

ONAIR

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The magazine for everyone interested in Air Liquide



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Energy Observer,
catamaran powered by hydrogen
and renewable energies

 **Air Liquide**

Interview



The health crisis that we have endured this particular year has highlighted more than ever Air Liquide's strengths, in particular its solid business model and long-term strategy. Benoît Potier discusses the Group's ability to adapt in times of crisis, which has been widely demonstrated in its history and again today.

As we approach the end of 2020, what conclusions are you drawing on the health crisis and its impact on the Group's performance?

As we have all seen, 2020 has been out of the ordinary. The global health crisis will without a doubt have a lasting effect on society and the economy. It has also underlined the Group's exceptional resilience, thanks notably to its solid business model and the trust of its shareholders. The health crisis also emphasized the commitment and capacity for initiative of Air Liquide's employees across the world. The Group's achievements during this period were made possible thanks to the collective efforts, as of day one of the pandemic, to ensure the continuity of our activities. I would like, once again, to sincerely thank all of the Group's employees for their outstanding commitment. The Group's strong performance also reflects the relevance of its strategic choices which allow us to build profitable, regular and responsible growth over the long term: meeting the major challenge of the energy and climate transition, supporting changes in healthcare, and harnessing the full potential of digitization. More broadly, Air Liquide is a corporate citizen that shoulders its responsibilities, in particular when they are in the public's interest. We stepped up to the mark in the wake of the health crisis. We are also responding to the ecological crisis.

Precisely, two years ago, Air Liquide announced the most ambitious Climate objectives in its sector. In what way is the Climate commitment a decisive factor in this crisis?

One of the clear effects of this crisis is the way in which it has accelerated general awareness of the need to protect the planet. The energy transition is a common feature of economic recovery plans across the globe. Companies have a key role to play in reducing CO₂ emissions, and Air Liquide has been committed to this approach for many years. Our Climate objectives have helped us structure our commitment and go even further. In 2020, we made progress in this respect through major achievements: investments in energy-efficient plants, acquisition and modernization of the world's largest oxygen production site in South Africa, renewable electricity purchase, optimization of our industrial processes, development of biomethane and hydrogen energy. We are working in this field on a global scale, particularly within the Hydrogen Council, to promote the emergence of a hydrogen economy. Its recent inclusion in several European economic recovery plans will provide a real boost to the sector's development and should make hydrogen energy a reality on an international scale.

How does innovation drive our current progress?

Innovation is at the core of the Group's strategy and is more necessary than ever to support our customers and patients in this changing world. Innovation is essential to the development of new offers and ways of working, in order to anticipate new usages in our historical activities and support the emergence of new markets. Together, with our customers, with our scientific partners, and with the start-ups, we are designing solutions for the future to support a sustainable societal model. It is notably thanks to our great capacity to innovate that we are able to step up to the mark and meet the challenges currently facing our society.



ACQUISITION

OF THE BIGGEST OXYGEN PRODUCTION SITE IN THE WORLD

 In September, Air Liquide signed a business purchase agreement with energy and chemical company Sasol to acquire the world's largest oxygen production site located in South Africa. This agreement represents a key step in the long-term relationship that Air Liquide has had with Sasol for the past 40 years. Not only will the Group operate the 16 Air Separation Units at this site, in addition to the unit that it already operates today, but it will also launch a plan to modernize the units. As well as the benefits that this will bring in terms of safety, reliability and efficiency, the solution provided by Air Liquide will help target, in coordination with Sasol, a reduction in CO₂ emitted during the production of oxygen.

- **42,000 metric tons**
of oxygen produced per day
- **-30 to -40%**
reduction in CO₂ emissions by 2030
- **600 MW**
of renewable energy planned to supply the site
- **€440 M** investment



Our achievements over the past six months

Hydrogen energy

TOWARDS MORE SUSTAINABLE ROAD TRANSPORTATION



Air Liquide believes that hydrogen is an essential alternative energy in the drive for clean transportation, and launched two new key initiatives in July:

THE CONSTRUCTION OF THE FIRST HIGH-PRESSURE HYDROGEN REFUELING STATION IN EUROPE ▶ Located in Fos-sur-Mer, in the south of France, this station will enable up to 20 daily refuelings of long-haul trucks with low-carbon hydrogen. This initiative is part of the HyAMMED⁽¹⁾ project which aims to reduce CO₂ emissions by more than 1,500 metric tons per year, the equivalent of more than 2 million kilometers traveled by truck.

A PARTNERSHIP WITH THE PORT OF ROTTERDAM TO FOSTER HYDROGEN-POWERED TRUCKS ▶ Objective: to allow 1,000 hydrogen-powered “zero emission” trucks to travel between the Netherlands, Belgium and Germany by 2025. Several partners from across the supply chain — truck manufacturers, carriers, fuel cell suppliers — have already committed to this initiative. This project will enable both a reduction in CO₂ emissions by around 100,000 metric tons per year and an improvement in air quality.

