

2022 ANNUAL REPORT

Advancing



Access
the digital
version

 Air Liquide

A world of challenges

p. 04

Advancing with confidence

p. 10

Advancing to meet the world's challenges

p. 26

Advancing with you

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What does it mean to advance? At Air Liquide, a group defined by future-oriented thinking, advancing means inventing the future by responding to the challenges facing society and seeing them as opportunities instead of roadblocks. It means tackling climate change, contributing to the transformation of healthcare systems, accelerating key markets of the future, supporting industry progress and continually renewing our commitment to develop concrete solutions that have a real impact. And most of all, it means delivering long-term, sustainable performance for all our stakeholders.

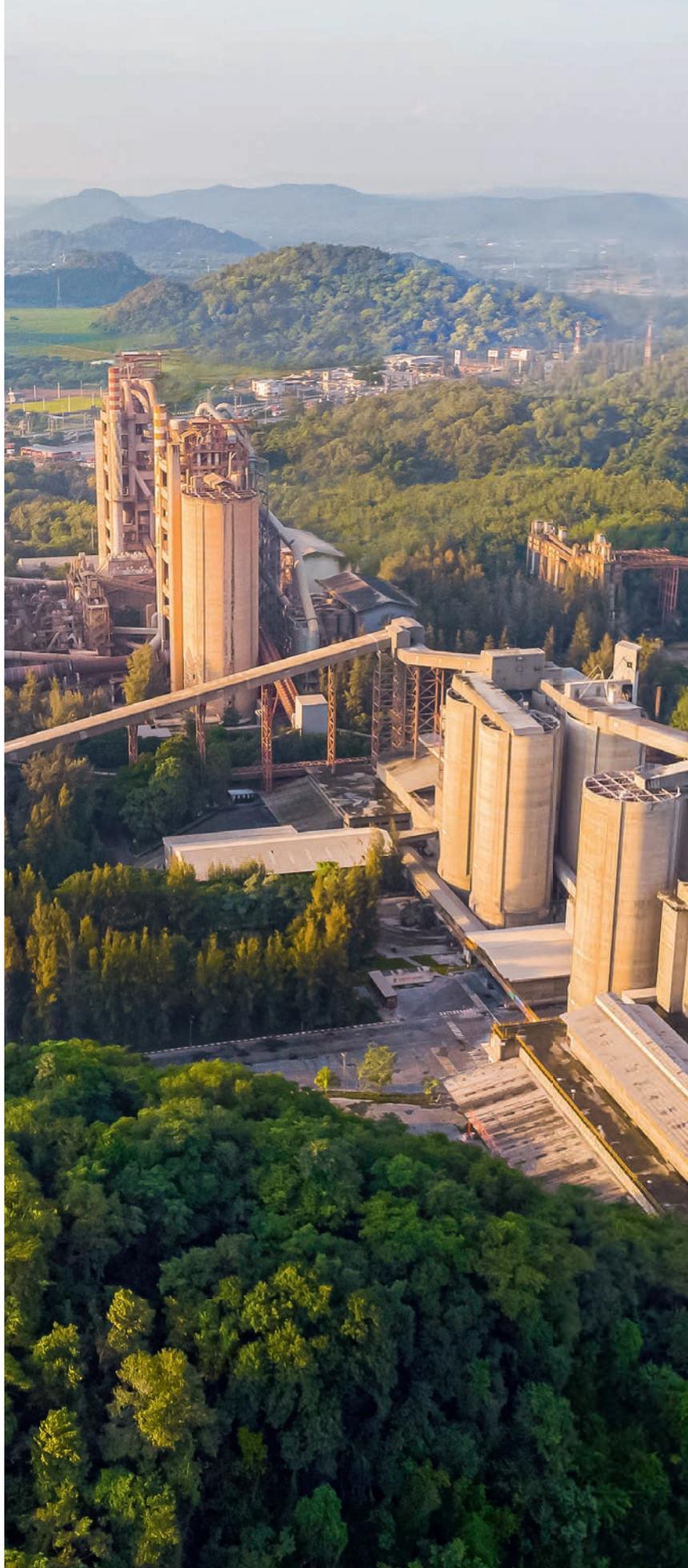
"The cement industry is a strategic one, and the essential work of decarbonizing it is already underway. We can reach this goal. At EQIOM, we aim to make our Lumbres plant in northern France the first

carbon-neutral

cement plant in Europe by 2028. This means rethinking production methods and integrating new technologies that will enable us to meet our CO₂ emissions reduction targets."

Pierre Bultez

Public Policy Manager
at EQIOM



Dr Stefan Larsson

Chairman and Co-Founder of
the International Consortium
for Health Outcomes
Measurement (ICHOM)



“The aim of anyone working
in healthcare should be to
improve patient outcomes.
Patient-reported data allow
us to build replicable care
models that continually

*improve
outcomes*

while reducing total costs,
helping tackle healthcare
challenges and bringing
value to providers,
professionals and, most
of all, patients.”



"Employees today expect companies to help them reach their full professional potential, but also to leave them time and energy for their personal lives. To do so, I employ three management principles. First, I

communicate proactively

and with transparency about intentions and challenges. Second, I empower and encourage team members to make their own decisions, while also opening doors for underrepresented groups. And finally, I prioritize speed and simplicity to enact change as quickly as possible."

Taki Nkhumeleni
Large Industries & Industrial
Merchant (LIM) Program
Director for Europe
Industries at Air Liquide



Olivier Mareuse

Executive Vice President,
Director of Asset
Management and of Saving
Funds at Caisse des Dépôts,
member of the Executive
Committee of Caisse des
Dépôts



“As the leading public institutional investor in France, Caisse des Dépôts places long-term shareholding at the heart of its investment strategy. We closely examine the individual challenges facing each company and business sector, using financial and extra-financial performance criteria (environment, social, governance). Our aim is to support companies in their

*sustainable
growth*

strategies by encouraging them to adopt the best ESG standards and practices.”



"The European Union faced many geopolitical and economic upheavals in 2022 including hydrocarbon supply difficulties and rising energy prices. This situation has provoked an

accelerated shift

in both energy usage and production methods by encouraging the adoption of low-carbon technologies. It has also triggered a historic surge in public policy. This momentum is happening on a global scale. In the United States for example, the Inflation Reduction Act ⁽¹⁾ is encouraging companies to invest in green energy."

(1) The U.S. Inflation Reduction Act, in place since January 1, 2023, aims to curb inflation by reducing the deficit, while meeting the challenges of climate change and strengthening the social security system.

**Marc-Antoine
Eyl-Mazzega**

Director of the Energy & Climate
Center at the French Institute
for International Relations
(Institut français des relations
internationales - IFRI)



Luana Cattan

Chemical engineering
Master's student at
University of Campinas
in São Paulo, Brazil



"Corporate social responsibility will be the most important criterion in the job I choose when I am ready to join the workforce. I need to feel comfortable with my work, so joining a company with

*a strong
sustainability
agenda*

will be a requirement. I believe major industrial companies have a responsibility to develop realistic solutions for a climate-neutral future and to start implementing them."



A person is sitting outdoors at night, with their back to the camera. The background is filled with soft, out-of-focus lights (bokeh) in shades of green, yellow, and orange, suggesting a park or a city street at dusk. The overall mood is calm and reflective.

Advancing with confidence

Advancing with confidence is advancing together with our stakeholders toward a sustainable future. It is a conviction that has led us to put sustainable development at the heart of our growth model. It is a mindset and an ambition embodied by everyone in the Group and those within our ecosystem.



Editorial by Benoît Potier, Chairman of the Board of Directors (p. 12)
Interview with François Jackow, Chief Executive Officer (p. 17)
Governance (p. 18) Business Model (p. 22) Performance (p. 23)

Believing in the future and, more than ever, inventing it



Benoît Potier,
Chairman of Air Liquide's
Board of Directors

We have reached a particular moment in the history of the world, with geopolitical tensions as well as energy and climate challenges becoming primary concerns. This context of uncertainty is a rallying call to action, with new energy approaches now available to address the common need for moderation, sovereignty and decarbonization. With the requisite tools in hand, Air Liquide is proposing innovative solutions and inventing a sustainable future.

I am therefore confident in our future. Since its creation, our Group has demonstrated its ability to take action regardless of the situation, with the past three years being the most recent proof of this. Our confidence is driven by our capacity to anticipate and design the solutions of the future, and we continuously invest in new technologies to support the industrial, electronics and healthcare sectors in their journey toward progress.

My confidence in the future is also founded on our capacity to adapt. Our strength lies in our ability to respond to global transformations and constantly expand our activities with solutions for our customers, all while addressing the major issues that impact society as a whole.

Finally, I am a fervent believer in the power of the collective, which has always been a cornerstone of our business model. Together with our employees, alongside our customers and our partners, and with the support of our shareholders, we have shown resilience and agility in initiating the transition toward a low-carbon society. But for future generations, we must pick up the pace. Our contribution to shared progress gives very strong significance to our individual and collective action. It is both what motivates us and what helps us advance.



Champion of climate solutions

Interview with
François Jackow,
Chief Executive
Officer of Air Liquide

“The planet is in a state of emergency, and as of now we have the capacity to provide concrete solutions to the major challenges of decarbonizing industry.”

2022 was a pivotal year with the launch of the new ADVANCE strategic plan. What can you tell us about the Group's performance?

That it is very solid! In 2022, we achieved another year of profitable growth despite a complex and changing environment. Our reported sales reached 29.9 billion euros, up +7%, ⁽¹⁾ and recurring net income grew

by +17%. ⁽²⁾ All our businesses – Gas & Services, Engineering & Construction and Global Markets & Technologies – are up significantly. Within Gas & Services, all our geographies are growing, in particular the Americas and Asia Pacific.

⁽¹⁾ on a comparable basis

⁽²⁾ at constant exchange rates

Focusing on markets of the future

In addition to revenue growth, we have further improved our operating margin thanks to significant efficiency gains and the dynamic management of our business portfolio. Moreover, in the context of rising energy prices, the Group has demonstrated its ability to create value, enabling it to adjust prices for customers. The quality of these results illustrates both the resilience of our business model and the mobilization and responsiveness of our teams, who have done a remarkable job in adapting to a volatile environment. I would like to take this opportunity to thank them.

