parameters (service routes, transport vehicles and drivers availability, etc.) with customers' replenishment requirements and their on-site storage capacities.

Therefore, at any given moment, Air Liquide has a clear vision of both its delivery capacities and its customers' requirements.

TENOR, which pushes the frontiers of Operational Research, obtains its primary data using telemetry solutions, a technology enabling remote monitoring of measures or parameters. Using diverse mathematical models, these data are processed to evaluate and compare, over a defined period of time, multiple solutions to meet customer needs. The delivery schedule is optimized, allowing customer replenishment on time while also reducing the distance traveled by the delivery vehicles.

### A promising future

TENOR makes it possible to meet a three-fold objective: to improve customer service, reduce CO<sub>2</sub> emissions released by the delivery vehicles, and lower distribution costs.

This precursory project, lying within the scope of the ALMA program, mobilized a multicultural team. It is the result of a successful collaboration between several entities within the Group: Research and Development, Group Industrial IT Divisions... and outside of the Group (through a partnership with Bouygues).

Thanks to a high level of involvement of the local teams, the pilot roll-out of TENOR was successful in the United States and thus makes it possible to envisage a significant reduction of delivery cost.

This project will soon be implemented in all of the countries in which Air Liquide is present, to manage supply chain logistics for the Group's liquid products.



## AIR LIQUIDE IN POLAND: A GROWTH INDUSTRY



Present in Poland since 1995 with the Large Industries WBL, Air Liquide's business is still relatively young. But for the past several years, the Industrial Merchant business has experienced extraordinary growth, and today it leads the way for Air Liquide in Eastern Europe.

### → Quick expansion with Floxfill

A key factor to Air Liquide Poland's future success is its 2008 roll-out of the new Floxfill line of standard cylinder fill plants. Floxfill moves away from the classic method of plant installation, which requires searching for available land, buying the space, then installing the plant. A Floxfill plant can be built off-site before a plant location has even been determined. The plant is transported in a standard shipping container and can be up and running in less than a month, saving 3-6 months over the traditional system. In addition to speed of deployment, Floxfill offers the benefit of standardization and ease of exchangeability and upgrading. Increased safety is another advantage, as universal safety practices can be applied to each newly installed plant.

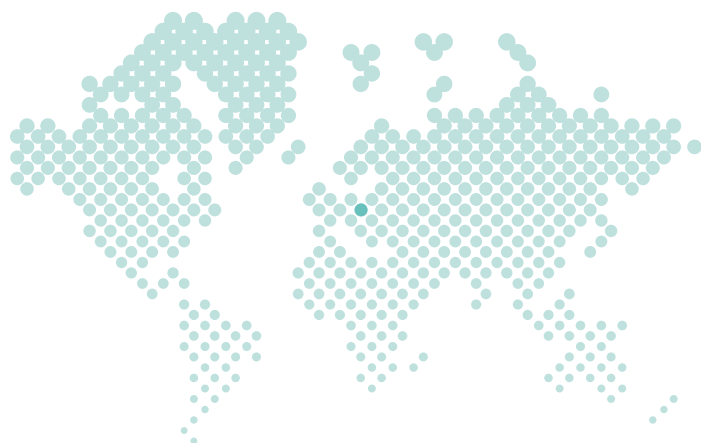
The Polish subsidiary runs the Quattro Floxfill plant at a new location in Gdansk (northern Poland, on the Baltic Sea). The plant has the capacity to fill 500-1,000 cylinders per day with mono gases as well as higher-value mixtures and blends.

### → Cost-effective asset transfer

The team of 230 core business employees has embraced the idea of using best practices and adapting them to the Polish market. The subsidiary makes use of Air Liquide brands and premium cylinder products, such as the user-friendly ALTOP™ cylinder range and the innovative SERVITRAX™ cylinder tracking system, two great contributors that have enabled profitability right from the early stages.

The subsidiary has leveraged its existing industrial base in southern Poland and has drawn on Group marketing and contracting expertise to develop its business, helping to further a strategy that highlights the distribution of high-margin products and gases such as argon.

Cylinder development is thus a chief focus. The ability to reuse cylinders from Air Liquide subsidiaries in Europe is key. Approximately 30% of current cylinder demand in Poland is met by this distribution process. With a 60% growth rate in 2008, the Poland subsidiary is booming.

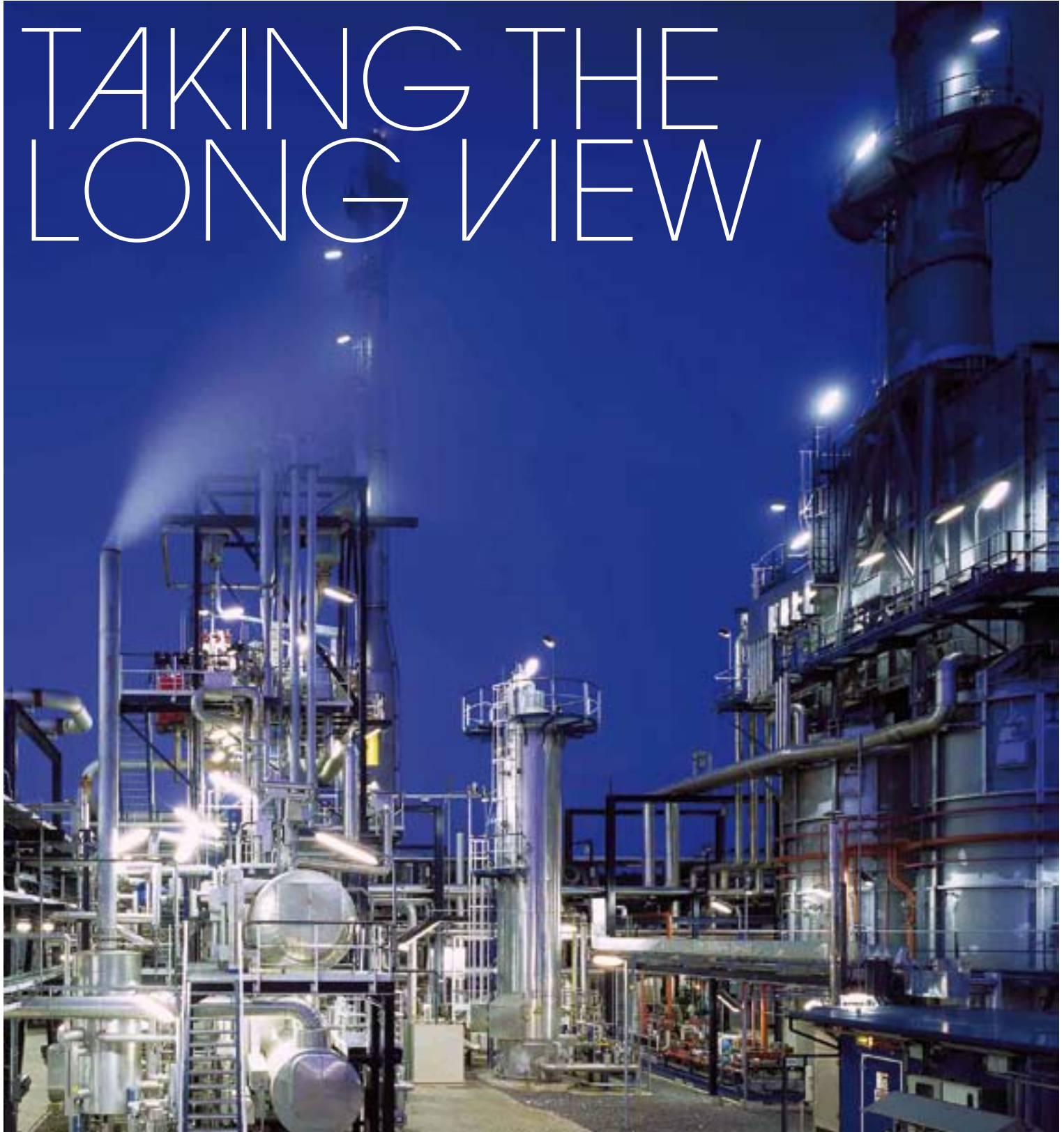




## LARGE INDUSTRIES



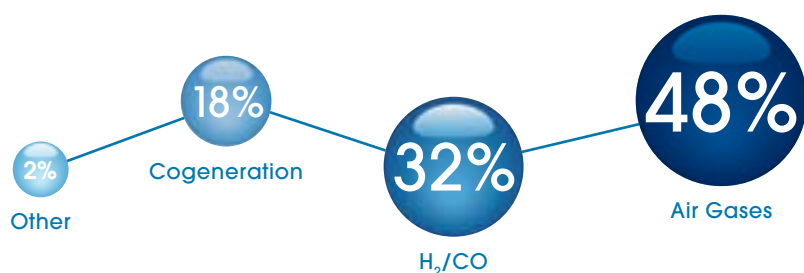
# TAKING THE LONG VIEW



€3,675 million  
revenue

+15% growth  
in 2008

## BREAKDOWN OF REVENUE



Air Liquide's Large Industries World Business Line (WBL) provides gases to customers in the refining, chemicals, energy and metallurgical industries. These gases are vital to the production processes of customers in such industries. The Group's gas and energy solutions enable businesses to reconcile optimal productivity with respect for the environment. Here, we take a close look at a sector in which Air Liquide is the undisputed world leader.

