Designing solutions for a positive life

# ACTIVITY REPORT 2021

ARTELIA

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ARTELIA

Consulting
Master planning & feasibility
Design & engineering
Construction & project management
Asset & facility management
Turnkey solutions

## international independent multi-disciplinary

**Mobility - Water - Energy - Building - Industry**

**6,700**
employees

**€745 M**
2021 turnover

**100%**
capital held by managers and employees

**100 years**
of experience

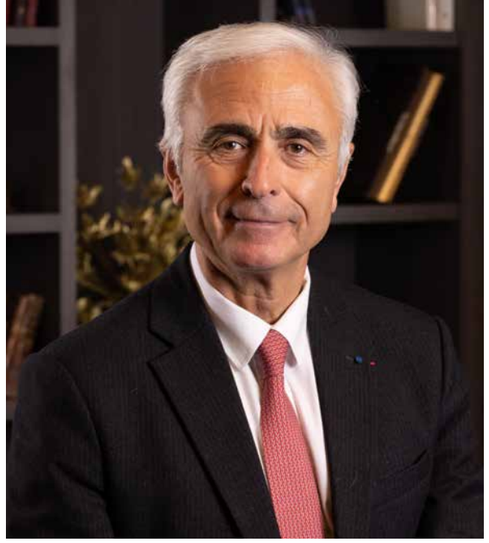
**40**
countries

**65%**
private-sector clients

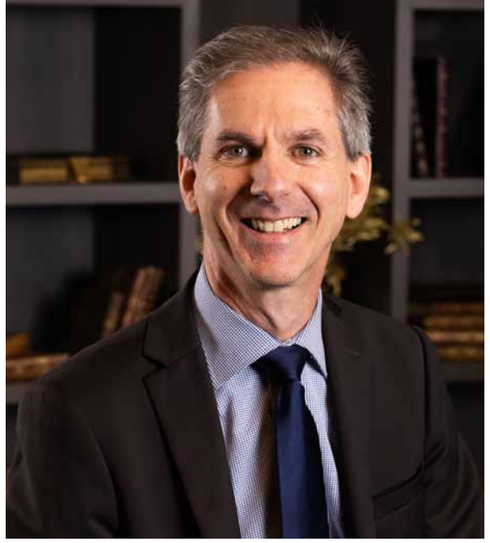
**Top 1%**
of engineering and architecture companies

We support
**Advanced Status**
The highest level of reporting in the United Nations Global Compact

# ADDRESSING THE CLIMATE EMERGENCY



Claude Imauven
CHAIRMAN OF THE BOARD OF DIRECTORS



Benoît Clocheret
CHIEF EXECUTIVE OFFICER

**The latest assessment reports from the Intergovernmental Panel on Climate Change (IPCC) stress the absolute necessity of reversing the trend in greenhouse gas emissions before 2025. The objective is to prevent the increasing frequency and intensity of extreme weather and climate events from making the planet unlivable for humanity. What is Artelia's position on this fundamental issue?**

**Claude Imauven -** Artelia has been helping to protect people from flooding, preserve water resources, improve the quality of life in cities, reduce harmful emissions from factories and produce renewable energy sources such as hydroelectricity for almost a century. Working towards sustainable, low-carbon development is far from new for the Group, which is paying close attention to the warning issued by IPCC scientists. Artelia is fully aware that despite the efforts made by several governments, local authorities, companies and citizens' organisations in recent years, greenhouse gas emissions continue to rise on a global scale and the deterioration of ecosystems vital to mankind continues. The recent crisis in Ukraine has exacerbated this problem by adding pressure to resources, which highlights the fragility of European energy systems. In its role as a consultancy and engineering company committed to a positive way of life, Artelia is not only aware of these facts, but is also taking action and stepping up its efforts every day to promote the ecological transition.