I would also like to add that our investment momentum, which is the guarantee of our future growth, has accelerated, particularly in regard to hydrogen and the transition to a low-carbon society. Indeed, our investments have reached a record level of nearly 4 billion euros. Finally, in terms of extra-financial aspects, our CO₂ emissions⁽³⁾ have remained stable for the second year in a row. This supports our goal of achieving carbon neutrality by 2050.

These results show that ADVANCE, our strategic plan combining our financial and extra-financial trajectory for 2025, is already bearing fruit. On the basis of this performance, we look forward to 2023 with confidence.

“Our ADVANCE strategic plan was designed to provide innovative solutions to challenges that are here to stay. The current context has acted as an accelerator, strengthening our resolve to move forward with a clear goal: pursuing

our global performance trajectory.”

The energy crisis, inflation, conflict in Europe... economic and geopolitical instability seems to be taking hold. Will this have an impact on Air Liquide's strategic road map?

Without a doubt, 2022 was defined by a range of geopolitical, energy and climate-related crises, which have obviously had an impact on our customers, our activities and society as a whole. This complex year confirmed more than ever the relevance of our road map, as our ADVANCE strategic plan was designed to provide innovative solutions to challenges that are here to stay. The current context has acted as an accelerator, strengthening our resolve to move forward with a clear goal: pursuing our global performance trajectory by combining financial and extra-financial performance.

This ambition is based on an extremely solid foundation built on the Group's proven resilience; the robustness of our business model through the diversity of our business lines and geographical footprint; and of course our teams, who demonstrated yet again this year their ability to respond to challenges. And, with ADVANCE, we are now positioned at the heart of the energy transition and are focused on the markets of the future, such as hydrogen mobility, electronics, healthcare and high technologies. All this provides Air Liquide with unprecedented positioning in terms of the current global upheavals, and an excellent opportunity to propel the Group into the future.

(3) In metric tons of CO₂ equivalent from Scopes 1 and 2 on a "market basis," restated to take into account for a full year from 2020 and each year thereafter, emissions from assets, which correspond to changes in scope (both upwards and downwards) and which have a significant impact on CO₂ emissions.

Amid all these challenges, you have made the climate crisis and decarbonization a priority.

Indeed. My aim is to make Air Liquide the champion of climate solutions. This is an urgent priority for the planet, and for us all. At Air Liquide, we are already able to provide tangible solutions to the major challenges of decarbonizing industrial activities. Moreover, our solutions apply to both our own activities and those of our customers. Our expertise and our thorough understanding of their needs mean we can help our customers meet their climate commitments.

For example, we are developing large-scale hydrogen technologies for industry and mobility, and I am proud to say that we have been pioneers in this field. We are also established in CO₂ capture, biomethane and oxycombustion, all areas that are in growing demand. We therefore offer a wide range of technologies based on our key molecules. This is something our customers appreciate, as shown by our recent strategic partnerships with cement manufacturer EQIOM, refiner Eni and aircraft manufacturer Airbus.

You have mentioned hydrogen as a solution for the future. What are the challenges involved with accelerating growth in this field?

The subject is no longer a matter of debate. Hydrogen has a major role to play in the decarbonization of industry and heavy transport. Its potential is huge, but we have many collective challenges to tackle before it can fully contribute to the energy transition. Industrial players will clearly contribute, but it is necessary to build an entire ecosystem around this technology. To do so, political strategies need to promote the development of new decarbonized usages, common

“It is necessary to build an entire ecosystem around this technology.

To do so, political strategies need to promote the development of

new decarbonized usages,

common regulation

and, of course,

support from investors.”

regulation and, of course, support from investors and consumer adherence.

This means developing new usages in sectors such as steel and road transportation. We have established several partnerships to collectively support the opening of these new markets. Additionally, it means increasing our low-carbon and renewable hydrogen production capacities. To do so, we intend to invest a minimum of €8 billion in the low-carbon hydrogen value chain by 2035. One example is the Group's largest renewable hydrogen production unit in Normandy, France, which is under construction and will be commissioned in 2025. We have also signed long-term contracts with industrial players in Europe to supply them with low-carbon hydrogen. In the United States, the Inflation Reduction Act⁽⁴⁾ will also create several opportunities. Driven by this unprecedented global momentum, we aim to triple sales, from €2 billion to €6 billion by 2035.

Visiting the Air Liquide industrial site in Hamilton, Ontario, in Canada.





Discussing with a researcher at the Shanghai Innovation Campus.

In addition to decarbonization, what are the other principal growth drivers for Air Liquide?

Air Liquide's major strength has always been its dynamic and diversified business portfolio, which is rich in potential sources of growth. I would like to mention two. First is electronics, where Air Liquide is currently a leading supplier of ultra-high purity gases and advanced molecules. A real revolution is taking place in this sector. The semiconductors market is growing rapidly, driven by the rapid development of artificial intelligence and connected objects, as well as by an increased need for North American and European sovereignty. This is evidenced by the establishment of several "megafab"⁽⁵⁾ projects. We are currently reinforcing our leadership position in these geographic areas.

Our second major source of growth is of course healthcare, and in particular home healthcare. This sector is continuing to evolve, after having demonstrated its central role during the public health crisis. Our Group is making a contribution. Both at hospital and at home, our activity is committed to a transformation toward value-added offers for patients and healthcare professionals. By offering personalized support

and innovative solutions, we aim to improve the quality of life of patients at the best cost for the healthcare system.

You have been leading the Group since June 2022. How do you see the rest of the year?

With energy and determination. And also with a great deal of composure, owing to my confidence in the unwavering commitment of our teams, regardless of what the future may hold.

Since my appointment, I regularly meet with our teams, and every time I do, I am impressed with their proactive approach in a context that frankly had the potential to be unsettling. From one side of the globe to the other, I have seen the same commitment to satisfying our customers, the same desire to advance, innovate and create an impact. This is a great source of pride for me as a leader, and I am deeply grateful to them.

The coming months will without a doubt be complex and full of surprises. But we are ready and determined to meet the needs and expectations expressed by our customers and patients, and to invent a more sustainable future together.

"I went to meet the teams, and I saw everywhere the same desire to satisfy our customers, the same drive to move forward and create impact."

(4) The U.S. Inflation Reduction Act, in place since January 1, 2023, aims to curb inflation by reducing the deficit, while meeting the challenges of climate change and strengthening the social security system.
(5) A megafab is a very large capacity electronic chip production unit.

A strategy guided by **ADVANCE,** our 2025 plan

The Group is pursuing its ADVANCE plan, placing sustainable development at the heart of its strategy and positioning itself on the path to global performance that combines financial and extra-financial performance.

Delivering strong global performance

The Group is rising up to an ambitious challenge: continuing its growth dynamic and improving profitability all while meeting its commitments to reduce CO₂ emissions and invest in the markets of the future.

+5 to 6%

average annual sales growth⁽¹⁾

>10% ROCE from 2023

Start reducing CO₂ emissions by 2025

Decarbonizing the planet

The Group is affirming its leading role in the decarbonization of industry and the dawn of a low-carbon society in which hydrogen has a key role to play. The Group is committed to decarbonizing its own operations while helping customers to do the same. Air Liquide plans to reach carbon neutrality by 2050, with an intermediate step of beginning to reduce its CO₂ emissions around 2025.

-33%

CO₂ emissions by 2035⁽²⁾

~50%

of industrial investment decisions will be devoted to the energy transition⁽³⁾

Unlocking progress via technology

Thanks to its capacity for innovation and its technological expertise, the Group is contributing to the development of five markets of the future: hydrogen mobility, electronics, healthcare, industrial merchant and high technologies.

~€8 billion

will be invested in the low-carbon hydrogen value chain by 2035

Acting for all

As a civic-minded company, Air Liquide strives to ensure that everything it does is in the interests of its employees, customers, patients, shareholders and partners, and, beyond that, of society as a whole.

35%

of engineers and managers will be women by 2025

Providing

100%

of our employees with common basis of care coverage by 2025

(1) Compound annual growth rate (CAGR) of sales, on a comparable basis, over the period 2021-2025.

(2) In tons of CO₂ equivalent, adjusted to include, from 2020 and for each subsequent year, the full year's emissions of assets acquired and integrated after 2020, scopes 1 and 2. Scope 2 emissions are calculated from purchased supplies (a market-based method); the Group uses the method recommended by the GHG Protocol.

(3) Industrial investment decisions for projects over €5 million.

Board of Directors

As of December 31, 2022

The Board of Directors is composed of 12 members: 10 who are appointed at the Annual General Meeting and two who represent Air Liquide employees. The Board of Directors brings together a diverse range of profiles. Four nationalities are represented (American, British, French and German) and 50% of elected members are women. Experience in fields including industry, services, research and innovation, healthcare, chemicals and construction are represented on the Board. Directors bring transversal finance, corporate social responsibility and digital skills, as well as their leadership vision of major international groups.

The Board of Directors determines Air Liquide's strategy and ensures its implementation, taking into consideration the social and environmental challenges of its activities. Accordingly, it examines and approves the Group's major strategic priorities, including multi-year strategy linked to corporate social responsibility.

In 2022, the Board of Directors notably focused on reviewing the new ADVANCE strategic plan, which includes the Group's Sustainable Development objectives, presented during Capital Market Day on

March 22, 2022, monitoring its implementation and choosing and executing the new unbundled governance structure. As of June 1, 2022, Benoît Potier is Chairman of the Board of Directors, and François Jackow is Chief Executive Officer. The work of the Board of Directors also included a review of the situation brought about by the geopolitical and macroeconomic context, in particular the conflict in Ukraine and actions to take into account the interests of Group employees and stakeholders. The Board also monitored the active pursuit of industrial investment decisions, in particular those related to the energy transition in line with the environmental objectives announced by the Group; oversaw the development of the Group's hydrogen activities; and decided to distribute one free share for every ten existing shares to Shareholders in June 2022.