### → Air gases, hydrogen, cogeneration

The Large Industries WBL is representative both of Air Liquide's historic expertise and of the technologies of the future. The WBL has established its presence around the world through its design and installation of more than 400 air separation units (ASUs), some 100 hydrogen production plants (of which 38 are major units) and 18 cogeneration units. This presence is strengthened by the Group's vast pipeline network, which allows Air Liquide to meet the air gas and hydrogen requirements of major customers in some of the world's largest industrial basins, in the United States, Europe and Asia.

Elsewhere, the start up of a new Air Liquide cogeneration plant, in the Rotterdam petrochemical basin, has put the Group in a privileged position at the heart of one of Europe's strategic industrial regions.

### → Maintained momentum

2008 saw major investments made in the Large Industries WBL in each of the Group's geographical regions. With more than 1 billion euros in development investments decided in 2008, the WBL has maintained the dynamism it showed in 2007.

The Group has also finalized the acquisition of Island Pipeline Gases (IPG), a business hitherto partnered with Air Products Singapore. This investment complements the Group's decision to extend its network of oxygen, nitrogen and hydrogen pipelines in the Jurong Island industrial park, in Singapore.

### → Ambitions for the future

Both mature and emerging economies offer numerous opportunities for growth.

As part of the ALMA program, the Group is aiming to standardize its production plants, to respond to growing global demand for industrial gases, and to reduce delivery lead times.

The Large Industries WBL is also pursuing a carefully designed international development strategy. In 2008, it established a presence in Kuwait, having entered into Russia and Qatar in 2007.

With energy being its principal expenditure, the WBL is pairing its ambitious growth program with a raft of initiatives aimed at better managing its energy consumption.

## → PERGEN GOES ONLINE

The start up in August 2008 of the Group's latest cogeneration plant, in the Rotterdam industrial basin, marks a crucial step forward for Large Industries. This investment, the largest ever made by the Group, enables it to meet the demands of major players in the energy sector.

### A major investment

The start up of this new cogeneration plant is the culmination of a project launched in 2004, and coordinated by the Group's Engineering and Construction Division. At the heart of this project, dubbed "Pergen", was the signature of a long-term contract with two major energy players in the Netherlands: oil producer Shell, and the electricity and gas supplier ENECO Energy. The contract guarantees the supply of up to 700 metric tons per hour of steam to Shell, as well as 300MW of electricity to ENECO. Cogeneration technology means that the products can be supplied with optimal reliability and flexibility.

### Cogeneration: serving sustainable development

Pergen is just the latest of the 18 cogeneration plants operated by Air Liquide around the world. These plants simultaneously produce steam and electricity. Consequently, they improve energy efficiency by 15% to 30%, as compared to the supply of steam and electricity from two separate plants. The plants operate on natural gas, as well as water, the bulk of which is transformed into steam, itself condensed and then re-used. The electricity produced is, in most cases, supplied to the local electricity grid. Such plants make a major contribution to the reduction of CO<sub>2</sub> emissions. In 2008, the operation of Group cogeneration plants prevented some 575,000 metric tons of CO<sub>2</sub> from being released into the atmosphere from industrial basins.

### A strategic presence

This investment, worth more than 200 million euros, affords the Group a privileged presence in the region as a whole, and bolsters its position in the Rotterdam industrial basin, which is of strategic importance to the refinery and petrochemical industries in Europe. The region supports some 12% of Europe's entire refining capacity, and is a major potential growth area for Air Liquide. To ensure that it is able to support the evolving gas and energy demands of its customers, the Group has invested more than 800 million euros in this region over the last 12 years.



## BINGO: BENELUX OPTS FOR OPTIMIZATION

Housing the massive Antwerp-Rotterdam industrial basin, Benelux plays a crucial role in the Large Industries WBL growth strategy. Aiming to meet the efficiency objectives set by the ALMA program, coordination of the Brussels network has now implemented the BINGO (Benelux Interconnected Networks Gas Optimization) tool to optimize hydrogen and carbon monoxide ( $H_2/CO$ ) production for all area clients.

### → Maximum responsiveness and foresight!

Stretching from Dunkirk, through Belgium, and up to Rotterdam, some 3,000 kilometers of pipe link approximately twenty Air Liquide production units with its clients' sites – a vast network geared towards continual improvement in performance and efficiency. This is the task of the BINGO tool, installed in the region at the beginning of 2007. Applied to  $H_2/CO$  operations, BINGO helps reduce the variable production costs (such as energy expenses) by collecting information necessary to answer two questions. First: in economic terms, which is the best site to use when transporting raw materials for their conversion? And: which unit should be used to respond to the needs of a particular client? BINGO also serves as a simulation tool capable of anticipating the effects of different scenarios, such as the halt of a site's production. By making production schedules more responsive to a wider breadth of situations, BINGO has emerged as an indispensable tool for the "maestros" of network coordination.

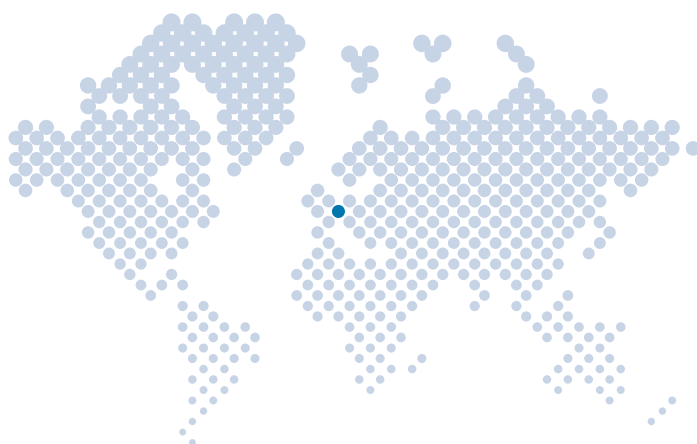
This integral panorama of Group activities and production, coupled with estimations made by the coordination team, guarantees optimum planning of medium- and long-term activities.

### → Objective: growth

BINGO will soon have a twin brother: in partnership with the Operations Control Center in Houston (United States), an optimization tool for the production of air gases (oxygen, nitrogen, argon) is currently in development. Moreover, a new hydrogen production unit in the Rotterdam basin will soon join the Benelux network, bringing an increase of over 30% in hydrogen production – yet another opportunity for BINGO to demonstrate its efficiency!

### → SCADA, a foundational tool

BINGO never could have come about without the prior development and installation of the supervisory tool SCADA (Supervisory Control and Data Acquisition). Launched in 2003, SCADA now connects every production unit in the network. The system's remote collection of data on Group production units provides a means of recording production and client consumption histories, in addition to supplying information to the database on which BINGO functions.





## ELECTRONICS



# A DIGITAL INSIDE LOOK

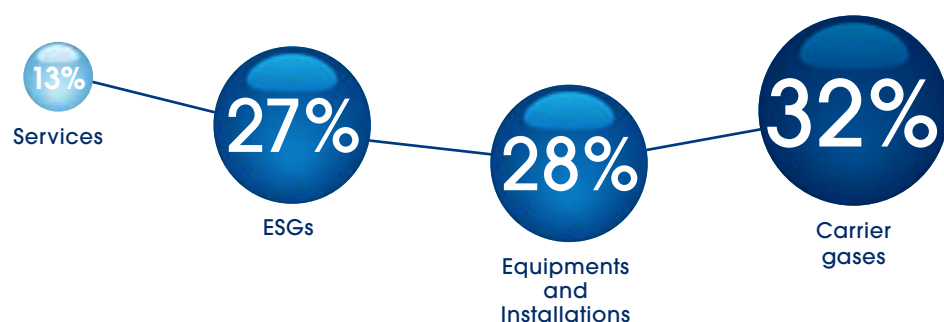




€1,044 million  
revenue

+9% growth  
in 2008

#### BREAKDOWN OF REVENUE



The Group's Electronics World Business Line (WBL) offers a large range of high added-value products and services used in the manufacture of the state-of-the-art technologies that we see all around us: flat screen displays, computers, mobile phones, digital cameras, mp3 players, etc. The Group also offers its electronics expertise to the booming photovoltaic industry.

#### → Illuminating solar panels and microchips

The Group's development strategy enables it to strengthen the entirety of its supply offer and to provide even closer support to its customers as they expand their businesses geographically.

For the booming photovoltaic industry, the Group is innovating and offering turnkey solutions, including the supply of gas and equipment, as well as associated support services. The Group has just signed a contract with Chinese company Best Solar, which is constructing one of the world's largest thin film solar cell production sites.

In addition, Air Liquide continues to support the electronics industry in its manufacturing of ever more powerful microchips. The Group has developed the new ALOHA range of "advanced precursors", which are designed on demand to match the exact process requirements of its semiconductor customers. Air Liquide also provides customers with an extended offer, which includes chemical equipment and piping installation for the distribution of ultra high purity fluids.

Air Liquide is also aiming to meet the growing demand for electronic specialty gases (ESGs) by investing in filling centers for gases such as silane.

#### → Focus on flat screens

In 2008, Air Liquide secured a series of major contracts with the manufacturers of flat screen displays. Beginning in 2009, Air Liquide will supply ultra pure nitrogen to the fabs of Innolux Display Corporation and ChiMei Optoelectronics, two Taiwanese industry leaders. Both nitrogen generator units required for this project will be designed and built at Air Liquide's Harima engineering center, close to Kobe, Japan. The total investments amount to 15 million euros. A gas supply contract has also been signed with Chinese manufacturer BOE Chengdu, another producer of flat screen displays. Other major events in 2008: the acquisition of the Chemical Management Division of Edwards Vacuum in the United States, continuation of investments in the silane market, and the construction of two nitrogen generation units for the supply of the 300 mm fab of Hynix-Numonyx, an Asian joint venture specializing in the manufacturing of Flash NAND memory sticks.