(1) A French alliance of industrial, transportation and mass retail players.

Innovation

MODERNIZING AND MAKING INDUSTRY CLEANER

Air Liquide will build the first global oxygen production plant incorporating an energy storage system. This innovative and unique process will contribute to making the power grid more stable and increase the quantity of renewable energy injected. The project, located in the Port of Moerdijk in the Netherlands, illustrates the Group's strategy to grow in strategic industrial basins, as well as its ability to design new solutions in line with its Climate objectives.

~ 10%

REDUCTION IN ELECTRICITY CONSUMPTION ON SITE

€125M
INVESTMENT
BY AIR LIQUIDE

Industry

TWO STRATEGIC CONTRACTS IN THE UNITED STATES AND RUSSIA

Air Liquide has signed two major contracts in the steel sector. As part of a long-term partnership with NLMK, one of the main steel producers in Russia, the Group will invest around 100 million euros in three projects at the customer's site in Lipetsk: the construction of a state-of-the-art Air Separation Unit (ASU), the acquisition of the site's existing hydrogen unit and of its rare gases production plant. Air Liquide has also signed a long-term agreement with U.S. steel major producer Steel Dynamics, Inc., to supply gaseous oxygen, nitrogen and argon to its new steel mill in Texas. Thus, the Group plans to invest more than 100 million US dollars in the construction of a cutting-edge, energy-efficient ASU on the Gulf Coast.

Digital

TRANSFORMING THE SUPPLY CHAIN TO BENEFIT CUSTOMERS

Following a successful pilot phase, the Group is rolling out its IBO (Integrated Bulk Operations) program worldwide, using digital technology to optimize the entire liquid gas supply chain. The aim of this is to make it more efficient and environmentally friendly. Analysis of customers' consumption data and availability of molecules, coupled with real-time driver assistance, help make deliveries more efficient and more reliable while reducing CO₂ emissions.



The IBO program is the perfect example of the Group's ability to use digital solutions on a global scale to optimize our operational performance and better serve our customers and the environment. //

MATTHIEU GIARD,
VICE PRESIDENT OF INDUSTRIAL
MERCHANT ACTIVITY AND MEMBER
OF AIR LIQUIDE'S EXECUTIVE COMMITTEE



ITER

ASSEMBLY OF THE LARGEST CRYOGENICS PLANT IN THE WORLD

The aim of ITER and its experimental fusion reactor is to exploit a source of energy as powerful as the sun, which is clean, carbon-free and safe. The assembly of the reactor began at the end of July. This is a key stage of an international project which has continued to progress despite the health crisis, thanks in particular to Air Liquide, which supplies the reactor with its cryogenic cooling system. The Group has just completed the manufacture and delivery of the final equipment for what will be the world's largest centralized helium cryogenic plant. After the installation and equipment connection phases, which will last several years, operational tests of the entire plant will start in 2024.



Taking action for the climate

The climate and energy transition will not succeed without a profound transformation of industries and consumption habits.

At Air Liquide, we serve customers from a wide range of industrial markets. For many years, we have been committed to combining growth and respect for the environment, including by developing innovative technologies.

Two years ago, we went one step further by setting the most ambitious Climate objectives in our sector to reinvent sustainable industrial solutions with our customers and partners,

thus contributing to the development of a low-carbon society.





ArcelorMittal's site in the industrial basin of Ghent in Belgium

The climate at the heart of Air Liquide's strategy

Global warming is a critical concern from a social and economical point of view. We have reached a turning point in ensuring a successful energy transition. At a time when policymakers, companies and investors across the world are working on the economic recovery, an opportunity has emerged to really make a difference and to focus on the ideal growth models that we envision for the future.

At Air Liquide, we have committed for some time to limiting our own environmental footprint and that of our customers. We draw on our capacity for innovation to invent more sustainable solutions. We are therefore taking ambitious actions to reduce the carbon intensity of our activities by 30% by

2025⁽¹⁾, notably through the signature of long-term renewable electricity purchase agreements to power our production sites, such as in Texas and more recently in Spain, and by improving the energy efficiency of our plants. At the same time, we have stepped up innovative initiatives to support the industry in switching to cleaner solutions. In South Africa, the Group is currently completing the acquisition of the largest oxygen production site in the world, with the aim of reducing its CO₂ emissions by 30 to 40% by 2030. In the steel industry, we are working on a project with ArcelorMittal in Belgium to capture carbon emissions from steel production and recycle them into bioethanol. Another example, in the maritime industry, is our Turbo-Brayton solution which relieves

natural gas evaporations from tankers and thus limits the emissions of this greenhouse gas.