Benoît Potier
Chairman of the Board
Born in 1957 – French



Geneviève Berger
Independent Director
Member of the Environment
and Society Committee
Born in 1955 – French



Kim Ann Mink
Independent Director
Member of the Remuneration
Committee
Born in 1959 – American



Aiman Ezzat
Independent Director
Member of the Audit and
Accounts Committee
Born in 1961 – French



Fatima Tighlaine
Director representing the
employees
Member of the Remuneration
Committee
Born in 1979 – French



François Jackow
Chief Executive Officer
and Director
Born in 1969 - French



Philippe Dubrulle
Director representing the
employees
Member of the Environment
and Society Committee
Born in 1972 – French



Siân Herbert-Jones
Independent Director
Chairwoman of the Audit
and Accounts Committee
Born in 1960 – British



Annette Winkler
Independent Director
Chairwoman of the
Environment and Society
Committee
Member of the Appointments
and Governance Committee
Born in 1959 – German



Bertrand Dumazy
Independent Director
Member of the Appointments
and Governance Committee
Born in 1971 – French



Xavier Huillard
Independent Director
Lead Director
Chairman of the
Appointments and
Governance Committee
and of the Remuneration
Committee
Born in 1954 – French



Anette Bronder⁽¹⁾
Independent Director
Member of the Audit and
Accounts Committee
Born in 1967 – German

(1) The Board of Directors took note of the resignation of Mrs Anette Bronder with effect from January 3, 2023, due to her wish to take up an executive position within an auditing firm, which is incompatible with the continuation of her term of office as Director of L'Air Liquide S.A. The Board met on February 15, 2023, and decided to appoint Mrs Monica de Virgiliis as Director for the remaining term of office of Mrs Anette Bronder, i.e., until the Annual General Meeting of 2024. Mrs Monica de Virgiliis has been qualified as independent by the Board of Directors.

Executive Committee

As of January 1, 2023

The Executive Committee coordinates Air Liquide's various programs and activities. It implements the strategy defined by the Board of Directors and oversees operations, the management of transformation projects and business development. It also carries out strategic reviews and monitors the Group's safety and operational performance.



François Jackow
Chief Executive Officer
Born in 1969 - French



François Abrial
Senior Vice President in charge of the Asia Pacific hub.
Born in 1962 – French



Ronnie Chalmers
Vice President in charge of the Africa / Middle East / India hub.
Born in 1968 - British



Marcelo Fioranelli
Chief Executive Officer of Airgas.
Born in 1968 – Brazilian



Matthieu Giard
Vice President supervising Hydrogen activities and the Industrial Merchant world business line.
Born in 1974 – French



Michael J. Graff
Executive Vice President supervising the Americas hub. He is also in charge of the Electronics world business line and the Engineering and Construction activity.
Born in 1955 – American



Fabienne Lecorvaisier
Executive Vice President in charge of Sustainable Development, Public and International Affairs, Societal Programs and the Air Liquide Foundation. She is also in charge of the General Secretariat.
Born in 1962 – French



Armelle Levieux

Vice President, Group Human Resources.
Born in 1973 – French



Émilie Mouren-Renouard

Vice President in charge of Innovation, Digital & IT, and Intellectual Property, as well as the Global Markets & Technologies activity.
Born in 1979 – French



Jérôme Pelletan

Chief Financial Officer
Born in 1970 – French



Jean-Marc de Royere

Senior Vice President in charge of Development Aid. He is also Chairman of the Air Liquide Fondation.
Born in 1965 – French



Diana Schillag

Vice President in charge of Healthcare activities in Europe and the Healthcare world business line. She also supervises the Procurement and the Efficiency Programs.
Born in 1971 – German



François Venet

Senior Vice President in charge of Strategy. He also supervises the Large Industries world business line.
Born in 1962 – French



Pascal Vinet

Senior Vice President in charge of the Europe Industries and Africa / Middle East / India hubs. He also supervises the Safety and Industrial Systems function.
Born in 1962 – French

In 2022, faced with the conflict in Ukraine, the Executive Committee came together to take appropriate action to protect employees in Ukraine, support refugees and monitor operations in Russia, which ultimately led to the decision to transfer, in a responsible and orderly manner, its activities in Russia to the local management team in the form of an MBO.⁽¹⁾ In addition, the Executive Committee closely followed major global

upheavals (the energy crisis in Europe, high levels of inflation, the fight against climate change in particular in Europe and the United States, etc.) to adapt how it carried out its operations.

On a strategic level, in March 2022, in an uncertain global context, the Executive Committee launched ADVANCE, the new strategic program for 2025, confirming its confidence in the Group's

ability to cope with crises. It has worked on implementing this program across its regions and activities, all while continuing to apply the Group's Sustainable Development objectives.

(1) Management buy out: the purchase of a company by its managers.

A unique model

Air Liquide draws its strength from the resilience of its model, the diversity of its businesses and regions, and its capacity to innovate in almost all sectors of the economy. These are solid pillars on which the Group relies to pursue its long-term growth dynamic and contribute to a more sustainable world.

67,100

committed employees
in 73 countries

Extensive scientific and technical expertise in industrial gases (oxygen, nitrogen, hydrogen, etc.)

>3.9M

customers and patients

3,600

employees contributing
to innovation

6

Innovation and Technologies
Campuses

~14,000

patents

>600

production units worldwide

Long-term vision and
sustainable growth
strategy

A wide range
of customers
and applications

**Air Liquide, a world
leader in gases,
technologies and
services for industry
and health**

Long-term customer
contracts indexed
to energy prices

Major ability
to innovate

Management and
optimization of gas production
and distribution chain

Large Industries

Industrial gases in large
quantities in the framework
of long-term partnerships

Industrial Merchant

Industrial gases in small and medium
quantities, application technologies,
small equipment and related services
serving a wide range of customers

Electronics

Ultra-pure gases in large quantities
and development of new molecules

Healthcare

Medical gases, products and services
to support patients and customers
at home and in the hospital

**Global Markets
& Technologies**

Molecules, equipment and
services to support the energy
transition and deep tech ⁽¹⁾ markets

Engineering & Construction

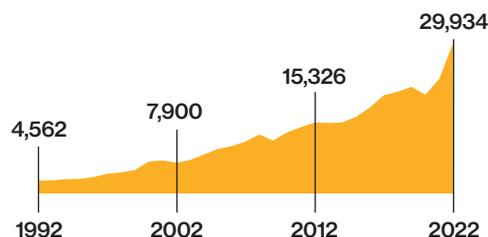
Plants and equipment for
industrial gas production

(1) Disruptive technologies based on scientific breakthroughs that can fundamentally change design and production methods.

Performance indicators 2022

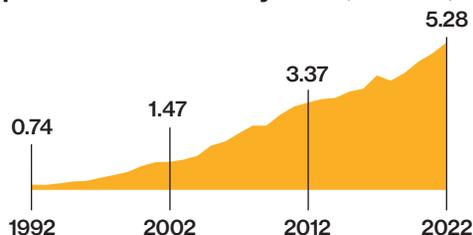
A regular long-term performance

Evolution of Group revenue over 30 years (in millions of euros)



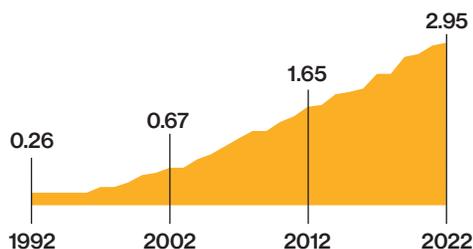
+6.5% average annual growth ⁽¹⁾

Evolution of adjusted net earnings per share over 30 years (in euros)



+6.8% average annual growth ⁽¹⁾

Evolution of adjusted dividend per share over 30 years (in euros)



+8.4% average annual growth ⁽¹⁾

Key financial figures

Revenue

€29,934M

+7%⁽³⁾

Net profit
(Group share)

€2,759M

+7.3%

Recurring net profit ⁽⁴⁾
(Group share)

€3,162M

+17.3%

Operational margin

16.2%

+70 pbs⁽⁵⁾

Efficiency gains

€378M

Gearing

41.8%

Investment decisions

~€4bn

(1) Calculated according to prevailing rules over 30 years.

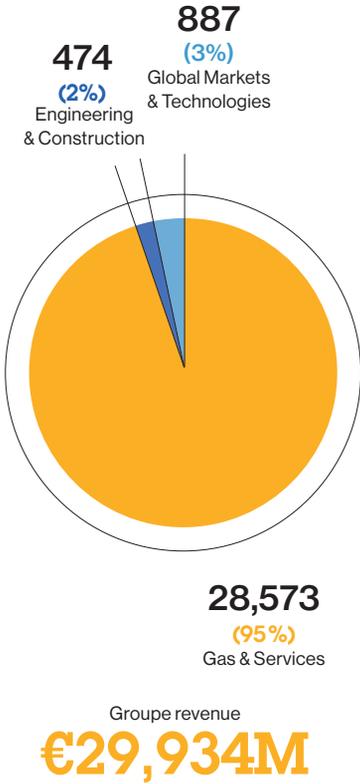
(2) Adjusted for the 2-for-1 share split in 2007, for free shares attributions and for the capital increase completed in October 2016.

(3) On a comparable basis (excluding currency, energy effects and excluding significant scope).

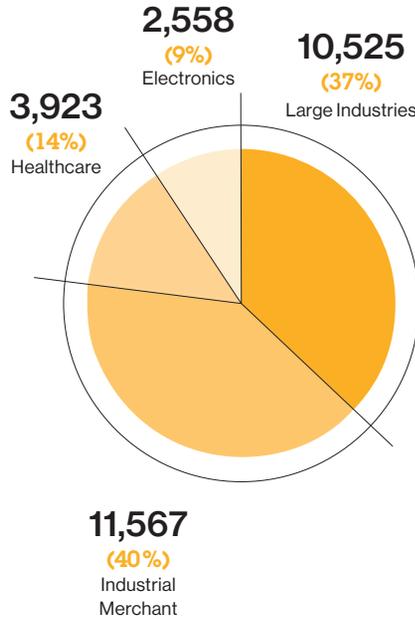
(4) Excluding exceptional and significant operations not impacting operating income recurring, at constant exchange rates.

(5) Operating Income Recurring on Sales excluding energy passthrough impact.