**Benoît Clocheret -** Indeed, acceleration has already been under way for many years and I am convinced that companies are an essential driver. This is indeed the case at Artelia, as our activities in 2021 show. We have particularly increased our expertise in energy, where we now cover a very broad spectrum of offers: transition strategy, energy efficiency, low-carbon production (particularly in the areas of offshore wind power, photovoltaics, latest generation heating networks and nuclear power). In construction at a time when vacant office space is increasing, there are more and more renovations with the aim of achieving exemplary levels of energy and environmental certification and labelling. We are a strong player in this transformation process. Our teams are also working on new low-emission building concepts, extending the lifespan of facilities, using bio-based materials and promoting re-use channels, as illustrated by the Living Places project, a visionary concept of comfortable, affordable, healthy and low-carbon housing developed by our Danish subsidiary MOE. Our talents are also mobilised to support industry to improve facilities and reduce their carbon footprint, particularly on iconic projects such as the conversion of the Grandpuits refinery in Seine-et-Marne. Artelia has also worked on innovative solutions for adapting to climate change in cities and coastal areas in Europe and Africa, which are subject to severe erosion and flooding risks; the stabilisation of the Grand Lahou sandbar in the Ivory Coast is a stand-out example.

## How can we go further and faster in ecological transition? Does this mean turning away from certain sectors of activity or categories of projects?

**BC -** We reject any dogmatic position which would mean refusing that our services could benefit certain sectors of activity that have been singled out. Some people sometimes make categorical statements about withdrawing from this or that sector. Has desertion ever helped to move forward or find solutions for a positive life? The reality is too complex and requires general mobilisation. Building a wind farm to develop low-carbon electricity production requires materials to be extracted and transported, factories to transform them, onshore or offshore installations to house them, and networks to distribute the electricity produced. This is the reality and we have to face up to it. Artelia has therefore chosen to support every sector that wishes to modernise and transform into low-carbon industries. This being the case, we do not want to serve projects contrary to the sustainable development objectives that we defend, and we are therefore extremely vigilant in selecting the construction projects to which we contribute by assessing their social and environmental impact beforehand, crystallising our knowledge to reduce the impact, and doing so in a spirit of transparency, independence and responsibility.

**CI -** It is important to position the Artelia intervention correctly. An engineering and consulting company does not decide whether or not to implement a project or a development policy. On the other hand, it can play a major role in its orientation and impact by opting more for solutions that promote decarbonisation and preserving the environment. These are the solutions that Artelia is committed to promoting with ever greater strength and determination to all its clients in order to meet the challenges we are collectively facing. Going further in terms of ecological transition also means stepping up efforts in terms of training and knowledge sharing to enrich the general and technical knowledge of Artelia staff members on these subjects. Naturally, these actions are part of the Group's CSR policy which, while attaching great importance to preserving the environment, has three complementary pillars devoted to sharing value, employee development and civic commitment. The Board of Directors and its CSR Committee pay special attention to these issues.

## After a year clearly disrupted by the Covid-19 pandemic, how did 2021 go in terms of activities and expansion?

**BC -** From a health perspective 2021 continued to be an uncertain and disrupted year, but in terms of activity levels, the year witnessed a strong rebound thanks to the dynamic drive of our clients and the unparalleled commitment of Artelia employees around the world. With the increasing complexity of projects requiring the combination of a wide range of technical and organisational skills, Artelia's multidisciplinary approach and international scope were particularly relevant and appreciated. Our revenue amounted to €745 million, significantly higher by almost 17% over 2020, and our operating profit rose sharply to almost €38 million. Investments in the Group's digital infrastructure have also borne fruit; the new WizArt platform now provides our clients with real added value in the management of their projects and of their assets. We created Artelia Consulting better to respond to the growing need for consulting. We also conducted a number of innovative studies on key topics such as the implementation of the digital twin, preserving biodiversity and measuring the carbon footprint.

