

# 2008

The number of connected objects overtook the number of human beings (**6.7 billion**)<sup>(1)</sup>

(1) Cisco survey of July 17, 2011

# 2021

The IIoT (Industrial Internet of Things) market is expected to be worth around **\$124 billion**<sup>(2)</sup>

(2) IndustryARC survey of June 29, 2016

# 2030

Around **500 billion** objects will be connected<sup>(3)</sup>

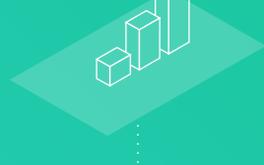
(3) Forum for the Future, November 16, 2017

The volume of data being gathered is growing exponentially and being transmitted at ever-greater speeds. Many applications or companies are now in development, and vast potential has yet to be invented and developed that will benefit performance and customer satisfaction.

From optimization of energy consumption to predictive maintenance and new digital technologies for production facilities... The Industrial Internet of Things (IIoT) represents an entire category of applications from many industry sectors.

## The benefits of IIoT

According to Morgan Stanley's survey, 'Investing in the Internet of Things' - January 23, 2015



**Improved operational efficiency**



**New business opportunities**



**Reduced downtime**



**Improved employee safety**



**Better understanding of consumer demand**

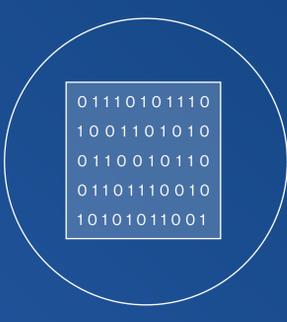
## Air Liquide and IIoT

The energy and environmental transition, healthcare and digital transformation: IIoT offers hugely promising opportunities in terms of these three trends which are structurally key to Air Liquide markets between now and 2020. As part of its policy and commitment to innovation, the Group is developing new skills that will allow it to play its full part in the development of Industry 4.0. It also has a subsidiary company dedicated to the IIoT: Alizent.



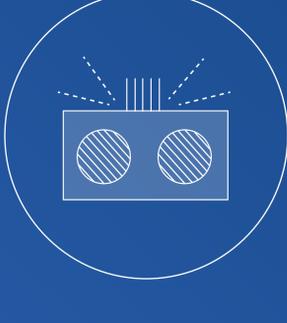
**246,000**

**connected objects within the Group**  
(healthcare, industrial gases and new markets)



**1 billion**

**data items** gathered every day in Air Liquide plants worldwide



**~ 1,500 sensors**

in each plant to gather an unbroken stream of process data

## Pilot projects

A number of IIoT applications are currently in operation or being tested in France and the USA by Air Liquide to improve supply monitoring, manage traceability or provide predictive maintenance.



### Forecasting the need for replenishment

Air Liquide monitors the levels of more than 40,000 oxygen and liquid nitrogen tanks on its customers' premises. This data enables Air Liquide to replenish its customers' stocks, relieving them of the need to place an order or monitor their own level.



### Cylinder geolocation

To help its customers optimize their supplies of gas cylinders on consignment, Air Liquide is currently testing real-time gathering of stock status data. By tracing cylinders using a geolocation tag fixed to each of them, this project will enable customers to manage the redistribution of stock and cylinder returns more effectively.



### Monitoring CO2 tanks

Another project currently at the research stage involves the use of smart sensors to monitor the CO2 tanks used by fast food chains for their carbonated drinks.



### Optimizing hospital stocks

Several tests are now being conducted using technologies for medical oxygen cylinder location at major U.S. and French hospital centers to optimize stock management.