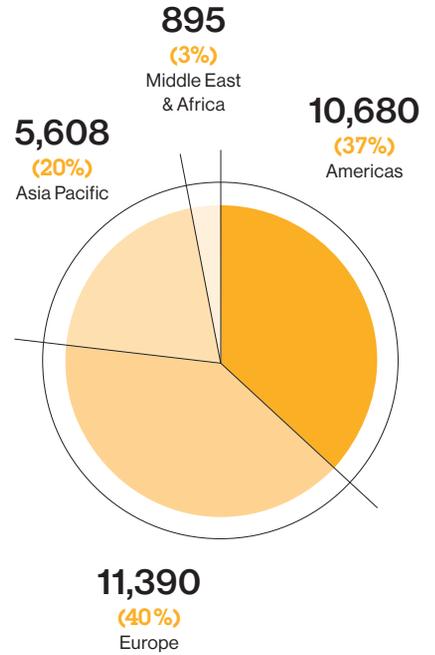
2022 Group revenue
(in millions of euros)



2022 Gas & Services revenue by activity
(in millions of euros)



2022 Gas & Services revenue by geography
(in millions of euros)



Innovation
(2022 figures)

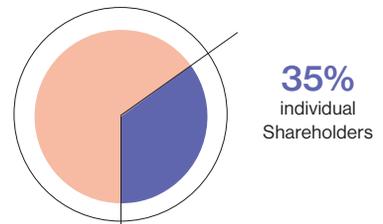
€308M
of innovation expenses
including €100M dedicated to
climate solutions

350
new patents filed

400
innovation partnerships
with academics, industrial
partners and start-ups

Group Shareholders
(as of December 31, 2022)

65%
institutional
Shareholders



€2.95
dividend per share
to be proposed at the
Annual General Meeting
on May 3, 2023

~750,000
individual Shareholders, including
123,000 direct registered Shareholders
and 181,000 intermediary registered
Shareholders

2022 environmental, social and governance (ESG) indicators

Air Liquide's ambition is to contribute to a more sustainable world. The Group's growth model is now based on the principle of global performance that combines economic growth and sustainable development. In 2022, supported by the announcement of ADVANCE, Air Liquide has made significant progress and confirmed the Group's alignment with its short-term and medium-term ESG objectives.

Act

For a low-carbon society

In line with the Paris Agreement, the Group aims to achieve carbon neutrality by 2050:

- In 2022, the Group's CO₂ emissions from scopes 1 and 2 amounted to 39 million metric tons of CO₂ equivalent.
- CO₂ emissions in absolute terms decreased in 2022 by 0.3% compared to the 2020 baseline.⁽¹⁾ They have remained stable for the second consecutive year in a strong business growth context.
- **This result is in line with the ADVANCE plan's objective of reaching an inflection point in 2025 before embarking on a trajectory of lower CO₂ emissions in absolute terms.**

For health

By improving the quality of life of patients with chronic diseases in advanced economies, and by facilitating access to medical oxygen in low- and middle-income countries.

1.9M

patients were cared for at home by Air Liquide in 2022, including:

49%

who are following a personalized care pathway, which amounts to 910,000 patients.

1.8M

people in low- and middle-income countries now have improved access to medical oxygen.

As a trusted partner

By engaging with employees and building best-in-class governance practices.

31.5%

of engineers and professionals in 2022 were women. Air Liquide is aiming for 35% of engineers and professionals to be women by 2025.

42%

of employees benefited from the common basis of care coverage in 2022, with a target of 100% coverage by 2025.

0.9

The lost-time accident frequency⁽²⁾ rate of Air Liquide employees and temporary workers decreased to 0.9 at the end of 2022, compared to 1.1 at the end of 2021.

⁽¹⁾ In tons of CO₂-equivalent of scopes 1 and 2, on a "market-based" methodology, restated to take into account over a full year from 2020 and each subsequent year, the emissions of the assets which correspond to changes in scope (upwards and downwards) and which have a significant impact on CO₂ emissions. Scope 2 emissions calculated from the specific supplies (market-based); the Group hence adopted the methodology recommended by the GHG Protocol.

⁽²⁾ With work stoppages per million hours worked.

A scenic view of a city skyline with a river and a park with yellow autumn trees in the foreground. The city skyline is visible in the background, featuring several tall buildings. The foreground is dominated by a dense forest of trees with bright yellow autumn foliage. A river flows through the park area, and a bridge is visible in the distance. The sky is a mix of blue and light grey, suggesting a clear day with some light clouds.

Advancing
to meet
the world's
challenges

Advancing to meet challenges that the world is facing means making innovation the driving force of our business strategy. It is leveraging our expertise to address the challenges of today and anticipate those of tomorrow. It is bringing to life the cutting-edge technology that will accelerate the key markets of the future. And it is embracing a leading role in developing solutions that matter for society.



Decarbonizing industry and mobility

Air Liquide has at its disposal a comprehensive portfolio of technological solutions and services to support the decarbonization of industry and mobility worldwide. This spans from the production and supply of low-carbon industrial gases to CO₂ management and the optimization and transformation of industrial processes.

Reducing CO₂ emissions at the world's largest oxygen plant



Your Guides:

[Jens Juckel], Senior Process and Efficiency Expert, Air Liquide, [Lizelle Meyer], Operations Excellence Manager, Air Liquide, [Cyril Sebei], Mechanical Area Manager, Air Liquide, [Simon Baloyi], Sasol Executive Vice President, Energy Operations and Technology

Secunda, South Africa



"I n a way, these units are coming back home," says Jens Juckel, gesturing toward a line of seven rectangular towers rising from a mesh of ground-level piping. But, of course, these air separation units (ASU) located in Secunda, in South Africa's Mpumalanga Province, aren't going anywhere.

As we head east across the expansive site to look at another row, Jens, Senior Process and Efficiency Expert at Air Liquide Large Industries South Africa, explains: "Air Liquide was commissioned by Sasol to build these ASUs in 1979." Here, South Africa's largest energy and chemical producer operates a two-mile-wide site that boasts the world's highest oxygen production capacity. The oxygen produced on-site is mainly used

to produce synthesis fuel and chemicals. Following a 480 million euro deal in summer 2021, the oxygen plant is now owned by Air Liquide. "We will be operating all 16 ASUs for the next 15 years, in addition to the unit we already operate today," says Jens, "and since we built them, it feels like we are coming full circle."

The deal is a key step in the long-term relationship that the Group has had with Sasol for the past 40 years. Not only is Air Liquide operating the whole oxygen production plant, but it is also modernizing the units. In addition to bringing benefits in terms of safety, reliability and efficiency, the solution provided by Air Liquide will help reduce the amount of CO₂ emitted during oxygen production. "We are aiming to cut emissions of the acquired assets in Secunda by 30% to 40% by 2031,"



“Air Liquide has brought us global expertise. It’s been very positive for the atmosphere.”

[Cyril Sebei]

explains Jens. “The most obvious option is to use renewable energy.” Indeed, Air Liquide and Sasol have signed power purchase agreements for the long-term supply of 480 MW of renewable energy. Ultimately, the goal is to procure a total capacity of 900 MW of renewable-generated power for the site.

Other key contributions to reducing CO₂ emissions include improvements in process efficiency and the introduction of a new operating philosophy for the acquired assets. “We have identified and

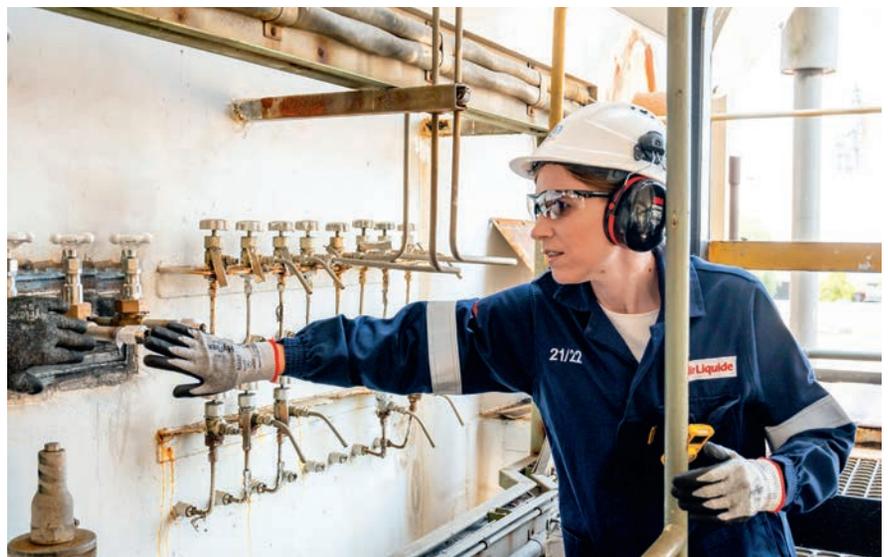
started work on a number of efficiency projects from which we are already seeing significant savings,” says Jens. And then there are what he calls “the quick wins”: running existing units more efficiently. At the eastern set of ASUs, Operations Excellence Manager Lizelle Meyer talks us through them. “Under Sasol, safety and reliability were paramount, as they are to Air Liquide. But we now have a third primary focus as well: energy efficiency, which we are pursuing through advanced process control optimization strategies.”

“In both senses of the term!”

[Jens Juckel]

“We apply digitalization to make maintenance more effective.”

[Lizelle Meyer]





Air Liquide is also working with the Sasol teams to identify and execute further opportunities for site decarbonization. According to Simon Baloyi, Sasol Executive Vice President, Energy Operations and Technology, the shared ambition to decarbonize operations in Secunda is what makes the partnership with Air Liquide successful. "By improving the energy efficiency of our operations and assets, we will reduce steam usage, which will directly result in less carbon dioxide emissions."

"Then there is increased reliability and safety, which has a direct impact on efficiency. Air Liquide uses digitalization to make maintenance more effective," explains Lizelle, introducing us to Cyril Sebei, Mechanical Area Manager,

who is responsible for a maintenance team. "With our extensive cold boxes maintenance program, for example," explains the engineer, "we are not only ensuring safety, but increasing efficiency."

"Air Liquide has brought a new operational strategy to the acquired Secunda assets," Cyril continues. "We now work with Sasol to forecast demand and reduce capacity whenever possible." He gestures over to the hulking Sasol cooling towers. "For some employees, the acquisition was worrying at first. As it turned out, though, Air Liquide has brought global expertise in industrial gases. It's been very positive for the atmosphere." Adds Jens with a chuckle: "In both senses of the term!"

"The partnership between Air Liquide and Sasol is anchored in open, honest and transparent collaboration."