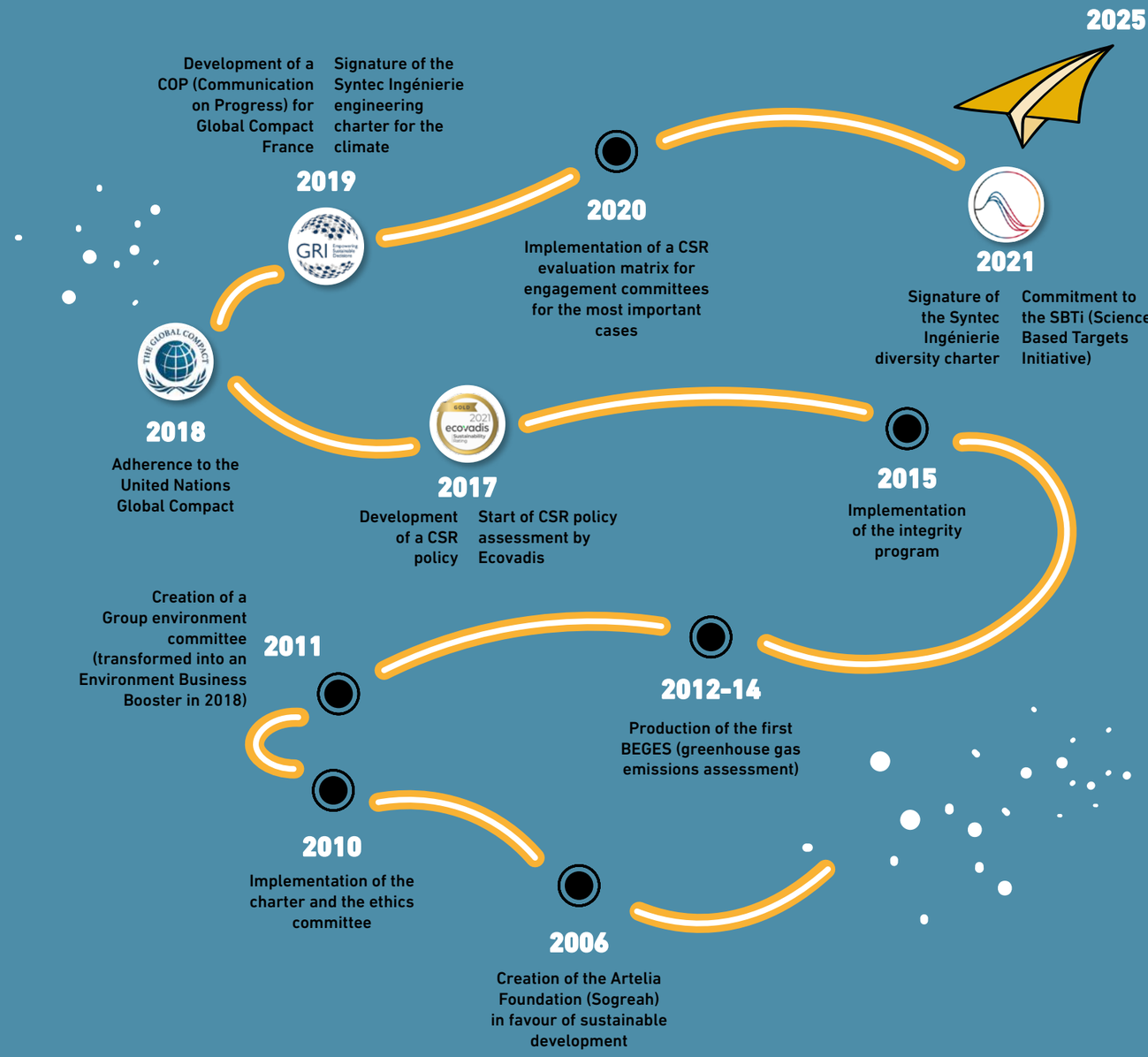
2021 was intense! With a strong base in Europe and a dynamic presence in Asia Pacific, we continue to make rapid progress and consolidate our position among the top 15 European and major global engineering firms. Our diversity of expertise, our international dimension, our financial strength and our dynamic innovation give us the means to live up to our ambitions and to assert ourselves as a company that is truly useful to people and the world.