## → SILANE: GAS OF THE FUTURE

With a market share of more than 35%, Air Liquide is the world leader in silane, a gas in high demand in the electronics industry. The Group has secured this position thanks to its thorough expertise in every step of the supply chain, from silane production through to specialized silane transfilling centers and dedicated logistics services. This combination enables the Group to meet the highly demanding requirements of the electronics industry.

### **SiH<sub>4</sub>: a key element for the electronics industry**

Air Liquide is the sole industrial gas supplier to produce silane, an ultra high purity gas which is essential in the manufacture of semi-conductors, flat screen displays and photovoltaic cells. Silane (monosilane, SiH<sub>4</sub>) is produced from metallurgical-grade Silicon, itself drawn from Silicon dioxide, one of the most abundant materials on our planet.

### **Historical positioning**

Today, the silane market is witnessing annual growth rates of 25%, thanks in particular to the rapid expansion of the solar energy sector.

The Group developed its expertise in silane at the beginning of the 1980s, through the development and refinement of an SiH<sub>4</sub> production and purification process. Then, in 1984, it built two pilot production units, one in France, and the other in Japan.

In 1987, in partnership with Japanese group Denka, Air Liquide founded the Denal joint-venture, and, in Omi, near Niigata, built a plant capable of producing 120 metric tons of silane per year. The production capacity of this plant has been steadily increased, and stood at 540 metric tons per year by the end of 2008.

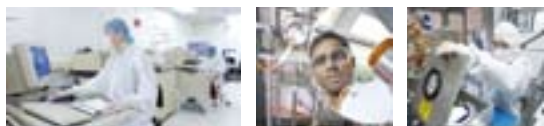
### **An ambitious development program**

The Group is continuing to invest in its silane expertise, and is looking to further bolster its ability to supply silane to customers on a large scale.

In 2008, Air Liquide launched a series of studies aimed at identifying practical means to boost production to 2,000 metric tons per year. By doing so, the Group will consolidate its position as the leading silane producer in Japan, and also across Asia and in the rest of the world. Simultaneously, Air Liquide signed a long-term agreement with the Renewable Energy Corporation (REC), one of the world's main silane producers. Through this strategic partnership, the Group aims to achieve two objectives: strengthen its position in a market where demand could soon outstrip supply, and support the growth of its existing customers. In order to offer to these customers reliable and comprehensive solutions, Air Liquide is also strengthening its silane transfilling center and related support services offers through the inauguration of three new Electronics Materials Centers (EMCs) in Japan, Taiwan and China.



## ELECTRONICS: AIR LIQUIDE STRENGTHENS ITS STRATEGIC POSITIONING



In 2008, the Group acquired the Chemical Management Division of Edwards Vacuum, a specialist in integrated vacuum solutions and in the treatment of gaseous effluents for the electronics industry. Thanks to this acquisition, Air Liquide has demonstrated its commitment to establish itself as a global player in this market.

### → Dedicated to electronics

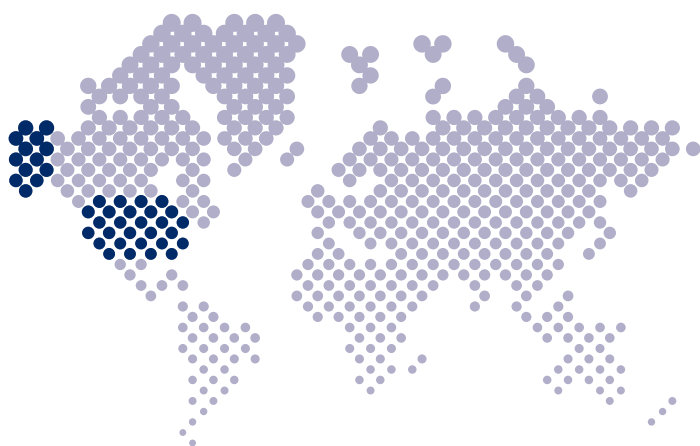
The Chemical Management Division of Edwards Vacuum is a worldwide supplier of chemical equipment. Its stated mission is to design, manufacture and sell chemical and slurry-dispensing equipment and installations and related services to manufacturers of semi-conductors and to their suppliers (Original Equipment Manufacturers or OEMs). The Chemical Management Division's production unit is located in Chanhassen, Minnesota. It employs 120 people, of which 20% are based in Asia and in Europe.

### → Additional sales and increased efficiency

Thanks to several thousand systems sold throughout the world and its long standing commercial relationships with major semiconductor manufacturers, the Chemical Management Division brings numerous opportunities for equipment sales and additional services. Greatly increasing the size of Air Liquide in the chemical equipment sector, this acquisition will significantly decrease costs, notably by enabling an increased purchasing volume of components for manufacturing equipment.

### → An extended offer

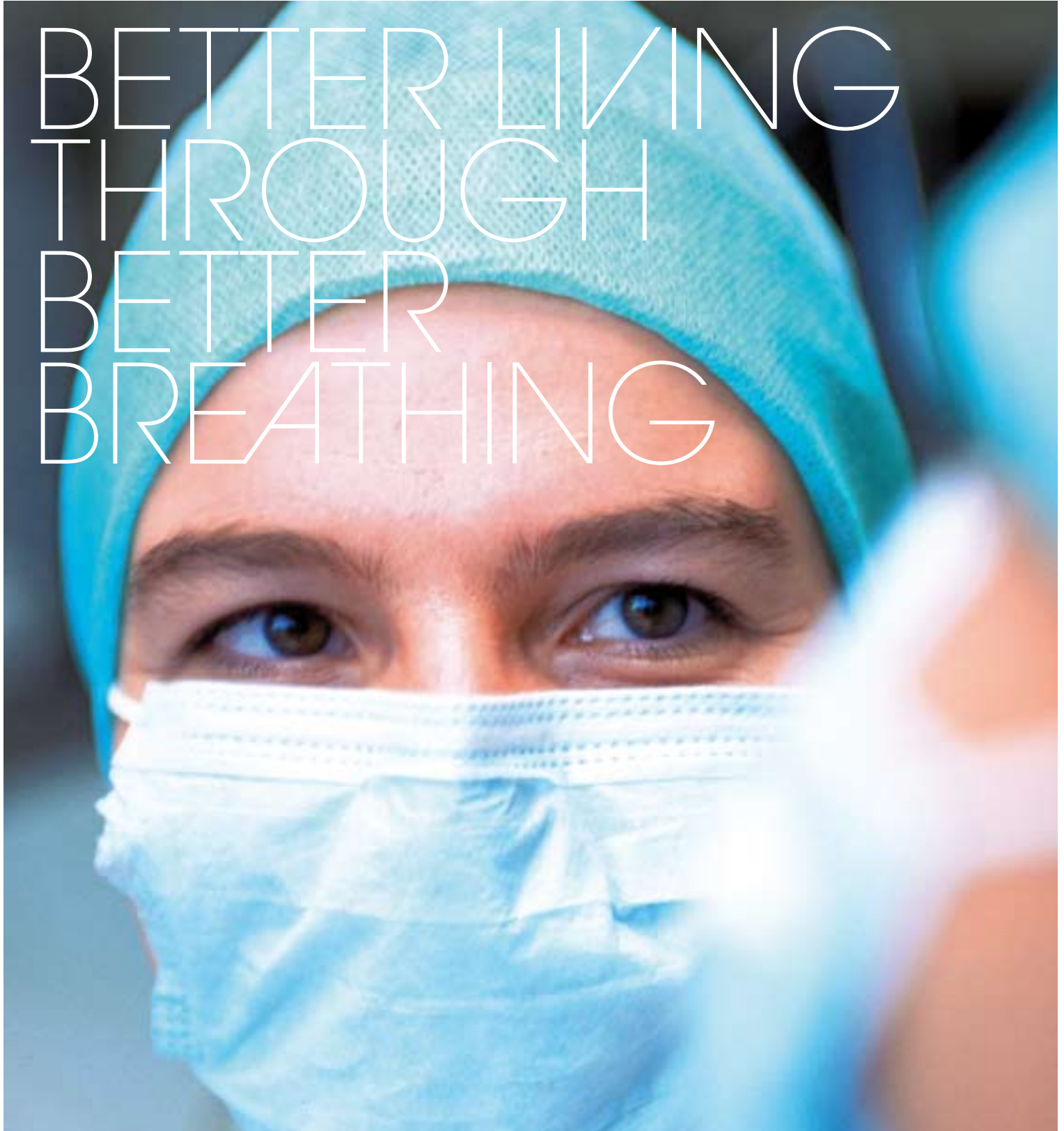
This acquisition strengthens Air Liquide's worldwide position in the electronics sector, particularly in the United States and in Asia. The Group now offers a full range of equipment and installations to support the provision of ultra high purity fluids for use in the semiconductors, flat screen display and photovoltaic industries.