[Simon Baloyi]





Delivering the world's glass with less gas

Your Guides:

[**Alessandro Pallotti**], Key Account and Business Development Manager at Air Liquide Italy, [**Benjamin Coiffier**], On-Site Innovation Program Manager, Industrial Merchant activity at Air Liquide, [**Andrea Cendron**], Technical Director at Verallia Italy

Pescia, Italy



Entering the meeting room at the Verallia glass plant in Pescia, Italy, the first thing one notices is all the bottles of water in the middle of the table. Luckily, we don't have to wait long until our host, **Andrea Cendron**, Technical Director at Verallia Italy, gestures toward them: "Please, help yourselves," he says, adding with a chuckle, "We're not running short."

That's certainly true: with 34 plants producing more than 16 billion glass containers every year, Verallia is the world's third largest manufacturer of bottles and jars for beverages and foodstuffs. And after the tour – especially the brief stop by the furnace – we're thirsty.

"Glass is made by melting a mixture of silica, contained in sand, or indeed recycled glass – and this requires temperatures of around 1,500°C," Andrea explains. By way of comparison, gold melts at just over 1,000°C; lead is already liquid at 300°C. "Our production process is highly energy intensive, so our main challenge is to lower our carbon emissions.

"This is where Air Liquide can help," says Alessandro Pallotti, Key Account and Business Development Manager at Air Liquide Italy. "In late 2021, Verallia announced ambitious sustainability objectives, and we were able to respond with a proposal specifically tailored to the glass market. Here in Pescia, we will be combining our new next-generation, on-site oxygen production unit, which will be 10% more energy efficient than the previous generation, with our HeatOx™ technology,



which will recover wasted heat from furnaces to save up to 20% of the energy needed for the glass melting process. The result: an 18% reduction in CO₂ emissions. The solution will also deliver an up to 90% reduction in nitric oxide emissions, which in high concentrations can be harmful to health.”

His colleague, Benjamin Coiffier, On-Site Innovation Program Manager at Air Liquide Industrial Merchant activity, explains the details. “Let’s start with oxygen: furnaces are heated by burning natural gas with air. If pure oxygen is used instead of air (this is called oxycombustion), then nitrogen and nitric oxide emissions are removed from the process and efficiency is higher.” He continues, “Now, separating oxygen from air also requires energy, but our new on-site oxygen production units are more efficient than current systems, which lowers both our energy consumption and related carbon emissions; they also produce purer oxygen, further reducing nitric oxide emissions.”

“Then, there is HeatOx™, our proprietary technology that harnesses the high-temperature fumes emitted by the furnace to preheat the natural gas and oxygen fed into it. They must be at about 500°C on entering the furnace. Thanks to heat recovery, less energy is needed to bring them up to temperature,” Alessandro further explains.

According to Andrea, these technologies are real game changers: “By introducing pure oxygen as an

“Our new-generation on-site oxygen production unit is more efficient than current systems. It lowers both energy consumption and related carbon emissions.”

[Benjamin Coiffier]





“We will be combining our new-generation, on-site oxygen production unit with our HeatOx™ heat recovery system to deliver energy savings of up to 20%.”

[Alessandro Pallotti]

oxidizer in our production process, and using HeatOx™ to recover the flue gas heat, we will vastly improve our performance regarding specific emissions compared to a conventional furnace.” Air Liquide’s twin oxy-combustion and heat recuperator solution is scheduled to go into service in Pescia at the beginning of January 2024, and preparations are already well underway.

“For us as glass producers, long-term planning and continuity of supply are absolutely essential,” explains Andrea. “Once we commission a new furnace, it will be in continuous operation – day and night – for its entire service life, which is around 15 years. If we ever had to switch it off, recommissioning would be difficult.”

“Here, our new-generation, on-site oxygen production unit offers another





**“We know that
Air Liquide is a
trusted partner
with whom we
can explore
future solutions
to our challenge
of reducing our
emissions.”**

[Andrea Cendron]

advantage,” says Benjamin. “Our unique cryogenic system is more reliable than pressure-swing absorption. It’s also more compact.” Alessandro nods: “And just in case there are any teething difficulties, we have contingency plans to deliver oxygen by truck. Continuity of supply is guaranteed at Air Liquide.”

“We have built up strong working relationships at all levels,” says Andrea, “and we know that Air Liquide is a trusted partner with whom we can explore future solutions to our challenge of reducing our emissions.” Air Liquide’s support of Verallia’s sustainability goals in Italy

is only the beginning. In Brazil, too, the Group is working with Verallia to upgrade its furnaces. As an important step toward making glass manufacturing carbon neutral, Air Liquide has completed preliminary tests with another partner to replace natural gas with hydrogen. “But before we start talking about H₂,” Andrea jokes, “can I offer anyone some more H₂O?”



Building the future of renewable hydrogen in Normand'Hy

"This is where Air Liquide's electrolyzer will be built," indicates Rahim Salemkour, Project Director. "It is scheduled to be commissioned in 2025 and will be the largest in the world." We are in Port-Jérôme, a small town in a region of Normandy, France, that is known for its industrial prowess.

In front of us, construction is underway at the site that will soon be home to the Group's new renewable hydrogen production unit. "Air Liquide Normand'Hy is a large-scale electrolyzer with an initial capacity of 200 megawatts," Rahim explains. This is equivalent to the average annual electricity consumption of more than 235,000 French households. "We will be able to produce

up to 28,000 tons of hydrogen per year here through water electrolysis, which is a production process that uses electricity to 'break' purified water molecules in order to separate the hydrogen from the oxygen."

Air Liquide Normand'Hy is the cornerstone of a project aimed at decarbonizing this industrial basin, which Air Liquide is implementing alongside other major industrial players in the region. The strong level of interest in the project means it has also garnered the backing of the French government as part of an Important Project of Common European Interest.⁽¹⁾

"To enable this kind of large-scale production of renewable hydrogen," states Rahim, "the Group has entered a

⁽¹⁾ Project selected among the 35 PIIEC "Hy2Use" projects.

Your Guides:

[**Rahim Salemkour**],
Project Director, Air Liquide,
[**Mathieu Cavélius**], Business
Developer, Air Liquide, [**Liliane
Herculano**], Project Manager,
Air Liquide

Port-Jérôme, France



joint venture with Siemens Energy to develop large-capacity electrolyzers. This will allow us to pool our technology and expertise in proton-exchange membrane (PEM) electrolysis." This Franco-German partnership is crucial for the development of a European hydrogen sector, which Air Liquide is spearheading.

Air Liquide has chosen to install this new electrolyzer in Port-Jérôme because it is a strategic location for the Group. "We have had a presence here since the 1970s and have rolled out many technologies in the region," explains Mathieu Cavélius, Development Engineer. Over time, the Group has cemented its presence by developing a pipeline network and forging long-standing partnerships with major refiners in the region who

use hydrogen to remove sulfur from fuel.

"It was clear that we would continue to roll out new technologies here," explains Mathieu. Indeed, Port-Jérôme is already home to the largest steam methane reforming hydrogen production unit⁽²⁾ operated by Air Liquide in France, just a few kilometers from the Normand'Hy site. Here, in 2015, the Group installed its Cryocap™ technology, which uses cryogenics to capture up to 98% of

(2) Method separating the atoms that make up methane (CH₄). Using steam, hydrogen and carbon dioxide are obtained. This is the most widely used and most economical method of producing hydrogen to date, but it does emit CO₂, which can be captured and utilized through various applications thanks to Cryocap™ technology.

Developing a new generation of electrolyzers with Siemens Energy

Air Liquide and Siemens Energy have embarked on a joint venture in the large-scale production of renewable hydrogen electrolyzers.

The combined expertise of the two leading companies in their field will enable a sustainable hydrogen ecosystem to emerge in Europe.





the CO₂ emitted during hydrogen production – a world first. Thanks to Cryocap™, Air Liquide has created new opportunities for capturing and reducing the carbon emissions of its own sites, as well as those of its customers. “Today, we are seeing great progress being made with the construction of this vast electrolyzer,” Rahim says. The main challenge lies in sourcing the electricity that powers it. “The electricity used will come from wind turbines and photovoltaic solar farms located near the site. This is what we mean when we talk about renewable hydrogen. There will be no CO₂ emissions produced during the production process,” said Rahim. As a result, up to 250,000 tons of CO₂ emissions per year will be prevented, the equivalent of the emissions of a French city with 25,000 inhabitants.⁽³⁾

Downstream, Air Liquide Normand’Hy will be connected to the regional industrial ecosystem. This will allow the hydrogen to be distributed directly to industries in the area. “We will continue to collaborate with refining, petrochemical and chemical companies that require hydrogen for their production. Today, with the climate challenges we are facing, it is a matter of gradually replacing the hydrogen we already supply with renewable hydrogen. This way, the carbon

footprint of industrial players can be reduced,” said Mathieu. This hydrogen will also be used to decarbonize heavy transport, starting with heavy goods and industrial vehicles, followed by buses and commercial vehicles in the region.

Not only will the Air Liquide Normand’Hy site produce renewable hydrogen, the project as a whole has an environmental approach. Liliane Herculano, a Project Manager who deals with regulatory aspects, explained: “Due to its size, the project

“Normand’Hy’s major asset is its ability to produce competitive and carbon-free hydrogen on a large scale from renewable energy.”

[Rahim Salemkour]





“This pioneering project is a unique opportunity for industrial players in this area of Normandy, as well as for mobility – it will be a milestone.”

[Mathieu Cavélius]

has been subjected to an environmental assessment. With the help of an environmental engineer, we carried out a year-long fauna and flora impact study, which represents a complete life cycle.” This allowed Air Liquide to adapt the project in terms of its design, construction and operation. “As a simple example, we decided to excavate the site between September and October 2022, as this is a time of year when animals are neither hibernating nor in their breeding period,” explained Liliane.

Air Liquide has worked to preserve the environment and support the entire area surrounding the Normand'Hy site. This project will contribute to the economic development of the region and build up a unique expertise in

hydrogen production. The Group is already committed to developing this expertise through the H₂ Academy, a higher education training initiative that teaches younger generations in the area about new career paths within the hydrogen industry.

Air Liquide's objective is to accelerate the development of renewable and low-carbon hydrogen on a global scale. To achieve this, it has decided to invest at least 8 billion euros in this area by 2035. The Normand'Hy project is this ambition brought to life!

(3) In 2019, the Carbone 4 consulting firm estimated the average emissions per person and per year in France to be nearly 10 tons of CO₂ equivalent.

And also



Up to

98%

of CO₂ emissions emitted by a hydrogen production unit captured thanks to Cryocap™.