We strive to focus on useful and responsible innovation in every aspect of our business. Innovation opens up new possibilities to drive a low-carbon society as well as new markets for future growth.

Hydrogen, an essential solution for the energy transition

The development of hydrogen energy is one of these possibilities. Over the past 50 years, Air Liquide has developed unique know-how in the management of the entire hydrogen value chain (production, storage, distribution and development of new uses). The Group firmly believes that this molecule is a key lever in the drive

(1) Based on 2015 emission levels



100%
**OF HYDROGEN PRODUCED
BY AIR LIQUIDE FOR THE MOBILITY
MARKET WILL BE LOW-CARBON
BY 2030**

TOWARDS THE PRODUCTION OF LOW-CARBON HYDROGEN

Air Liquide's unique know-how allows the Group to reduce the carbon footprint of hydrogen produced thanks to different processes: biomethane reforming, CO₂ capture and storage or water electrolysis.

to decarbonize industrial activities that are still dependent on fossil fuels. Its main advantage: it generates zero pollution during its use. It can be produced using renewable energy sources, stored long term and then be re-transformed into electricity, thus compensating for the intermittent nature of these same energy sources.

Scaling up the use of hydrogen as a clean energy vector is therefore one of the priorities set by Air Liquide. This ambition is shared by public authorities, as the recent recovery plans of different countries show, or the creation by the European Commission of a clean hydrogen alliance⁽²⁾ in July 2020. All draw the same conclusion: major investment is required in this energy in order to achieve carbon neutrality by 2050⁽³⁾.

Cars, buses, trains, ferries and even planes — hydrogen energy is one of the solutions for clean mobility and Air Liquide continues to invest in this field. In addition to the roll-out of stations for light vehicles, in particular in Europe, Japan, South Korea and California, Air Liquide is also focused on the heavy vehicle segment. In France, for example, the Group plans to build the first high-pressure hydrogen refueling station in Europe, in Fos-sur-Mer, which will fuel long-distance trucks as of 2022. Moreover, in July, the Group announced the launch of a partnership with the Port of Rotterdam to support the roll-out of hydrogen-powered trucks (see p. 4).

Hydrogen also has a role to play in the development of a low-carbon industry. This molecule, which has already been used for many years, is now being used

in new virtuous methods such as in the steel industry. At the thyssenkrupp facility in Duisburg, Germany, hydrogen provided by Air Liquide partly replaces coal used in the blast furnaces. This results in a reduction in CO₂ emissions from the steel production process of up to 20%.

The Group is also actively involved in several major clean mobility projects alongside other industrial players and international institutions. This global mobilization is required to promote the emergence of a global hydrogen economy and to meet the energy transition challenge.

(2) European Clean Hydrogen Alliance

(3) Objective stated by the European Commission in November 2018 in its "A clean planet for all" strategy

BUILDING A LOW-CARBON SOCIETY



1

2

“We have reached the dawn of a systemic change, in which hydrogen will play a key role”

“In order to contribute to a low-carbon future, Air Liquide has decided to rely on hydrogen, which could represent 18% of global energy consumption in 2050⁽¹⁾. This molecule is currently seen as a key solution to reducing the carbon emissions of several sectors, including heavy industry, transport, urban heating networks and data centers.

Hydrogen's potential is therefore immense. We are working to roll out its use on a large scale, to make it a viable energy alternative in the quest for a low-carbon society. In Canada, for example, we are about to put into service the largest membrane electrolyzer in the world for the production of carbon-free hydrogen destined notably for the North American mobility market.

Moreover, Air Liquide plays a leading role in promoting hydrogen as part of a collective effort supported by industrial players, states and international institutions. The Group has founded several initiatives such as the Hydrogen Council which brings together almost 100 executive officers from leading energy, transport and industrial companies as well as investment firms. It has also forged public-private partnerships, such as those in South Korea and California, to offer collaborative solutions that will change the scale of the distribution networks and make hydrogen a tangible reality at a global level.”

1. PIERRE-ÉTIENNE FRANC,
VICE PRESIDENT OF THE HYDROGEN
ENERGY WORLD BUSINESS LINE
AT AIR LIQUIDE

(1) McKinsey report for the Hydrogen Council - Path to hydrogen competitiveness, a cost perspective - 2020.

(2) Waste disposal, solar panel installation, planting trees, etc.

“To act efficiently, we need to bring together all energies”

“Our Group has set ambitious Climate objectives. These objectives are part of a global approach. Not only are we taking action to reduce our own carbon footprint, but we are also supporting our customers in the same approach, while contributing more generally to the creation of a low-carbon society.