## HEALTHCARE



BETTER LIVING  
THROUGH  
BETTER  
BREATHING





€1,700 million revenue

More than 300,000 patients  
assisted at home worldwide

+7.5% growth in 2008

More than 6,000 hospitals  
supplied worldwide

#### BREAKDOWN OF REVENUE



#### → New successes in 2008...

In 2008, the Healthcare WBL secured a number of significant contracts, in particular in homecare. In southwestern Britain, some 10,000 patients suffering from chronic obstructive pulmonary disease (COPD) will now be monitored in their homes by Air Liquide, following the signing of a contract with the National Health Service. This major success forms part of the Group's wider development goals in the United Kingdom, and complements the strategic acquisitions made there in 2007. Significant health contracts were also reached in Canada, Australia and South Africa.

In the hospital sector, Air Liquide has seen strong growth in its activities in both North and South America, and is consolidating its presence in Poland, thanks to the construction of a Schülke production plant (hospital hygiene).

The Group's solutions have also progressed significantly. The first anesthesia procedures using LENOXe™ (composed of xenon) have been achieved in Italy and Portugal. The vasodilator VasoKINOX™ (a nitrogen monoxide-based product), which has specific applications in cardiac surgery, received market approval in several European countries. Two new service offers have also been launched in the French homecare market: Pro'Inspire, designed to support patients suffering from COPD, and VitalPPC, to support the treatment of sleep apnea.

The Healthcare World Business Line (WBL) provides to its customers, in hospitals or at home, medical products and services that contribute to the improvement of patients' quality of life, all around the world.

#### →...and new projects

The Group continues a comprehensive modernization of its medical gas production tools in Europe (France, Italy, Belgium, Portugal), specifically for production of the latest gases in its range (KINOX™, LENOXe™). In Hamburg, Germany, the Group is also building a manufacturing plant for sterile hygiene products, enabling the Group to support demand for antiseptic products and to meet the latest needs of the biotechnologies market.

Lastly, in August 2008, Air Liquide acquired Indian medical equipment manufacturer Electrocure Systems. This operation, the Group's first steps into the Indian health market, provides Air Liquide with a solid base for further development in this country.

#### → 2009, shoulder-to-shoulder with patients and medical staff

Building on its success in 2008, Air Liquide is now ready to respond to the strong growth of the health sector predicted for 2009, in both the hospital and homecare domains.

All over the world, Air Liquide's teams will continue to provide health professionals with daily support, helping them to leverage technological progress for the benefit of their patients, all the while working to achieve the highest possible safety and quality standards. Beyond its established presence in Europe, the Group aims to strengthen its hospital activities in the United States, and in emerging economies such as China.



## → A COMPREHENSIVE SOLUTION FOR PULMONARY ARTERIAL HYPERTENSION

Acute pulmonary arterial hypertension (PAH) is a complex medical condition which often has serious consequences. Today, treatment for the condition is much improved, in particular thanks to the use of inhaled nitrogen monoxide. In 2008, Air Liquide was granted the market approval for its new nitrogen monoxide product VasoKINOX™ in several European countries.

### **An adapted solution**

PAH is an extremely serious condition, leading to heart failure and death if left untreated. It results in chronic high pulmonary blood pressure.

PAH can be halted by the administration of vasodilators, medicines which dilate blood vessels and raise blood oxygenation. In this field of treatment, Air Liquide has developed VasoKINOX™, an inhaled vasodilator composed of nitrogen monoxide, a gas naturally produced by arterial cells.

VasoKINOX™ is appropriate for the treatment of PAH arising either during or after heart surgery, both in adults and children.

In 2008, Air Liquide received the market approval for this new offer in Spain, Portugal and Belgium. Other countries should soon be added to this list.

### **VasoKINOX™ and OptiKINOX™, a winning combination**

Thanks to its composition, VasoKINOX™ can deliver a discriminatory medical effect: inhaled nitrogen monoxide acts solely on lungs' ventilated zones, and unlike other products does not lead to heavier cardiac output. Moreover, VasoKINOX™ gets to work just seconds after it is administered to the patient.

For the administration of VasoKINOX™, Air Liquide has developed a specific administration system, OptiKINOX™, which is integrated into a mobile, ready-to-use treatment station.

OptiKINOX™ is easily programmable, allowing the necessary doses of inhaled nitrogen monoxide to be precisely administered to the patient's respiratory system, where the gas is diluted with oxygen. Besides OptiKINOX™ itself, the treatment station houses two VasoKINOX™ cylinders, an emergency MiniKINOX™ system, and an analysis kit.

VasoKINOX™, with the OptiKINOX™ administration system, should now contribute to the treatment of between 60,000 and 80,000 PAH patients each year all across the world, saving lives wherever it is used.



**The OptiKINOX™ station should now contribute to the treatment of between 60,000 and 80,000 PAH patients each year.**

## FIRST STEPS IN THE INDIAN HEALTH MARKET



In 2008, Air Liquide established itself in the Indian health sector. The Group acquired Electrocure Systems, a company specializing in medical equipment for respiratory care – an important acquisition in a booming country.

### → India: growing needs

With a population of more than one billion people and a GDP strongly increasing every year, India's health industry is one of the most rapidly developing in the world, growing almost 15% per year.

Numerous hospitals equipped with state-of-the-art technologies are under construction or development in order to meet India's (and the world's) growing needs. India is set to become one of the main destinations for complex surgeries, such as cardiac or orthopedic surgery. These operations are performed in top class facilities by doctors recognized as among the best in the world, for prices much lower than those in Western countries.

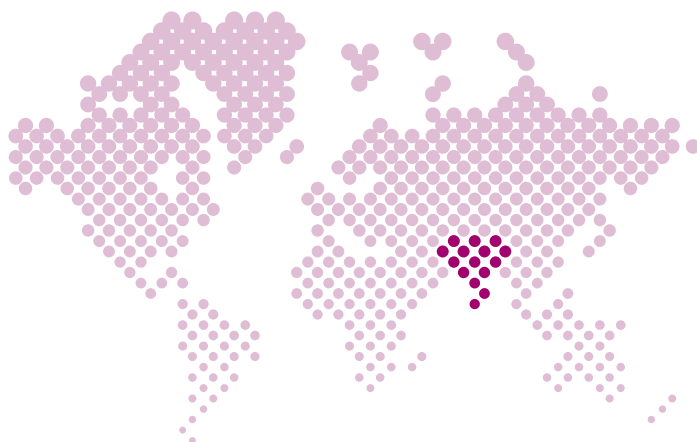
### → A leader in respiratory care

Founded in 1987, Electrocure Systems is located in the southern Indian city of Chennai, considered to be the Indian health capital. The company manufactures ventilators and medical air generators, and distributes medical respiratory equipment made by Air Liquide. Thanks to this activity, it became a leader in the field of respiratory care equipment.

Over the last 20 years, Electrocure and Air Liquide have developed relationships of trust and become recognized partners of Indian hospitals. The 100% acquisition of Electrocure Systems provides Air Liquide with a solid position in the Indian health market. The Group intends to develop respiratory activity of its Healthcare WBL in the country, whether providing equipment, medical gases or services to patients in hospitals and at home.

### → An action with far reaching effects

This acquisition should be followed soon by others in India and in neighboring countries. Air Liquide is already at the vanguard of the intensive care ventilator market. Lastly, the acquisition of Electrocure Systems enables the Group to act simultaneously on two of its five growth drivers: the development of activities in emerging economies, and health.



ENGINEERING  
AND CONSTRUCTION

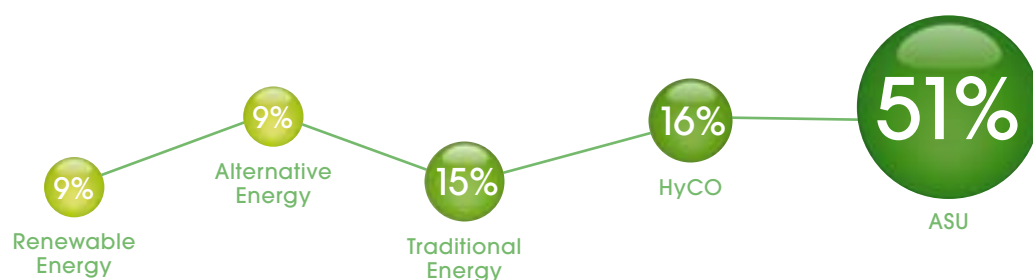


# LARGE SCALE PROJECTS



# €1,081 million revenue

## ORDERS IN HAND



### → Projects on a large scale

The Engineering and Construction Division, with 3,800 employees worldwide, constructs the Group's production units – mainly air separation units (ASUs) and hydrogen production units – and provides plants for third party clients in sectors as varied as refining, production of methanol and its derivatives, and biofuels. The Lurgi teams were partially redeployed to internal projects in order to develop the Hydrogen division.

### → 2008: a dynamic year

In 2008, Lurgi launched the design of the Group's future hydrogen production unit at Rotterdam. This new 130,000m<sup>3</sup>/hour unit will meet the needs of Neste Oil, among others.

In China, the division was sustained year-long mainly by contracts for equipment supply for Heibi (2,200 metric tons of oxygen per day) and Yangkuang (2,000 metric tons of oxygen per day).

Finally, Air Liquide concluded a contract with Posco for two 3,700 metric ton/day ASUs, which will be added to the 15 units already constructed by the Group.

In Russia, Air Liquide signed a contract to provide Eurochem with a plant.