# CSR POLICY

# OUR ENVIRONMENTAL SOCIAL AND GOVERNANCE (ESG) COMMITMENTS

Artelia has made corporate social responsibility (CSR) one of the guidelines for its development. The Group has developed an ambitious policy structured around four main pillars and has quantified progress targets that are regularly updated. It has an internal organisation dedicated to integrity, compliance and CSR management.

Artelia uses recognised international benchmarks (IIRC, GRI) to carry out robust annual reporting on ESG issues for all its stakeholders. Each year the Group also has its CSR commitment assessed by independent organisations specialising in these subjects (Global Compact, Ecovadis).




## GRI

The Global Reporting Initiative is a non-profit organisation that helps companies and institutions report on their economic, environmental, social and governance performance.

## SBTI

The Science-Based Targets initiative encourages companies to set greenhouse gas emission reduction targets consistent with limiting global warming to 1.5°C in line with IPCC recommendations and the Paris Climate Agreement.

We support

## Statut Advanced

The highest level of reporting in the United Nations Global Compact

A major initiative, the United Nations Global Compact encourages companies to respect ten universal principles (human rights, labour rights, environment, anti-corruption) and to implement 17 SDGs (Sustainable Development Goals).

## Top 1%

of engineering and architectural firms

EcoVadis is a rating agency that evaluates the performance of companies on 4 themes: Environment, Social & Human Rights, Ethics and Responsible Purchasing.

CSR POLICY

# PROGRESS TOWARDS 2025 TARGETS

Artelia is committed to achieving several objectives by 2025 as part of four pillars structuring its CSR Policy. Here are the achievements for 2021.

## PROTECT OUR ENVIRONMENT

### OUR COMMITMENTS

- **Promote** systematic measures to enhance environmental performance in our design and work site supervision assignments.
- **Consider** the CSR impact of our clients' projects by means of a social, ethical and environmental assessment grid.
- **Preserve** natural resources and support the circular economy by rolling out eco-responsible practices at all our sites.
- **Contribute to the fight against climate change and work towards net zero carbon** by reducing and offsetting our greenhouse gas emissions.

| OUR TARGETS FOR 2025 | INDICATORS 2020 | INDICATORS 2021 |
|---|---|---|
| • Train **100%** of our project managers in eco-design and environmental issues on work sites | • Training rolled out at the start of 2021 | • **17%** |
| • Submit **100%** of our commercial proposals for design and works supervision assignments to an assessment using our CSR grid | • Performance of CSR risk assessments on **100%** of bids over €5m or those that present specific risks | • Performance of CSR risk assessments on **100%** of bids over €5m or those that present specific risks |
| • Work towards **zero** single- use plastics and recover **100%** of the paper and electronic waste produced at our sites | • Due to the measures in place during the health crisis, temporary continuation of single use plastics, **100%** of paper and electronic waste recycled | • Due to the measures in place during the health crisis, temporary continuation of single use plastics, **100%** of paper and electronic waste recycled |
| • Reduce the group's carbon footprint by **50%** in comparison with 2020 (in t $CO_2$e per person) | • Next GHG assessment in 2022 for the year 2021 | • Decrease in **23%** |

## DEVELOP OUR HUMAN CAPITAL

### OUR COMMITMENTS

- **Guarantee** working conditions that protect the safety and well-being of our employees.
- **Promote** diversity and multiculturalism in all their forms within the Group.
- **Support** our employees by providing skills development opportunities.
- **Encourage** dialogue within the company and involve staff and management representatives in corporate decision-making.

| OUR TARGETS FOR 2025 | INDICATORS 2020 | INDICATORS 2021 |
|---|---|---|
| • Achieve a workplace accident frequency rate of less than **3** | • **3.06** accident frequency rate | • Accident frequency rate **0,93** |
| • Increase the proportion of female project managers to **30%** | • **25%** female project managers and/or project managers | • **26%** female project managers and/or project managers |
| • Enable **100%** of our employees to access skills development opportunities each year | • **70%** of the workforce | • **70%** of the workforce |
| • Obtain **90%** favourable opinions during mandatory consultation procedures | • **100%** favourable opinions | • **90,5%** favourable opinions |