Our expertise and our strong capacity for innovation are our greatest strengths to help achieve these objectives. Our employees, who contribute daily to our low-carbon ambitions, play a key role in their deployment. To monitor our progress and share best practices, we have built an internal network which, in each entity, is led by Climate Champions and Climate Ambassadors. The former are responsible for implementing Climate objectives. The latter are employees, all of whom have volunteered for this role, responsible for overseeing environmental initiatives⁽²⁾ on a local scale.

We also rely on our stakeholders to accelerate the energy transition. In collaboration with our customers, we are co-building solutions to make industry more efficient and responsible. Moreover, we are stepping up international and local partnerships to develop new markets in which we are particularly involved, such as biomethane and hydrogen energy. We firmly believe that these collective efforts will help us make the greatest strides to develop a low-carbon society.”

2. DAVID MENESES,
VICE PRESIDENT SUSTAINABILITY
AT AIR LIQUIDE

SOLIDARITY

Our employees engage with local communities

EUROPE



PRESERVING BIODIVERSITY

Virginia González

Air Liquide Invoicing Customer Service Manager

& Miguel Angel Ortega

Founder of the Reforesta NGO

Safeguarding biodiversity means protecting the forest, which is essential for preserving air quality. In this context, Air Liquide Iberia has strengthened its contribution to a reforestation program in Spain and Portugal. Today, around fifty employees from the subsidiary company are participating in this operation.

"By taking part in this project as a volunteer, I really became aware of the need to protect our forests and the importance of raising the awareness of the people around me. Planting trees with my own hands gave me a real sense of acting concretely for the planet."

VIRGINIA

"Thanks to volunteers and financial support from Air Liquide, we've been able to extend the reach of our projects: planting more trees and working in remote areas."

MIGUEL

AMERICA



FACILITATING PROFESSIONAL TRADE DEVELOPMENT FOR YOUNG PEOPLE

Brian Blackwood

Area Vice President, Airgas Mid South

& Elizabeth Meyer

Agricultural Education Instructor, Sublette High School, Kansas

Airgas, Air Liquide's U.S. subsidiary, has expanded a high school training program covering welding techniques. Airgas specialists meet with technology teachers and students to help them learn new and advanced skills in this field.

"We have noticed a shortage of welders in the United States. This program has allowed 70 teachers to introduce the welding profession to 330 students. If each of these teachers results in just one student enrolling in a welding school, this potentially means as many future welders on the market!"

BRIAN

"Through classroom instruction and hands-on lab work, Airgas instructors provide us the most relevant information to support and prepare our students seeking employment in the industry."

ELIZABETH

All around the world, Air Liquide’s employees are mobilized in the field to support local communities. Explore some of the projects undertaken and those that contribute to bring them to life everyday.

To read the full interviews, visit onairmagazine.airliquide.com

ASIA



PROVIDING EMERGENCY AID TO LOCAL COMMUNITIES

Zhengfeng Li

Operator at Air Liquide’s Wuhan Tianma plant

In January 2020, Wuhan, the epicenter of the Covid-19 pandemic in China, was the first city to announce the lockdown of its population. Air Liquide employees who were based here showed solidarity to aid their communities in the face of this public health emergency.

“During lockdown, due to the closure of supermarkets and the restrictions on movement, essential supplies were distributed to residents by local communities. Volunteers came together via WeChat to carry out these deliveries. I also wanted to be part of this show of solidarity.

Concretely, I delivered food parcels and masks to residents in the Hongshan district. I also distributed free food to isolated elderly people. Although I was frightened by the situation, helping others during such challenging times was a great source of pride for me.”

ZHENGFENG

AFRICA



SUPPORTING THE MOST VULNERABLE

Diamantina Messaris

Talent and Internal Communications Manager, Air Liquide South Africa

& Carole Podetti Ngoni

Director & Founder of the Valued Citizens Initiative NGO

The Covid-19 crisis has exacerbated social issues in many South African communities. In partnership with the Valued Citizens Initiative NGO, the Air Liquide Foundation funded a program to supply food parcels, hygiene kits and psychological support to Leandra schools, near Johannesburg.

“This project addressed three aspects of the Covid-19 crisis: health, humanitarian and educational. We provided support to around 2,900 children, as well as to their families and teachers. Not all communities were equal with respect to the crisis and I felt that it was important to offer solidarity and humanity to the vulnerable.”

DIAMANTINA

“We have to be resilient to get through the health crisis that we are facing. The Air Liquide Foundation played a key role in the management of the crisis by supporting the ecosystem of school communities with emotional and mental wellbeing sessions to 90 educators and their learners while also contributing towards the feeding scheme.”

CAROLE

Breathing better and Acting within local territories

Two missions at the core
of the Air Liquide Foundation

To find out more or
submit a project:

 fondationairliquide.com/en