### → Continuing to make progress

Engineering and Construction is constantly looking to increase the competitiveness of its products for the Group and its customers, reducing investment and operating costs through improving unit performance and decreasing projects' total timeline. To achieve this goal, the Group uses various methodologies, such as value engineering, design to cost and design to market. Air Liquide is continuing its development efforts in the second generation biofuel sector and launched the construction of a pilot unit for this kind of fuel in collaboration with the Karlsruhe Institute for Technology (Forschungszentrum Karlsruhe). This investment is the follow up to a first phase, completed in 2007, and aims to showcase the production of synthesis gas from biomass.

The Group is also helping develop oxycombustion by providing ASUs and cryogenic carbon dioxide purification units, especially as part of a technological partnership with Australian group Callide Oxyfuel Services.



## → **BIOLIQ®: SECOND GENERATION BIOFUELS IN THREE STEPS**

Unlike first generation biofuels, those of the second generation (2G) are produced using the non-edible elements of biomass, such as straw, wood, and vegetable waste.

Air Liquide has begun the construction of a 2G biofuel production plant at the Karlsruhe Institute for Technology, in Germany. The goal is to prove the viability of Bioliq®, a three-step production process which enables the transformation of the biological material through synthesis gas into second generation biofuel.

### **Bioliq®: a three-step process**

The first phase of the Bioliq® process, achieved successfully in 2008, involves transforming straw or other agricultural and woodland waste into a raw synthetic slurry (bioliqSynCrude®). The second sept of the project is a gasification process, transforming the slurry into raw synthetic gas, a mixture of hydrogen and carbon monoxide. This stage of the project involves engineering, procurement, construction, and start up of the unit, with a planned operation in the fall of 2011. The third and last phase of the project will involve the conversion of the synthesis gas into a liquid fuel. The entire project is being coordinated by Lurgi, a pioneer in gasification technologies which was integrated into the Air Liquide Group in 2007. The project is being completed in collaboration with the Karlsruhe Institute for Technology (KIT).

### **Latest generation, latest performance**

The different phases of the Bioliq® process enable the transformation of the non-edible part of plants into synthetic fuels for vehicles (a process commonly called "Biomass to Liquid" or BtL). Biofuels produced through this method have a significantly smaller carbon footprint than alternative fuels: CO<sub>2</sub> emissions from this method are some 90% lower than those of mineral fuel combustion, and 50% lower than first generation biofuels.

The production of these biofuels does not have an impact on world food supplies, since they are produced from the non-edible parts of biomass: this means that the fruit or sugars of the base plant can still be harvested as food.





## AIR LIQUIDE IN CHINA: SETTING THE PERFORMANCE STANDARD



Air Liquide is preparing to deliver two air separation units (ASUs) to Shenhua Ningxia Coal Group (China). The gases produced by these ASUs are key to the coal gasification process. This contract is particularly important for Air Liquide as the Group seeks to reinforce its position in this strategically important economy, where the Group's new standardized separation units are being designed and manufactured.

### → A crucial Air Liquide business entity

Founded in 1995, Air Liquide's subsidiary in China is situated in the region of Shanghai. The core activity of this unit and its 700 employees is based on the design and manufacture of air separation units (ASUs), up to very large sizes. The units produce oxygen and nitrogen, as well as rare gases such as argon. Air Liquide mainly serves the Chinese market, which is by some distance the world's largest for these units.

The Chinese subsidiary is at the heart of the Group's worldwide program to standardize the Group's ASU range. Its engineers design standardized ASUs that are modular, more compact, less costly, easier to construct and can be delivered faster to customers.

This standardization process is crucial for the growth of the Group, both in China and elsewhere. This is why this subsidiary occupies a key position at the core of the Engineering and Construction Division. Thanks to the support and expertise of the Group, it has been able to improve production standards and further develop its strategy, while simultaneously doubling its size, profile and capacity in 2008.

The Group is continuing on this development trajectory thanks to the signature in 2008 of an important agreement with Shenhua Ningxia Coal Group (SNCG), a world leader in coal production and technologies. Air Liquide will supply the Chinese company with two ASUs with a capacity far surpassing those of existing units in the region (with 3,150 metric tons of oxygen produced per day, per ASU) for propylene production. SNCG produces propylene, a base product for plastics, via coal gasification.

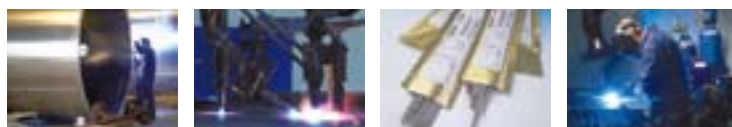
This contract forms part of Air Liquide's development strategy. It will help the Group become a significant reference in the promising market covering all use of oxygen for the production of chemicals and synthetic fuels through coal gasification.

### → A prestige contract

This strong involvement has enabled Air Liquide to become the partner of choice for a number of Chinese corporations which are active in the chemicals market (Huainan General Chemical Works), in petrochemicals (Shanghai Petrochemical Co., Ltd.), welding (BaoSteel, Anshan Steel), and more.



## WELDING-CUTTING



## A RENAISSANCE RANGE

Air Liquide offers a range of varied, innovative welding and metal cutting solutions in robotics, consumables and protective equipment, responding to the specific technological challenges faced by its customers.

It strategically positions the products of the Group's five main brands so that they can provide more complete, harmonized service bundles to customers, perfectly suited to international deployment. In simplifying and streamlining the ranges of products and services, largely thanks to a new customer coding system, Air Liquide is better able to respond to customer needs, and is also gaining market visibility.

The Group today offers solutions adapted to the needs of its diverse customer base: industrial customers are served by the Oerlikon and Saf-Fro brands; semi-professional users by Cemont; and the DIY market through Weldteam. In addition, the Weldline brand offers the necessary accessories and protective equipment for welders.

**€614 million  
revenue**

### → A complete, harmonized offer

Greater safety, greater productivity and greater technology: as a world leader in its field, Air Liquide is constantly seeking to improve its products, solutions and services.

To achieve this goal, the Group has launched a project to redefine its product range. The 'New Offer' project, rolled out in 2008, broadens the Group's activities to include new parts of the welding and cutting market.

### → Always innovating

The complete reorganization of the Welding-Cutting activity goes along with the development and marketing of innovative and productivity-enhancing products: the TOPTIG welding process has been a trailblazer in accomplishing this strategic goal. Already present on the European, South African and Canadian markets, TOPTIG successfully entered the Japanese market in 2008.

For its part, Saf-Fro has just launched its new range of compressed air plasma cutting equipment for manual applications (PRESTOJET and PLASMAJET), which are faster and more efficient than existing products.

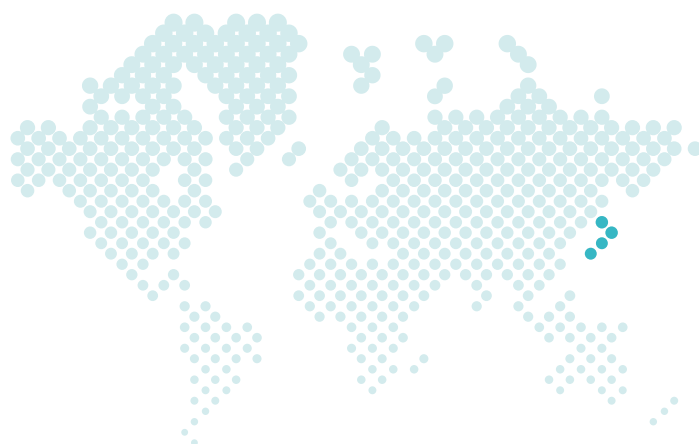
The Spray Modal™ process is a further demonstration of Air Liquide innovation at work, the process significantly improving the precision welding of aluminum components.

## TOPTIG: FROM THE WEST TO THE LAND OF THE RISING SUN

Conceived in 2005 at the CTAS, Air Liquide's welding applications research center in Saint-Ouen-l'Aumône, France, TOPTIG is an innovative, robotized welding process. It has now been adopted by some 100 customers in the automotive, aeronautical, metal joinery and manufacturing industries. Following its successful entry into the European, South African and Canadian markets, TOPTIG recently made a successful debut in Japan.

### → TOP quality welding

TOPTIG assures high quality welding of thin sheets, and enhances productivity. The product improves the TIG welding process, which involves the generation of an electric arc (screened by an inert 'shielding' gas) between the non-consumable electrode and the metallic part to be welded. Where TOPTIG is innovative is in its use of a patented Air Liquide torch, the design of which enables the introduction of the filler metal towards the weld seam at an angle which, amongst other advantages, reduces spatters, fumes and noise. The result is perfect welded joints in record time and significantly improved working conditions for operators.



### → Success in Japan

The precision, speed and reliability of TOPTIG have impressed Japanese businesses, amongst the most demanding customers in the world. Prior to its launch on the Japanese market in 2007, the process was adapted to meet local standards, a vital step to ensuring its success. Japan Air Gases (JAG), Air Liquide's subsidiary in Japan, coordinated the technical re-configuration of the TOPTIG power source, its robotic interface and its automatic electrode replacement system. For its part, Air Liquide took responsibility for forming local site teams to ensure that the TOPTIG process was understood and properly maintained over time. One year later, TOPTIG was unveiled at the international welding exhibition in Osaka. Thanks to the JAG marketing campaign, TOPTIG was rapidly adopted by major Japanese companies, including Toyota, Honda and Yamaha. Since 2008, a distribution contract has also been signed between Air Liquide and Japan's OTC-DAIHEN Corporation. The aim is to roll out this innovative process in markets across Asia. For TOPTIG, the journey is a long way from being finished!