## A COMMITMENT TO CIVIC AND HUMANITARIAN CAUSES

### OUR COMMITMENTS

- **Promote** social, economic and environmental initiatives, in particular by supporting the actions of Artelia Foundation.
- **Pursue a responsible purchasing policy** by encouraging our suppliers and subcontractors to commit themselves to socially and environmentally sound practices.

| OUR TARGETS FOR 2025 | INDICATORS 2020 | INDICATORS 2021 |
|---|---|---|
| • Aim to invest an amount equivalent to at least **3%** of the Group's operating income in the Foundation each year | • **0.85%** of the operating profit (the Foundation's activities were restricted due to the health crisis) | • **0,80%** of the operating profit (the Foundation's activities were restricted due to the health crisis) |
| • Require **100% o**f our business partners to comply with the terms of a responsible procurement charter | • **85%** of suppliers to the Purchasing Department (excluding production suppliers) signed the Artelia Charter or have their own Charter | • **85%** of suppliers to the Purchasing Department (excluding production suppliers) signed the Artelia Charter or have their own Charter |

## COMBINE INDEPENDENCE AND VALUE SHARING

### OUR COMMITMENTS

- **Guarantee** that control of the company remains in the hands of its management, promote employee shareholding on a broad level and encourage regular renewal in this regard, in order to uphold our independence.
- **Share** the value created by the Group with all its employees (through individual and collective bonuses).

| OUR TARGETS FOR 2025 | INDICATORS 2020 | INDICATORS 2021 |
|---|---|---|
| • Increase the proportion of employee shareholders to **50%** with **50%** aged under 40 | • **50%** employee share ownership levels, of which **43%** held by employees under 40 | • **45,5%** employee share ownership levels, of which **39,2%** held by employees under 40 |
| • Share at least **50%** of the Group's operating income with the workforce | • **58%** of the Group's operating profit | • **34%** of the Group's operating profit |

# BY OUR CLIENTS' SIDE

**55**
locations
in France

**5,400**
staff members
in Europe

**6,700**
staff members
worldwide

Operating in over
**40 countries**

Projects in over
**100 countries**

# PROGRESS

**New ways of working, digital transformation, decarbonising the economy, energy transition, preserving biodiversity... The challenges currently facing us are numerous, complex and pressing. Artelia strengthens its resources every year and implements innovative solutions to meet them.**

JULIEN SAINT
Artelia Consulting Director

ARTELIA Consulting

## BETTER RESPONSE TO THE GROWTH OF CONSULTING NEEDS

In the current context bringing a project to fruition is an increasingly long and demanding process. The increase in the number of stakeholders and the interweaving of economic, environmental and societal issues exacerbate the need for consulting services. Artelia has therefore created Artelia Consulting, a company focusing on these activities which draws on the Group's experience and broadens its offering. For decades Artelia has been assisting public and private decision-makers in defining regional strategies and managing land and property assets. Artelia teams have developed an approach that is both technical and human, promoting dialogue between various business lines and bringing the decision-making and operational spheres closer together.

artelink

## CONNECTING FREELANCERS AND CONSTRUCTION COMPANIES

French start-up Artelink has launched the first digital intermediation platform specialising in construction engineering. Focusing on the building, energy, industry, water and environment sectors, it aims to provide greater flexibility for companies which must constantly adapt teams to market fluctuations, and to offer new opportunities to freelancers, whose numbers have increased significantly in recent years. Artelink's ambition is to become the French reference in this field by 2025 and to extend its scope to other European countries.