Toward carbon neutrality: CCS, a promising solution

How can large volumes of CO₂ emitted by industrial players be captured in the short term? Carbon capture and storage (CCS) is currently one of the most viable and efficient solutions.

Air Liquide has been developing CO₂ management solutions for 15 years now, with a notable example being its Cryocap™ system. In Normandy, France, this solution is already in use at the Group's Port-Jérôme hydrogen production facility, where it uses cryogenics to capture up to 98% of emitted CO₂. The liquefied CO₂ is

then recovered for other industrial uses. This unique capture process will also be integrated into Air Liquide's low-carbon and renewable hydrogen production unit in Grandpuits, France, which is under construction as part of a long-term contact with TotalEnergies.

The Group is present across the CCS value chain, from CO₂ capture to its transport to sequestration sites. It is deploying large-scale projects in France, Belgium and the Netherlands. Meanwhile, a joint venture with Sogestran, called OCEOS, is enabling Air Liquide to participate in maritime transport of carbon to meet the needs of future CCS projects in Europe.

Accelerating hydrogen development in the U.S.

Hydrogen mobility is growing in the U.S. To meet the increasing demand, Air Liquide opened its largest liquid hydrogen production facility in 2022, in North Las Vegas, Nevada.

The facility and the associated logistics infrastructure mark a 250 million dollar investment by the Group in the national hydrogen market. The plant has a production capacity of 30 tons of liquid hydrogen per day, which is enough to fuel up to 40,000 hydrogen vehicles. It will serve customers looking for low-carbon solutions, notably those in the mobility market in California.



Biomethane: for a sustainable energy mix

Air Liquide is committed to the development of biomethane, a key energy source to decarbonize transport and industry and accelerate the energy transition as part of a circular economy approach.

The Group is positioned as a partner of choice for industrial players, farmers and local authorities thanks to its presence along the entire biomethane value chain: from biomass sourcing, to the production of biogas and its purification into biomethane, to final transportation to customers. With production

facilities in France, Norway, Sweden, the United Kingdom and recently Italy, the Group is expanding its business on a global scale. In the United States, Air Liquide is currently building its largest biomethane production plant to date, in Rockford, Illinois. And in China, where biomethane has major potential, the Group launched its first production plant at the end of 2022.

22

biomethane production plants worldwide with production capacity of 1.6 TWh per year, equivalent to the average gas consumption of approximately 333,000 people.

+25%

increase in capacity over the past 3 years.



Taking to the skies, powered by hydrogen

To help the aviation sector achieve carbon neutrality by 2050, Air Liquide has partnered with Groupe ADP (Aéroports de Paris) to create a joint venture that will provide airports with the engineering and services needed for the transition to hydrogen. As Airbus aims to operate the first hydrogen-powered commercial aircraft by 2035, airports need to start reconsidering their infrastructure today. In particular, they must look at how liquid hydrogen will be supplied and how it can also serve other ground mobility usages, notably heavy-duty transport or ground support.

Tomorrow





now

Toward low-carbon shipping

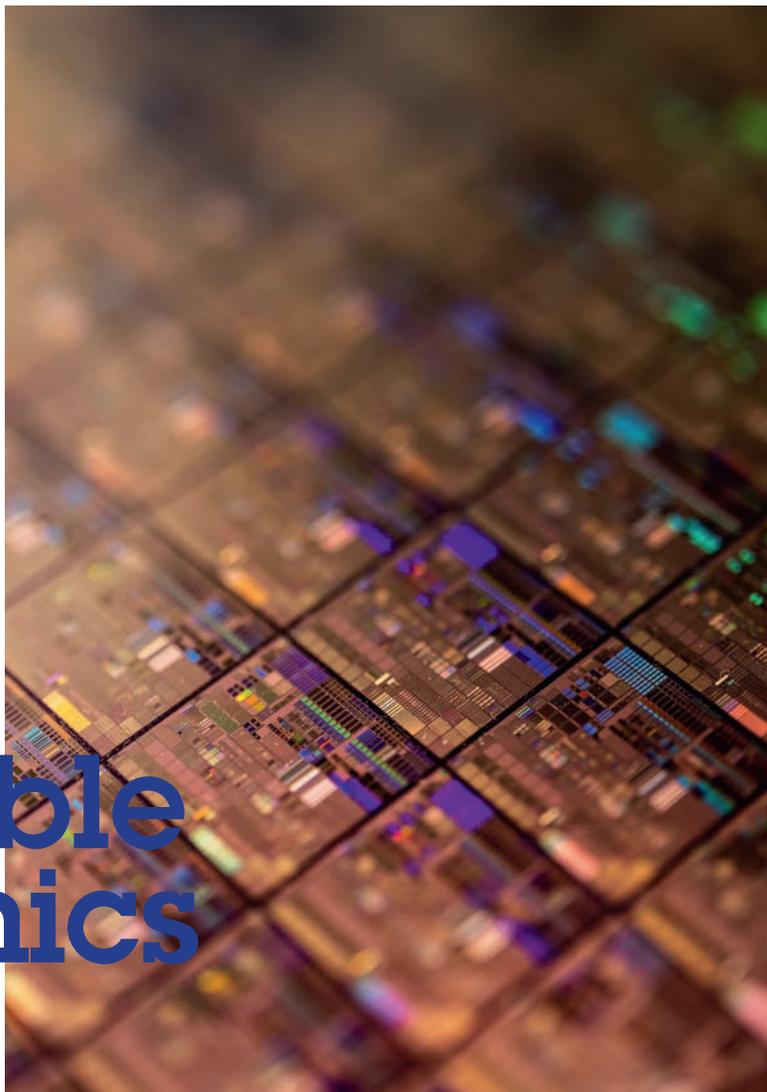
With more than 500 million metric tons of goods transported inland in the European Union,⁽¹⁾ shipping companies are looking for solutions to decarbonize their logistic chain. In this context, Air Liquide and Future Proof Shipping (FPS), a provider of zero-emission shipping solutions, have signed a long-term contract for the supply of hydrogen to FPS's inland barge, the Maas, which transports containers in the Benelux region. This supply will allow the substitution of hydrogen for the conventional fuel used in the shipping industry, thus reducing the sector's environmental footprint. The hydrogen will be delivered in specially designed multi-modal hydrogen storage suited for inland barges. The overall solution will avoid nearly 2,000 metric tons of CO₂ emissions per year for the first ship concerned. Due to its replicability potential for other ships (and other heavy-duty mobility usages), the project is a milestone on the path to the decarbonization of inland waterways.

(1) Eurostat

Unlocking progress through innovation

Innovation and technology are major forces of Air Liquide and have always enabled it to play a pioneering role. It is thanks to these strengths that the Group is contributing to the development of key sectors for the future. This includes electronics, where its molecules are used in the manufacture of semiconductors, and healthcare, where its solutions contribute to improving patient's quality of life.

Advanced materials for sustainable electronics



Your Guides:

[**Jenny Tan**], Frontend Global Materials Operations Director, Micron, [**Jiro Yokota**], Technology Program Manager, Advanced Materials, Air Liquide, [**Dylan Low**], Strategic Business Unit Director, Air Liquide Singapore, [**Helena Seiver**], Vice President, Strategic Account Management for Micron, Air Liquide

Singapore



“**W**hen people hear ‘advanced materials,’” says **Jiro Yokota**, “they often think that we are dealing with simple, plug-and-play solutions: ‘Just exchange material A for material B to save X amount of money in production,’” says the **Technology Program Manager at Air Liquide Advanced Materials**. “But what we do is far more complex – and requires a closer relationship with the customer and a thorough understanding of their production processes.”

We have come to one of Air Liquide’s longest-standing customers, Micron, to get a feel for what Jiro means. For 30 years now, Air Liquide has been supplying the US-based provider of memory storage solutions with the ultra-pure gases required in microchip production. During this time, the electronics industry had expanded rapidly as computers and then smartphones became standard consumer goods, while at the same time cars and household appliances acquired more complex electronic components capable of faster performance and more processing power. All while reducing financial costs and environmental footprint.



We are here in Singapore at the Air Liquide Advanced Materials center built for Micron. Located on the western shore of the island state, a couple of miles away from its gleaming center, the facility is an ultra-modern production plant – “the first of its kind,” explains Dylan Low of Air Liquide Singapore.

He picks us up at the gates alongside Helena Seiver, Vice President, Strategic Account Management for Micron at Air Liquide, and while we don protective goggles, helmets and overalls for our tour of the plant cleanrooms, she explains her role as “providing one Air Liquide service to one Micron.” This means ensuring that Air Liquide deploys its international reach to support its partner as it, too, expands globally. In this case, the Group opened one of its largest electronics

advanced materials production facilities alongside Micron in Singapore.

This strategy of regionalizing supply chains makes them more robust and responsive. With covid-19 lockdowns in place during the construction of Air Liquide’s Advanced Materials center in Singapore, the importance of regional synergies became even more salient. About the partnership with Air Liquide, Jenny Tan, Frontend Global Materials Operations Director at Micron, comments, “Micron and Air Liquide have been successfully collaborating for the last 30 years on various projects that have contributed to Micron’s production efficiency, supply chain resiliency and sustainability efforts. We are excited to continue our long partnership with Air Liquide in the years to come.”



“Our enScribe™ products are designed to reduce the global warming potential typically associated with most contemporary gases used in etch processes.”

[Jiro Yokota]

“We are excited to continue our long partnership with Air Liquide in the years to come.”

[Jenny Tan]



Jiro takes this as his cue to talk us through how Air Liquide's enScribe™ etching molecules help the company's electronics customers make marked emissions reductions in their manufacturing processes. “Our materials replace high global warming potential etching gases, which have more potent greenhouse gas emissions than carbon dioxide,” he says. “As such, whenever a customer adopts one of these molecules, it has the potential to reduce the entire sector's emissions. The use of just one of these molecules

by some customers has already helped reduce the industry's overall emissions by almost 1%.”

“Also,” he adds, “each chip that leaves a fab has the potential to further reduce emissions down the line – by making a computer or even a car more efficient.” Advanced materials indeed!

“For 30 years, Air Liquide and Micron have grown together. The Singapore Advanced Materials Center, their most recent joint achievement, is the first production plant of its kind.”

[Dylan Low]



[Helena Seiver]



Toward *personalized* *care* at home

"My life has changed," says Margaret Watty, a lively, independent-minded woman who is living with chronic obstructive pulmonary disease, a condition that results in severe breathing difficulty.