## SPECIALTY CHEMICALS



# WINNING FORMULAE

A subsidiary of Air Liquide since 1986, SEPPIC develops and markets specialty chemicals and innovative biological products (e.g., active ingredients, excipient products, vaccine adjuvants, polymers) which are used in the health/beauty and industrial sectors.

### → From health to industry

SEPPIC's customers belong to one of four broad sectors: cosmetics, pharmaceutical/nutrition, vaccines and industry. The ingredients developed by the Group have a range of different applications, but all bring enhanced performance to their customers, and are frequently patented. They contribute to the manufacture of cosmetics with unrivalled effects and enhanced properties, to the production of more effective medications, new vaccines, better-protected fiber-optics, and to the manufacture of resistant coatings for painted surfaces.

### → 2008: internationalization and innovation

2008 was marked by an important movement towards internationalization in South America and Asia. SEPPIC has created a commercial subsidiary in Brazil and has opened an office in Colombia. In Asia, two other regional offices have been opened in Singapore and India. Lastly, a production plant dedicated to the manufacture of vaccine adjuvants for animals has been established in China. Today, SEPPIC is present in more than 80 countries through its subsidiaries, offices and network of distributors.

In innovation, 34 patents were secured in different sectors of the business, in particular with the development of SEPITRAP™ (pharmaceuticals), an agent to make substances soluble in powdered form, the launch of two anti-wrinkle ingredients, Timecode™ and Survicode™ (cosmetics), and MONTANIDE™ gel, a vaccine adjuvant (animal health). These and many other innovations have enabled SEPPIC to significantly strengthen its position as market leader.

## SEPPIC AND THE FIRST THERAPEUTIC VACCINE FOR LUNG CANCER

SEPPIC has developed pioneering expertise in vaccine adjuvants. Air Liquide's Specialty chemicals arm is today part of a major world first: a therapeutic vaccine developed specifically to treat lung cancer, one of the most widespread cancers in the world.

### → A huge step forward in therapy

CimaVax EGF is the first vaccine targeted at cancer, in this case, lung cancer, and is the result of 16 years of research. The product is a therapeutic vaccine, meaning that it combats (rather than prevents) the developed illness by selectively stimulating the immune system of patients. Benefits for patients include a lengthening of life-expectancy by several months, pain relief, and positive effects on patients' lack of appetite and breathing difficulties. Use of the vaccine is less onerous and causes fewer side effects than radiotherapy and chemotherapy treatments, which CimaVax EGF complements, but for which it does not substitute.

### → Lasting success

The encouraging results achieved through the use of CimaVax EGF should soon open up new markets for the product in other countries. For SEPPIC, the first officially recorded success of one of its adjuvants in a human therapeutic vaccine should accelerate the development of a further 150 projects currently being run with its customers. A number of these are phase 3 projects (which immediately precedes their launch on the market). Lastly, this major success also strengthens Air Liquide's position in the human Health sector.

### → SEPPIC's decisive contribution

For more than 15 years, SEPPIC, building on its legitimacy in the animal vaccine adjuvants market, has progressively developed its expertise in the market for oil adjuvants for human vaccines. This technical expertise, bolstered and maintained by the competence of SEPPIC's teams, makes the subsidiary the partner of choice for a range of research institutes around the world. SEPPIC provides the vaccine adjuvant MONTANIDE™ ISA 51. This innovative substance allows the progressive and controlled release of the vaccine's active ingredient, simultaneously enhancing the effectiveness and tolerance of the treatment.





## AERONAUTICS, SPACE, CRYOGENICS



## INNOVATION AS THE COMMON THEME

In response to the requirements of its clients for state-of-the-art applications in scientific applications, both aeronautical and spatial, Air Liquide designs highly sophisticated systems which leverage the Group's technologies and expertise in gases and very low-temperature cryogenics.

as well as cryogenic systems for the exploratory observational satellites Planck and Herschel, due to be launched by Ariane 5 in 2009. At les Mureaux (France), the liquid hydrogen and oxygen tanks for Ariane 5 are built. Looking to the future, Air Liquide is participating in the development of the new upper level of the future European launcher system through the HX project which is being coordinated by CNES (the French space agency). Meanwhile, in Kourou, French Guiana, Air Liquide Spatial Guyane produces propulsion liquids for Ariane 5, and provides technical support at the launch pad.

### → From the earth... to space

With more than 50 years experience, the Group is today a world-renowned actor in the space domain. At its Sassenage site in France, Air Liquide maintains a unique capability, which includes the design and manufacture of cryogenic tanks for the Ariane 5 launcher, as well as equipment required for orbital systems. Teams from the Group's Advanced Technologies Division (DTA) have developed key components of the MELFI refrigeration system, deployed on the international space station (ISS),

### → Developments in aeronautics

Building on its position as a world leader in air separation technologies, the Group is innovating to broaden its offer to respond more directly to the requirements of the aeronautical industry. Air Liquide teams are now designing oxygen and nitrogen production systems which are fitted directly to aircraft. Such systems increase flight safety.

## AIR LIQUIDE AND KSTAR: MASTERING NUCLEAR FUSION

Scientists working on the KSTAR project, which studies thermonuclear fusion, have produced the first plasmas inside an experimental reaction chamber. The goal is production of an inexhaustible energy of the future. Progress in plasma production is a source of significant pride for the scientific community as a whole and for Air Liquide, a partner to the project coordinators since its inception.

### → From the atom's core, the energy of the future

Mastery of nuclear fusion offers the potential to produce electrical energy in a whole new way, helping resolve global energy shortages. The KSTAR (Korean Superconducting Tokamak Advanced Research) project, which is run by the Korea Basic Science Institute (Daejeon, South Korea) is committed to this goal. KSTAR seeks to develop an experimental reactor to increase understanding and mastery of this physical reaction. The entire project depends on a highly sophisticated physics instrument: the Tokamak. Thanks to the creation of powerful electromagnetic fields, this apparatus enables the generation of a plasma that is a necessary pre-condition for controlled atomic nuclear fusion. Similar to the reaction which occurs at the heart of the sun, this reaction releases massive amounts of energy which can be converted into electricity. The operation of the Tokamak requires the use of superconducting magnets which only operate effectively at ultra low temperatures. Air Liquide, a world expert in state-of-the-art cryogenic systems, has been a partner of the KSTAR project since 2005. The Group has designed, built and put into service an unprecedented helium supercritical liquefaction and distribution system to bring the entire apparatus to ultra low temperatures:  $-269^{\circ}\text{C}$ , close to absolute zero, the lowest attainable temperature in the universe.



### → Air Liquide and nuclear fusion

Besides KSTAR, Air Liquide has participated in the world's most important nuclear fusion projects for more than 20 years: Tore Supra (France), JET (United Kingdom), and SST-1 (India) all feature on the Group's list of references. This long-term engagement has enabled the Group to develop unique, specialist knowledge in this domain. Today, Air Liquide continues to produce innovative and high-performance cryogenic solutions for its customers.

As a result of this experience, Air Liquide today finds itself in an excellent position to participate in the future ITER (International Thermonuclear Experimental Reactor) project. This new nuclear fusion reactor is currently being assembled at Cadarache (in southern France). An unprecedented project, and the result of truly international collaborative efforts, ITER aims to demonstrate the industrial feasibility of electricity production by nuclear fusion.



## DIVING



# A WAVE OF PROGRESS

The world leader in diving material, Aqua Lung, an Air Liquide subsidiary, designs equipment for leisure, professional, and military diving as well as for other aquatic hobbies.

### → In the ocean, in swimming pools, and even in the air!

Aqua Lung remains the world leader in the leisure diving market, thanks to its line of high-quality, innovative products and its extensive distribution network.

Focused on aquatic hobbies, the Sporting Goods division of Aqua Lung focuses on two sectors: fitness swimming and snorkeling.

The military activity recorded strong growth in 2008. It is currently active in two distinct markets, both in rapid development due to the current fight against terrorism: military diving equipment and personal safety devices aboard aircraft.

### → 2008: continual innovation

Aqua Lung introduced several innovative products into the leisure diving market that received a warm welcome from dive shops and consumers. These innovations included: Mikron, the smallest and lightest regulator on the market (a diving device that adjusts the pressure of a compressed gas), Slingshot, pivoting fins that enhance thrust while lowering effort, and Pearl I3, a next generation buoyancy compensator suit for women. Furthermore, in 2008 two major contracts were signed in the military sector, one with the US Army and another with the French Navy, both for the delivery of breathing and diving equipment.

### → Spotlight on swimming, military, and Eastern Europe

Aqua Lung intends to further its strategy of diversification by increasing its investments in the military and swimming divisions. The subsidiary also plans to increase its presence in the developing economies of Eastern Europe, where a growing leisure market is appearing.



## AQUA LUNG GIVES A SECOND WIND TO ARMED FORCES

In 2008 two major contracts were signed in the military sector: one for the delivery of PHODS breathing apparatus to the helicopter section of the US Army, the other for the delivery of CRABE diving equipment to the French Navy. Aqua Lung has thus committed its know-how to producing respiratory equipment for military pilots and divers.

### → PHODS combats hypoxia

Above a 3,100 meters altitude, teams in depressurized helicopters start feeling the effects of the lack of oxygen (hypoxia), including slow reaction time, confusion, and dizziness. Until now, American soldiers, who operate mainly between 3,100 and 5,580 meters, used simple tubes connected to oxygen cylinders to stave off hypoxia. With PHODS (Personal Helicopter Oxygen Delivery System), designed by Aqua Lung, oxygen travels automatically via nasal tubes or masks, thus limiting potential leaks. The result is a greatly reduced risk of fire and an oxygen duration extended to 2 ½ hours at 4,650 meters altitude!

