



**Applus**  *Together*  
beyond  
standards

*for a more sustainable world*

**Hydrogen**  
**solutions**

## COMMITTED TO ENERGY TRANSITION

Applus+ supports key renewable technologies

In the renewables sector, Applus+ is a leading services supplier with over 20 years of experience and we are a global company offer testing, inspection and certification services. Applus+ is deploying services for projects in all key renewable technologies: from green hydrogen and onshore/offshore wind farms through to photovoltaic and concentrated solar power plants, batteries and storage solutions.



GREEN HYDROGEN



ONSHORE AND OFFSHORE WIND



ENERGY STORAGE SOLUTIONS



PHOTOVOLTAIC SOLAR  
CONCENTRATED  
SOLAR THERMAL



OTHERS

The Group's efforts for a more sustainable world have been an increasingly important objective in recent years. Applus+ delivers services to support our clients in the sustainable management of their products and services and, in addition, the Group follows nine of UN's sustainability development goals (SDGs). United Nations initiatives centred on the Sustainable Development Goals.

Applus+ is listed in the most internationally-recognised sustainability indexes.



## HYDROGEN: VALUE CHAIN



The green-hydrogen value chain includes the same activities as other energy sources, from its production at the plant to its final use in industry, transport or households. Applus+ provides services and solutions at all stages of the value chain, contributing daily to creating a more sustainable world.



# Applus+ HYDROGEN PORTFOLIO

A wide range of services to ensure risk, safety and environmental management



ENGINEERING



RISK CONSULTANT



ENVIRONMENTAL



SUPERVISION AND INSPECTION



## Applus+ TECHNOLOGICAL SOLUTIONS & DIGITAL TOOLS

Best-in-class technologies for a greener world

*Innovation at Applus+ is advancement with a purpose. Our engineers and technicians work closely with clients to devise new ways to make digital technologies and solutions work seamlessly.*

 **200+**  
projects

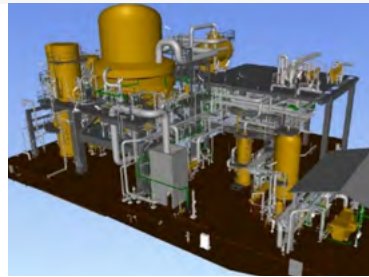
 **800+**  
people

 **300,000+**  
hours



### DATA SCIENCE AND AI SOLUTIONS

- Risk analysis software: PHAWorks, exSILentia, and in-house developed risk-analysis software.
- Customised predictive models, dashboards, KPIs, geo-tagged data and visualisation reports.
- 3D and CAD design and modelling.
- Remote and virtual data-monitoring, analysis and reporting.



### DIGITAL TWIN

- Virtual reality model using photogrammetry software capable of tracking the degradation of physical assets.
- Used to view scanned assets via a web browser.
- Custom-reporting that allows direct interfacing into a client's database.
- Allows the end-user to take informed decisions through the use of virtual models.



### UAV-DRONE AERIAL INSPECTION

- UAV industrial inspection services at Applus+ are highly customised and scalable to meet our clients' specific demands.
- Drone asset inspections can provide critical inspection information in a fraction of the time and at a fraction of the cost of other remote-access methodologies, while removing most of the human risk factors.
- We develop in-house systems combining laser imaging detection and ranging (LiDAR) technology with drone-based inspections that produce high-resolution and interactive 3D models of assets.



### REMOTE INSPECTION

- Flexible and cost effective alternative to conventional inspection methods.
- We are inventors of the CU24, a telescopic crane mounted with an HD camera, currently the quickest and safest tool for pipe rack inspections.
- Wide experience in remote inspection of all types of assets and facilities, from wind turbines to pipe racks, supporting structures, tanks or any hard-to-reach structure.

## OUR LATEST HYDROGEN PROJECTS

10+ years experience in risk analysis consultancy for hydrogen



### BARCELONA GREEN HYDROGEN PRODUCTION PLANT AND HYDROGEN FUEL STATION



The expert team at Applus+ has provided **Geotechnical Studies, Environmental Risk Assessments** and **Engineering Services**: technical specifications evaluation; civil, structural, electrical and I&C H<sub>2</sub> auxiliary systems detailed engineering at a green-hydrogen generation plant by electrolysis, and a H<sub>2</sub> station to fuel the TMB public service buses (Metropolitans Barcelona Transport entity).



### PUERTOLLANO GREEN HYDROGEN PRODUCTION PLANT



Applus+ has carried out **Engineering Services**: calculation of operating parameters and design of demineralized water and water system; closed cooling circuit; compressed air and drains system at a Green H<sub>2</sub> generation plant by electrolysis, for use as raw material in the production of ammonia and nitric acid.



### ANTWERP GREEN HYDROGEN PRODUCTION PLANT



Applus+ team has provided a **Third Party Inspection Services Of The Pressure Equipment** at a green-hydrogen generation plant by electrolysis in Antwerp, Belgium.

Visser & Smit Hanab



### HYDROGEN PIPELINE NEW CONSTRUCTION



The expert team at Applus+ has delivered advanced NDT services on the new construction of a hydrogen pipeline.



### TIE-INS HYDROGEN PROJECT



The Applus+ expert team has provided advanced NDT services on the new construction of a hydrogen pipeline.



### GREEN-HYDROGEN PIPELINE NEW CONSTRUCTION



The Applus+ team has provided **geotechnical study, Environmental Characterisation Of The Subsoil And Pre-Load Monitoring** at a new construction of a green-hydrogen generation plant by electrolysis.



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