Her gratefulness is palpable as we sit together in the warm, sunny living room of her Madrid apartment. "Before, I couldn't go out—I could hardly walk." After two bouts with covid-19, she now requires oxygen therapy 24 hours a day.

David Rudilla, Air Liquide Healthcare's Director of Patient Quality of Life and a psychologist, is on-site with us today. He is part of a multidisciplinary team of nurses, technicians, doctors and pharmacists who help patients like Margaret cope with living with a range of chronic conditions. "I am passionate about placing human dignity and quality of life at the center of the support teams provide," he enthuses. "As we are on the ground

Your Guides:

[**Federica Bellingeri**], Patient Empowerment and Centricity Manager, Air Liquide Healthcare, [**David Rudilla**], Director of Patient Quality of Life, Air Liquide Healthcare, [**Carlos Garcia Diaz**], Oxygen technician, VitalAire Spain

**Madrid,
Spain**



interacting with patients throughout their care, we have a global view that takes into account more than just clinical data." This proximity allows a more comprehensive understanding of each person's needs, which in turn enables the development of innovative solutions to help them.

Carlos Garcia Diaz, Margaret's VitalAire oxygen technician, is also joining us today. He visits Margaret regularly and the two have developed a close bond. He is always on the lookout for ways to improve her quality of life, and he recently brought her a new oxygen concentrator that better fits her needs. "Originally I had a bigger machine, but

Carlos found me this smaller one," says Margaret with a smile. "I'll be able to put it in a backpack, so I can be more mobile." Carlos nods in agreement. "She has to be constantly connected to the machine," he explains. "These long tubes can be a real impediment when she moves around. But the portable machine allows her to leave her home and be more independent."

Because every patient experiences their illness differently, personalized care plans are more effective

"It makes a huge difference to me to know that the people delivering my follow-up understand my situation."

[Margaret Watty]





“My goal is to try to ensure the therapy interferes as little as possible with the patient’s daily life.”

[Carlos Garcia Diaz]

than a one-size-fits-all approach. A combination of human presence, digital platforms and data analysis allows Air Liquide Healthcare teams to build a personal profile for every patient and continuously adapt it as the patient’s situation evolves. “It makes a huge difference to know that if I call I can speak to Carlos, and not a machine telling me press 1 if I need this, press 2 if I need that,” says Margaret.

To learn more about the importance of value-based healthcare models, we jump in a car with David and head to his office to meet with Federica Bellingeri, Patient Empowerment and Centricity Manager for Air Liquide Healthcare in the Netherlands. “Value-based healthcare is increasingly gaining traction in the health sector,” she

tells us. “Payers understand that personalized care plans allow for better targeting of resources and efforts.” David agrees: “The approach improves patient outcomes at the best cost for healthcare systems, which are under unprecedented strain due to rising life expectancy, chronic diseases and treatment costs,” he says.

To improve treatment adherence and long-term quality of life, feedback from patients on their needs, expectations and treatment experience is vital. And even their lifestyle enters into the equation. “Patient adherence to therapy is vital, but patients are often dealing with chronic conditions at home,” David points out. “Therapy outcomes rely not only on clinical indicators, but on the barriers or inconveniences of treatment being minimized as much as possible.”



“Therapy outcomes rely not only on clinical indicators, but on the barriers or inconveniences of treatment being minimized as much as possible.”

[David Rudilla]

The future of healthcare has to be an ecosystem that puts the patient at the center. Air Liquide Healthcare teams collaborate closely with stakeholders to find ways to advance this goal. “Some payers have adopted an outcome-driven model, with payment linked to therapy adherence or to patient satisfaction, and to innovation that improves patient outcomes,” says Federica. For David, Air Liquide Healthcare is contributing to the development of a virtuous circle: “Doctors benefit from the information

we provide. Hospitals that entrust us with their patients’ care at home get better outcomes at the right cost. Patients are empowered because their voices are heard. We receive feedback that makes our solutions more effective. And, ultimately, society benefits from a more sustainable healthcare system.”

“My life has returned to almost normal,” says Margaret. And that is the most meaningful outcome of all.

“We’re creating synergies with stakeholders to ensure that the ultimate treatment goal is the one most meaningful to the patient.”

[Federica Bellingeri]



And also

ALTEC, cutting edge engineering at Airgas

In 2022, Airgas, Air Liquide's American subsidiary, opened the new ALTEC⁽¹⁾ center, which brings its engineering teams together to innovate, create and accelerate solutions for their customers.

The 42,000 square feet facility includes cutting-edge laboratories dedicated to industries spanning from food, metals and glass to welding and automation. This new center facilitates the sharing of resources, ideas and expertise in a customized space, providing synergies that greatly amplify Airgas's ability to provide tailor-made solutions to customers.

(1) Air Liquide Technology Center.



Data and AI working for the energy transition

The energy transition is impossible without technology, and artificial intelligence (AI) is playing a decisive role. For Air Liquide, AI is a strong lever of value creation and efficiency, fully in line with its innovation strategy for a sustainable performance.

Every day, billions of data are collected from the Group's 500 plants, 20 million gas cylinders and 9,900 trucks. Analyzing this data allows a detailed and global understanding of industrial assets and, ultimately, monitoring optimization. For example, the teams have implemented AI solutions that reinforce the reliability of production units, which are controlled by remote centers, and that optimize their energy consumption, thus reducing their environmental impact.

20 million

kilometers avoided
thanks to AI



Making factories more flexible with AI

Contributing to a low-carbon society requires using renewable energy to power industrial and urban areas. However, their intermittence poses a major challenge. Air Liquide has thus launched an ambitious research program with the École des Mines ParisTech into how to use AI to address this challenge. Among other things, the program focuses on the flexibility of industrial units, which is essential for integrating renewable energy into the grid, and on the development of algorithms to optimize plant production.

Another axis for decarbonizing operations is logistics. In 2020, the Group deployed a program to digitize its liquid gas supply chain, based on AI. This will allow Air Liquide to better anticipate its customers' needs and determine optimal routes, thus limiting the number of kilometers traveled by delivery trucks. The goal is a 10% reduction per year until 2025.

Tomorrow



To the Moon

As an expert in extreme cryogenics and a supplier of key molecules, Air Liquide is a major partner in sustainable space exploration. Its cutting-edge technologies are an essential building block for establishing the first prolonged human presence on the Moon. In particular, they will enable the refueling of space vehicles via stations in orbit, and the use and production of hydrogen in situ from lunar resources. The Group is already meeting these challenges with its partners in the sector, notably the ESA and NASA, to whom it supplied high-pressure nitrogen for the launch of the Artemis 1 mission to the Moon.

When CO₂ is recycled into textiles

Start-up Fairbrics is using CO₂ emitted by industry to replace polyester made with fossil fuels. Founded in 2019, this green chemistry start-up has developed an innovative process that turns captured CO₂ into textile fibers. It serves as a concrete example of how the circular economy can contribute to decarbonization. During the two years that it spent at Accelair, Air Liquide's deep tech start-up accelerator, Fairbrics developed its technology thanks to the laboratories at its disposal and the technical and safety expertise of the Group's R&D teams. Thanks to this support, Fairbrics was able to launch and raise nearly €10 million in 2020 and 2021 to transition to an industrial scale. In 2022, following a second round of financing of more than €20 million, the start-up announced the construction of a pilot plant in Antwerp that will produce 1,000 T-shirts per day from the CO₂ emissions of factories in the industrial zone.

now

Advancing with you



Advancing with you is recognizing the journey toward a sustainable future as a joint endeavor requiring collaboration throughout our entire ecosystem. It is forging meaningful connections with employees, customers, patients, shareholders and all other stakeholders. It means acting for all in the pursuit of a more sustainable, just and equitable world.



With our employees (p. 58) With our customers (p. 59) With patients (p. 60)
With communities (p. 61) With our shareholders (p. 62)

Leading by example

Lori Kuiper,
Orbital, Heating and
Pipe Product Manager,
Red-D-Arc, part of
Airgas, Air Liquide's
U.S. subsidiary



Being a woman in a traditionally male profession is not always easy, but welding engineer Lori Kuiper was raised to believe you can be anything you want to be. Today, she is determined to pass on this message by inspiring women to forge their path in the industry that she loves.

How did your career as a woman welder start?

When I was 24, I applied for an apprenticeship program at General Motors that had reserved three places for women. On my first day, I ended up in a dark, smoky foundry with overhead cranes on tracks carrying buckets of molten metal – and I wondered what I had gotten myself into! My career has evolved a lot since then, but I wouldn't be here at Airgas today if that original

opportunity for women hadn't been created – proof that when a company does something with intent, it pays off.

You are very committed to encouraging women in the industry. Do you have examples of initiatives to share with us?

There are a lot of fantastic grassroots initiatives such as Weld Like a Girl™ and Women Who Weld®. ⁽¹⁾ Internally at Air Liquide, Women in TCL ⁽²⁾ supports employees to advance in their field. This program recognizes employees for their technical knowledge and scientific expertise, offering them a flexible and structured career path. We are also involved in educational outreach, and we provide welding equipment and training to help teachers and students learn new and advanced skills in the field. That might seem basic, but not being able to find personal protective equipment that fits correctly is a huge barrier to learning to weld.

What would you say to a woman thinking about an engineering career at Air Liquide?

I would tell them that it's a place where their voice will be heard and where different points of view are valued. But most importantly, I would say don't let other people put limitations on you or hold you back from your path.

(1) Weld Like a Girl™ is an empowerment project for girls and women, using welding and creativity to boost self-esteem and whole-person wellness. Women Who Weld® is a nonprofit organization that teaches women how to weld and find employment in the welding industry.
(2) Technical Community Leaders.

As Chief Procurement Officer at leading specialty polymer manufacturer Covestro, Thomas Römer oversees all global procurement activities and works closely with suppliers to find ways to reduce the company's carbon footprint.

Why did you choose Air Liquide as a supplier?

Industrial gases like hydrogen and carbon monoxide serve as the basis for all of our end products: they are "backbone" materials. The choice of suppliers is indeed critical, and we were won over not only by the price, but also by Air Liquide's reliability, which is of the utmost importance to us. We also really appreciate the key account concept. This means we have one main contact at Air Liquide for day-to-day operations and project development, which simplifies everything and accelerates decision-making. He always works to understand what we as the customer need and then find a solution for us. And if needed, he is capable of mobilizing a task force to solve technical issues.