PHODS has already been successfully tested in low-pressure chambers and with three different engine types. The pilots never felt any discomfort, even above 5,580 meters. Moreover, oxygen tanks are easy to change and can be recharged on board – a simple and effective solution to providing oxygen in low-pressure aircraft.

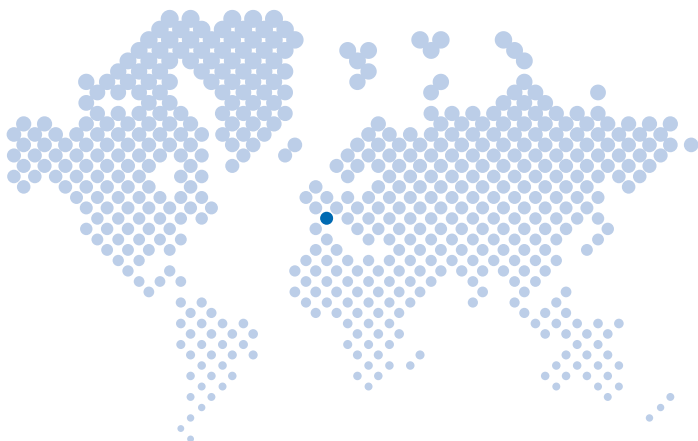
Attracted by these results, the US Army ordered 7,000 respiratory systems from the Group for its high-altitude helicopter teams.



### → A successful dive for CRABE

Aqua Lung won the French Navy's call for tenders to renovate its diving material. At the core of the proposition is CRABE (Complete Range Autonomous Breathing Equipment), an innovative, "recycling" diving apparatus that keeps some of the gas exhaled by the diver, reintroducing it into the respiratory system. The result is increased autonomy, comfort, and diving time, all in complete safety thanks to an emergency breathing channel.

Demagnetized and nearly silent, CRABE is thus undetectable by mines, which use magnetic or auditory sensors. Easy-to-use, shock-resistant, and able to withstand variations in temperature, it enables divers to focus on their mission, not their equipment. The Group will deliver 270 CRABE devices to the French Navy. The contract also provides maintenance for devices in use and replacement parts for a period of 30 years. CRABE is sure to be around for a long while.



# FINANCIAL INFOR MATION



# CONSOLIDATED INCOME STATEMENT

FOR THE YEAR ENDED DECEMBER 31

In millions of euros	2007	2008
<b>Revenue</b>	<b>11,801.2</b>	<b>13,103.1</b>
Purchase	(4,547.9)	(5,547.1)
Personnel expenses	(2,037.8)	(2,176.8)
Other income and expenses	(2,485.5)	(2,437.4)
<b>Operating income recurring before depreciation and amortization</b>	<b>2,730.0</b>	<b>2,941.8</b>
Depreciation and amortization expense	(935.9)	(992.8)
<b>Operating income recurring</b>	<b>1,794.1</b>	<b>1,949.0</b>
Other non-recurring operating expenses	(5.3)	(30.2)
<b>Operating income</b>	<b>1,788.8</b>	<b>1,918.8</b>
Net finance costs	(179.4)	(214.4)
Other net financial expenses	(54.3)	(55.9)
Income taxes	(411.8)	(401.5)
Share of profit of associates	26.7	24.8
<b>Profit for the period</b>	<b>1,170.0</b>	<b>1,271.8</b>
Minority interests	46.9	51.8
<b>Net profit (Group share)</b>	<b>1,123.1</b>	<b>1,220.0</b>
<b>Basic earnings per share</b> (in euros)	<b>4.26</b>	<b>4.70</b>
<b>Diluted earnings per share</b> (in euros)	<b>4.22</b>	<b>4.67</b>

# CONSOLIDATED BALANCE SHEET (SUMMARIZED)

FOR THE YEAR ENDED DECEMBER 31

In millions of euros	December 31, 2007	December 31, 2008
<b>ASSETS</b>		
Goodwill	3,642.7	3,956.2
Intangible assets and property, plant and equipment	9,098.2	10,236.1
Other non-current assets	718.5	712.2
<b>TOTAL NON-CURRENT ASSETS</b>	<b>13,459.4</b>	<b>14,904.5</b>
Inventories and work-in-progress	795.9	818.3
Trade receivables and other current assets	3,240.0	3,388.3
Cash and cash equivalents including fair value of derivatives (assets)	796.4	1,493.6
<b>TOTAL CURRENT ASSETS</b>	<b>4,832.3</b>	<b>5,700.2</b>
<b>TOTAL ASSETS</b>	<b>18,291.7</b>	<b>20,604.7</b>

In millions of euros	December 31, 2007	December 31, 2008
<b>EQUITY AND LIABILITIES</b>		
Shareholders' equity	6,328.3	6,856.8
Minority interests	148.1	148.8
<b>TOTAL EQUITY</b>	<b>6,476.4</b>	<b>7,005.6</b>
Provisions, pensions, other employee benefits & deferred tax liabilities	2,755.6	2,636.5
Non-current borrowings	4,992.7	6,205.2
Other non-current liabilities	163.0	193.4
<b>TOTAL NON-CURRENT LIABILITIES</b>	<b>7,911.3</b>	<b>9,035.1</b>
Provisions, pensions and other employee benefits	168.9	244.8
Trade payables and other current liabilities	3,304.9	3,553.9
Current borrowings including fair value of derivatives (liabilities)	430.2	765.3
<b>TOTAL CURRENT LIABILITIES</b>	<b>3,904.0</b>	<b>4,564.0</b>
<b>TOTAL EQUITY AND LIABILITIES</b>	<b>18,291.7</b>	<b>20,604.7</b>

# CONSOLIDATED STATEMENT OF CASH FLOWS

FOR THE YEAR ENDED DECEMBER 31

In millions of euros	2007	2008
<b>Cash flow from operating activities before changes in working capital</b>	<b>2,054.4</b>	<b>2,206.7</b>
Changes in working capital	93.6	127.9
Other	(45.9)	(41.7)
<b>Net cash from operating activities</b>	<b>2,102.1</b>	<b>2,292.9</b>
Purchase of property, plant and equipment and intangible assets	(1,359.3)	(1,908.3)
Acquisition of subsidiaries and financial assets	(1,308.2)	(242.3)
Proceeds from sale of property, plant and equipment and intangible assets	193.7	50.5
Proceeds from sale of financial assets	6.1	7.5
<b>Net cash used in investing activities</b>	<b>(2,467.7)</b>	<b>(2,092.6)</b>
Dividends paid		
- L'Air Liquide S.A.	(496.9)	(550.8)
- Minority interests	(33.3)	(39.0)
Proceeds from issues of share capital	91.4	44.5
Purchase of treasury shares	(533.9)	(168.2)
Increase (decrease) of borrowings	1,111.3	1,042.0
<b>Net cash used in financing activities</b>	<b>138.6</b>	<b>328.5</b>
Effect of exchange rate changes and change in scope of consolidation	59.9	(41.2)
<b>Net increase (decrease) in cash and cash equivalents</b>	<b>(167.1)</b>	<b>487.6</b>
<b>NET CASH AND CASH EQUIVALENTS AT BEGINNING OF PERIOD</b>	<b>821.0</b>	<b>653.9</b>
<b>NET CASH AND CASH EQUIVALENTS AT END OF PERIOD</b>	<b>653.9</b>	<b>1,141.5</b>

# NET INDEBTEDNESS CALCULATION

In millions of euros	2007	2008
Non-current borrowings (long-term debt)	(4,992.7)	(6,205.2)
Current borrowings (short-term debt)	(371.5)	(611.4)
<b>TOTAL GROSS INDEBTEDNESS</b>	<b>(5,364.2)</b>	<b>(6,816.6)</b>
<b>Total cash and cash equivalents</b>	<b>726.9</b>	<b>1,262.9</b>
Derivative instruments (assets) - fair value hedge of borrowings		116.2
Derivative instruments (liabilities) - fair value hedge of borrowings	(22.9)	(46.9)
<b>TOTAL NET INDEBTEDNESS AT THE END OF THE PERIOD</b>	<b>(4,660.2)</b>	<b>(5,484.4)</b>

# STATEMENT OF CHANGES IN NET INDEBTEDNESS

In millions of euros	2007	2008
<b>NET INDEBTEDNESS AT THE BEGINNING OF THE PERIOD</b>	<b>(3,446.6)</b>	<b>(4,660.2)</b>
Net cash from operating activities	2,102.1	2,292.9
Net cash used in investing activities	(2,467.7)	(2,092.6)
Net cash used in financing activities excluding increase (decrease) of borrowings	(972.7)	(713.5)
<b>Total net cash flow</b>	<b>(1,338.3)</b>	<b>(513.2)</b>
Effect of exchange rate changes, change in scope of consolidation and others	124.7	(311.0)
<b>Change in net indebtedness</b>	<b>(1,213.6)</b>	<b>(824.2)</b>
<b>NET INDEBTEDNESS AT THE END OF THE PERIOD</b>	<b>(4,660.2)</b>	<b>(5,484.4)</b>