In light of Covestro's climate neutrality goals, what is Air Liquide doing to help you achieve them?

Cost and availability have always been key purchase criteria for us, and our CO₂ footprint is now another, as we want to achieve net-zero emissions⁽¹⁾ by 2035. With Air Liquide, we are looking into the possibility of using biogenic carbon dioxide⁽²⁾ for production processes, and low-carbon hydrogen and

ammonia for heating. We're also interested in Air Liquide's work on water electrolysis.

What are the challenges that Covestro faces on its way to carbon neutrality?

Making our industry carbon neutral is critical, but today no chemical company can instantly become 100% defossilized. So, we have to find the most promising solutions to help reduce the CO₂ emissions of

production units all while meeting our customers' needs in terms of competitive solutions. Air Liquide helps us by adapting offerings and processes to the situation, such as the recent investment in Shanghai for low-carbon hydrogen production, which benefits from green financing.

(1) Scope 1 and Scope 2

(2) Biogenic carbon dioxide is carbon dioxide that is produced as a by-product of the decomposition of organic materials.

Thomas Römer
Chief Procurement
Officer at
Covestro



A joint approach
to reducing CO₂ emissions

Committed to improving the lives of people with diabetes, Air Liquide has partnered with the International Diabetes Federation (IDF) Europe to engage stakeholders in developing a patient-centered care ecosystem and inspire policy change that will transform the future of people living with diabetes.

IDF Europe aims to advocate on all levels for those with diabetes. How do you do this?

A big part of our work is to raise visibility and awareness about diabetes, which currently affects more than 32 million Europeans. We do this through information campaigns as well as advocating for policy change at the national and European levels. In November 2022, we celebrated a major achievement when a new resolution on the prevention, management and better care of diabetes was adopted by the European Parliament. We worked together with Air Liquide Healthcare teams, people living with diabetes and other diabetes stakeholders on a campaign that engaged policymakers to get this resolution passed, highlighting what you can achieve if you have strong political will and science working together.

What should the future of diabetes care look like?

Care needs to shift from being disease-focused to person-focused. Patient empowerment is critical to helping people self-manage their condition. Thanks to companies like Air Liquide Healthcare, recent years have seen huge advancements in using unique combinations of human support, digital tools and devices to provide the right support for each patient, with the objective of improving both

health outcomes and quality of life. Personalized care plans are really an investment that could prevent long-term complications.

Are things moving in the right direction?

I'm optimistic, as stakeholders are starting to see the importance of smoother, personalized care pathways. Our shared goal is to reduce the burden of living with the disease.

Elisabeth Dupont
Regional Manager
Europe at
the International
Diabetes Federation

*Elevating
the voices*
of patients



When the conflict in Ukraine started in February 2022, Internationaler Bund Polska, a social action organization, which provides a variety of reintegration services, rapidly mobilized to help the influx of refugees arriving in Poland. A local Air Liquide employee contacted the NGO to see what could be done to help. Consequently, Air Liquide supported the charity's project with employee volunteering and a grant from the Fondation Air Liquide.

What was the situation like for your organization when the conflict in Ukraine started?

We are a small, local organization helping people in difficulty. When the conflict started, the international NGOs didn't arrive immediately, so in a very short time and on a major scale we had to organize ways to help those fleeing. We had 2,500 people show up to our center. Two days later, we opened the first warehouse to distribute material aid. And during the most intense period, we had 10 locations open in Krakow.

How did you manage? And how did Air Liquide get involved?

We opened a huge warehouse, which at one point had 300 volunteers from 24 countries working there. In the midst of all this, Paweł Świątkowski, an Air Liquide

engineer, came to my office and asked, "What do you need?" At the time we critically lacked women's underwear and hygiene products, and he told me, "OK, we'll take care of it."

What is the most important way companies can help?

We helped 174,000 Ukrainian refugees in 2022, and it was invaluable to have a partner that listened over the long term and adjusted the type of support given as our needs changed. They also

gave employees time off to work with us⁽¹⁾ – one day all our warehouse volunteers were from Air Liquide! What truly makes the difference is everyone coming together – individuals, businesses, other NGOs – to offer help.

(1) Employee volunteering that took place in the framework of Citizen at Work. By 2025, this Air Liquide program will offer all Group employees the possibility to support, during work hours and on a voluntary basis, their local communities by participating in initiatives organized or identified by their entity.

Maria Wojtacha
Director of
the Fundacja
Internationaler
Bund Polska

Joining forces
*To help
communities*





Investing is a social commitment

Virginie I.
an Air Liquide
individual Shareholder ⁽¹⁾
since last year,
founder of the
association Coup de
Pouce (A Helping
Hand) and an active
philanthropist.

A proponent of impact investing, ⁽²⁾ Virginie I. helps major investors choose investments that generate a positive social and environmental impact in addition to financial performance. This criteria led her to invest in Air Liquide.

Why did you choose to invest in Air Liquide?

Impact investing in companies like Air Liquide gives purpose to my investments. In addition to the financial return, which allows me to conduct an after-school project in the Haut-Katanga Province of the Democratic Republic of the Congo, my Air Liquide shares are a way for me to support a company that is aligned with my beliefs. They are also an opportunity to contribute to the development of solutions that

are beneficial to society and that meet daily needs, from transport and energy to healthcare and more.

In your opinion, what are Air Liquide's strengths?

Air Liquide may be an international Group, but it values close relationships and favors direct contact with its Shareholders. I have great confidence in Air Liquide's long-term vision, in part due to the stability of its strategy.

How do you get involved as a Shareholder?

Air Liquide provides many services and tools to Shareholders that are invaluable for answering our questions and helping us to feel involved in the Group. I follow Air Liquide's news closely via the Shareholder Newsletter, which I read regularly, and via the website. I also get involved in events such as Génération Hydrogène, which explained hydrogen usages and its future potential. This involvement is essential to helping me understand the full extent of my investment.

(1) Direct registered shareholders hold a securities account directly with Air Liquide, without going through a financial institution.

(2) Impact investments are investments made in companies, organizations and funds that aim to generate a positive social and environmental impact in addition to a financial return.



Consolidated income statement

(summarized)

AS OF DECEMBER 31, 2022

<i>(in millions of euros)</i>	2021	2022
Revenue	23,335	29,934
Operating costs	-17,002	-22,606
Operating profit before depreciation	6,333	7,328
Depreciation and amortization	-2,173	-2,466
Operating income recurring	4,160	4,862
Other non-recurring operating income & expenses	-150	-571
Operating income	4,010	4,291
Net financial costs and other net financial expenses	-408	-386
Income taxes	-915	-1,002
Share of profit of associates	5	1
PROFIT FOR THE PERIOD	2,692	2,904
- Minority interests	120	145
- Net profit (Group share)	2,572	2,759
Basic earnings per share (in €)	4.94	5.28
Recurring net profit (Group share)	2,572	3,162

Consolidated Balance Sheet (summarized)

AS OF DECEMBER 31, 2022

Assets (in millions of euros)	12/31/2021	12/31/2022
Goodwill	13,992	14,587
Fixed assets	23,984	25,458
Other non-current assets*	1,216	1,234
Total non-current assets	39,192	41,280
Inventories & work in-progress	1,585	1,961
Trade receivables & other current assets	3,611	4,216
Cash and cash equivalents*	2,311	2,019
Total current assets	7,507	8,196
Assets held for sale	84	42
TOTAL ASSETS	46,783	49,518

Equity and Liabilities (in millions of euros)	12/31/2021	12/31/2022
Shareholders' equity	21,462	23,736
Minority interests	537	836
Total equity	21,999	24,572
Provisions & Deferred tax liabilities	4,419	4,457
Non-current borrowings	10,506	10,169
Non-current lease liabilities	1,033	1,052
Other non-current liabilities*	382	372
Total equity and non-current liabilities	38,339	40,622
Provisions	309	282
Trade payables & other current liabilities	5,614	6,258
Current lease liabilities	228	228
Current borrowings*	2,256	2,113
Total current liabilities	8,407	8,881
Liabilities held for sale	37	15
TOTAL EQUITY AND LIABILITIES	46,783	49,518

* Including fair value of derivatives

Consolidated cash flow statement

(summarized)

AS OF DECEMBER 31, 2022

<i>(in millions of euros)</i>	2021	2022
Funds provided by operations	5,292	6,255
Changes in working capital	377	-397
Other cash items	-98	-48
Net cash from operating activities	5,571	5,810
Purchases of property, plant and equipment, and intangible assets	-2,917	-3,273
Purchases of financial assets and the impact of changes in scope	-660	-136
Proceeds from sale of subsidiaries, property, plant and equipment, and intangible and financial assets	225	167
Net cash in investing activities	-3,352	-3,242
Distribution	-1,418	-1,487
Increase in capital stock	175	38
Purchase of treasury shares	-40	-192
Transactions with minority shareholders	-37	-4
Change in borrowings and lease liabilities (including net interests)	-497	-1,136
Impact of exchange rate changes and net debt of newly consolidated companies and others	17	-165
Change in net cash and cash equivalents	420	-378
NET CASH AND CASH EQUIVALENTS AT THE END OF THE PERIOD	2,139	1,761



AIRLIQUIDE.COM

See our annual publications on our website:
Annual Report, Sustainability Report,
Universal Registration Document,
Shareholder's Guide.



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Air Liquide's Normand'Hy electrolyzer project on page 36 is supported by:



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European Union
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Complimentary copy. Published by the Communications department of the Air Liquide Group,
75 quai d'Orsay, 75007 Paris, France

Publication Director: François Jackow. **Editor:** Domitille Fafin. **Date of publication and legal deposit:** April 2023. ISSN: 2803-6220.

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This document is printed on FSC-certified paper sourced from sustainably managed forests by an Imprim'Vert-certified printer.

L'Air Liquide - S.A. company established for the study and application of processes developed by Georges Claude
with issued capital of 2,878,976,490.50 euros.

**Air Liquide is
a world leader
in gases,
technologies
and services for
industry and
health**

Present in 73 countries and counting 67,100 employees, Air Liquide serves over 3.9 million customers and patients. Oxygen, nitrogen and hydrogen are essential small molecules for life, matter and energy. They embody Air Liquide's scientific territory and have been at the core of the company's activities since its creation in 1902.