# CONSOLIDATED STATEMENT OF CHANGES IN EQUITY

FOR THE YEAR ENDED DECEMBER 31

In millions of euros	Share capital	Additional paid-in capital	Retained earnings (including net profit)	Net income recognized directly in equity	Translation reserves	Treasury shares	Shareholders' equity	Minority interests	Total equity
<b>Equity and minority interests as of January 1, 2008</b>	<b>1,313.6</b>	<b>5.9</b>	<b>5,945.3</b>	<b>11.2</b>	<b>(732.7)</b>	<b>(215.0)</b>	<b>6,328.3</b>	<b>148.1</b>	<b>6,476.4</b>
Profit for the period			1,220.0				1,220.0	51.8	1,271.8
Fair value variation of financial instruments				(27.5)			(27.5)		(27.5)
Change in foreign currency translation reserve					(5.3)		(5.3)	8.0	2.7
<b>Total income and expenses for the period</b>			<b>1,220.0</b>	<b>(27.5)</b>	<b>(5.3)</b>		<b>1,187.2</b>	<b>59.8</b>	<b>1,247.0</b>
Increase (decrease) in share capital	4.3	37.2					41.5	3.0	44.5
Allotment of bonus shares	133.2	(14.3)	(118.9)						
Distribution			(550.8)				(550.8)	(39.0)	(589.8)
Cancellation of treasury shares	(16.0)	(10.4)	(245.9)			272.3			
Purchase of treasury shares						(168.2)	(168.2)		(168.2)
Share options			14.5				14.5		14.5
Put options of minority interests								(10.0)	(10.0)
Other			4.2			0.1	4.3	(13.1)	(8.8)
<b>Equity and minority interests as of December 31, 2008</b>	<b>1,435.1</b>	<b>18.4</b>	<b>6,268.4</b>	<b>(16.3)</b>	<b>(738.0)</b>	<b>(110.8)</b>	<b>6,856.8</b>	<b>148.8</b>	<b>7,005.6</b>

In millions of euros	Share capital	Additional paid-in capital	Retained earnings (including net profit)	Net income recognized directly in equity	Translation reserves	Treasury shares	Shareholders' equity	Minority interests	Total equity
<b>Equity and minority interests as of January 1, 2007</b>	<b>1,332.6</b>	<b>75.3</b>	<b>5,577.6</b>	<b>3.6</b>	<b>(574.8)</b>	<b>(128.5)</b>	<b>6,285.8</b>	<b>281.0</b>	<b>6,566.8</b>
Profit for the period			1,123.1				1,123.1	46.9	1,170.0
Fair value variation of financial instruments				7.6			7.6		7.6
Change in foreign currency translation reserve					(157.9)	(0.2)	(158.1)	(9.8)	(167.9)
<b>Total income and expenses for the period</b>			<b>1,123.1</b>	<b>7.6</b>	<b>(157.9)</b>	<b>(0.2)</b>	<b>972.6</b>	<b>37.1</b>	<b>1,009.7</b>
Increase (decrease) in share capital	9.0	79.9					88.9	2.5	91.4
Distribution			(496.9)				(496.9)	(33.3)	(530.2)
Cancellation of treasury shares	(28.0)	(149.3)	(270.3)			447.6			
Purchase of treasury shares						(533.9)	(533.9)		(533.9)
Share options			12.9				12.9		12.9
Put options of minority interests								(1.1)	(1.1)
Other			(1.1)				(1.1)	(138.1)	(139.2)
<b>Equity and minority interests as of December 31, 2007</b>	<b>1,313.6</b>	<b>5.9</b>	<b>5,945.3</b>	<b>11.2</b>	<b>(732.7)</b>	<b>(215.0)</b>	<b>6,328.3</b>	<b>148.1</b>	<b>6,476.4</b>



# GLOSSARY

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## Absolute zero

It is the coldest temperature theoretically possible. By international agreement, it is defined as  $-273.15^{\circ}\text{C}$  or 0 Kelvin.

## Adjuvant

An additive that strengthens another element or reinforces the element's effectiveness.

## Advanced precursors

The increasing performance of electronic chips requires the use of new materials. These materials are supplied and integrated into the chips by advanced precursors, complex molecules that are generally liquid.

## ALLEX

Air Liquide Leading Engineering Excellence: program for training young engineers by rotating them through various positions.

## Biomass

Organic materials, usually plant-based, that can be used to produce energy, or to serve other purposes.

## Carrier gases

Carrier gases (nitrogen, oxygen, hydrogen, etc.) are used to transport and dilute process gases or to protect semiconductors from minute dust particles.

## COPD

Patients with COPD (chronic obstructive pulmonary disease), also known as "smokers' disease", cannot breathe properly and have trouble oxygenating their organism.

## Cogeneration

The simultaneous production of steam and electricity. Cogeneration enables more efficient use of primary energy and produces less air pollution, specifically fewer carbon dioxide ( $\text{CO}_2$ ) emissions.

## Effluent

Any gas or liquid waste material that carries polluting agents and contains substances hazardous to the environment.

## Electrolysis

The chemical decomposition of some substances exposed to an electric current.

## F<sub>ab</sub>

A plant that makes semiconductors.

## Fischer-Tropsch process

A catalyzed chemical reaction between carbon monoxide ( $\text{CO}$ ) and hydrogen ( $\text{H}_2$ ), which is used to produce hydrocarbon fuel.

## Greenhouse effect

The greenhouse effect prevents solar heat from dissipating back into space. This effect is necessary because without it, the average temperature on the surface of the Earth would be  $-18^{\circ}\text{C}$ . However, negative consequences arise when too much greenhouse gas concentrates within the atmosphere.

## Higgs boson

A type of particle that many elementary particle physicists believe exists. It is hypothesized that these particles determine the mass of all particles in the Universe. However, their existence has not yet been proven.

## HyCO unit

Unit that produces simultaneously hydrogen and carbon monoxide.

## Know-AL

A program designed to mobilize experienced employees to be "lent" for up to six months to a Group subsidiary for a specific need.

## Liquid gases

Gases can assume a liquid form, usually at an extremely low temperature, thus considerably reducing their volume. For example: when reheated, one liter of liquid nitrogen at -196°C produces close to 700 liters of nitrogen gas at room temperature. This makes it possible to more easily transport, distribute and store gases.

## NAND flash memory

Flash memory is a type of semi-conductor computer memory that remains non-volatile when unplugged. NAND flash memory offers faster erase and write capabilities, and greater density at a lower cost.

## NO<sub>x</sub>

Nitrous oxides are among the pollutants that cause acid rain. They are found in motor vehicle emissions and are also produced during all high-temperature combustions that use air. Air is mainly composed of oxygen and nitrogen, which can recombine to form nitrous oxides. Replacing air with oxygen prevents these oxides from forming by removing nitrogen from the equation.

## Nuclear fusion

Nuclear fusion involves fusing light atomic nuclei resulting in the formation of a new element. Fusion reactions are carried out under highly controlled conditions and produce large amounts of energy. Countless nuclear fusion reactions occur naturally on stars, such as the Sun.

## On-site unit

Industrial or medical gas production unit installed on the customer's site and operated by Air Liquide.

## Operational research

Operational research refers to the use of scientific methods (mathematical models, statistics, optimization, etc.) to improve problem-solving and decision-making.

## Oxygen therapy

The treatment of chronic respiratory insufficiency by administering extra oxygen to the patient.

## Plasma

A gaseous medium in an excited state. It is the fourth state of matter, after solid, liquid and gas. Plasma is produced when an electrical charge is set off in a gas at a very high temperature (several tens of thousands of degrees).

## Rare gases

Rare gases are natural, inert products found in very small quantities in the air we breathe: argon (0.9% of air), neon (0.002%), krypton (0.0001%), xenon (0.00001%).

## Silicon

After oxygen, Silicon is the most common element present in the earth's crust. It does not exist in a free state, but is found in composite substances, such as silica (a component of sand).

## Sleep apnea

Iterative temporary stop of respiration during sleep. Sleep apnea is frequent (5 to 10% of the adult population in industrial countries), severe (multiplies by six the risk of motor vehicle accidents and heart problems) and still under-diagnosed. Air Liquide is leader in France and Europe for device and follow-up of patients undergoing Continuous Positive Airway Pressure (CPAP) treatment and expands this activity in the rest of the world.

## SO<sub>x</sub>

Sulfur oxides are pollutants that cause acid rain, smog and respiratory illnesses. They are produced by the combustion of hydrocarbons containing sulfur.

## Superconductivity

A phenomenon characterized by zero electrical resistance and the exclusion of the interior magnetic field in certain so-called "superconducting" materials. Superconductivity occurs at very low temperatures.

## Wafer

A slice of Silicon cut from a Silicon ingot with a diameter of 150, 200 or 300 mm and used as a semiconductor base.



## L'AIR LIQUIDE S.A.

Société anonyme pour l'étude et l'exploitation des procédés Georges CLAUDE with registered capital of 1,435,211,387.50 euros

### Published by the Communication Department of Air Liquide

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#### Written by

WordAppeal, Air Liquide

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Reference Document  
(including the Sustainable  
Development Report)



Letter to shareholders



Shareholder's Guide

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Air Liquide would like to thank all the people who contributed to this Annual Report and to the photos.

This report was printed on a Triple Star satin paper. As part of its sustainable development approach, Air Liquide has chosen to print this document on a PEFC-certified paper. The fibers of this paper come from forests planted and managed in a sustainable manner. The paper is printed by an ISO 14001-certified printer which holds an imprim'vert label.