NICOLAS BERTRAND
Artelink Managing Director

ANTOINE LABROSSE
Artelia Digital Solutions Director

ARTELIA Digital Solutions

## WIZART, THE CLIENT PLATFORM DEDICATED TO PROJECT AND ASSET MANAGEMENT

Artelia has developed its digital skills (platforms, Internet of Things, cybersecurity) and deployed new services to optimise and secure the performance of its clients' assets (buildings, infrastructure, industrial facilities) throughout their life cycle. Its subsidiary Artelia Digital Solutions, which provides all of the Group's digital solutions, has launched WizArt, a project and asset management platform hosted in a secure European cloud.

The modular and ergonomic portal is a digital interface for projects that makes it possible for clients to access data and related deliverables at any time (dashboards, BIM models, GIS maps, reports, etc.). Several associated services (auditing, financial management, lease management, multi-year planning of works, etc.) are also offered. The Volkswagen group, for the real estate management of its dealerships in France, and the Shell group, for the management of investments in its service station network, have retained us and use WizArt.

MARIE QUATREFAGES
Director, Strategic & Operational Consulting Department

## WIZART SUPPORTS URBAN RENEWAL PROJECT

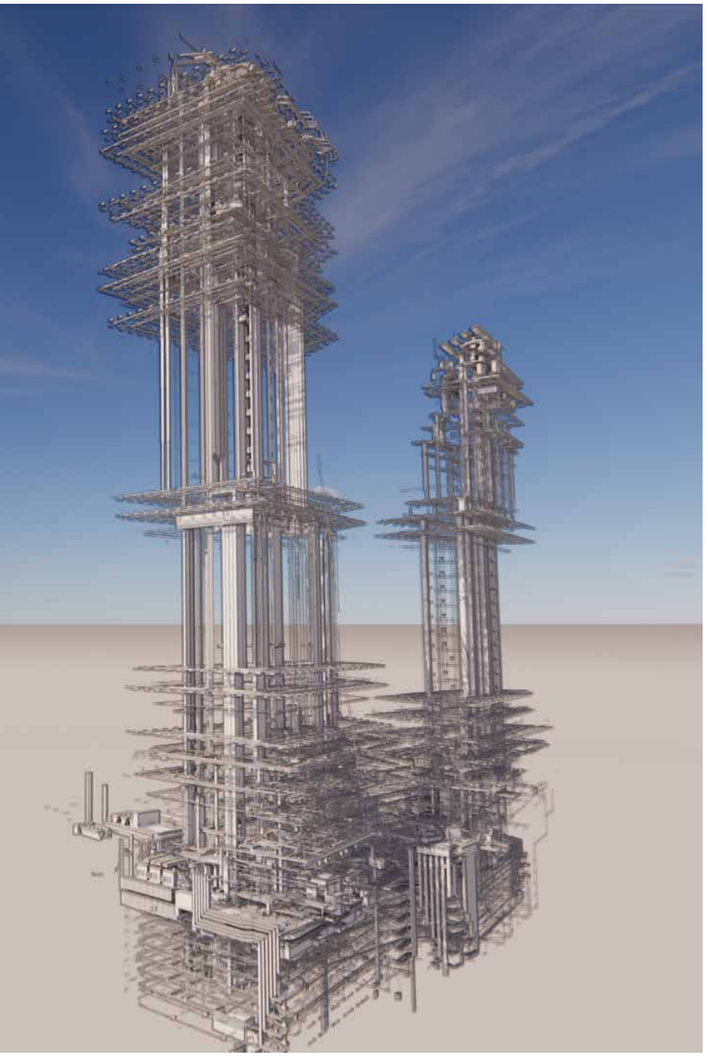
Artelia is contributing to the renewal of the Agnettes district in the Greater Paris area by assisting the municipality in coordinating the studies and deploying management tools. Built between 1955 and 1974, this complex of housing and facilities must be fully upgraded. The operation requires the engagement of many stakeholders and monitoring of many indicators. WizArt is perfectly designed to tackle such a challenge.

In looking for a tool to effectively manage the project, the municipality has chosen our platform because it is user-centric, collaborative and secure. WizArt allows us to organize and easily access all project data, generating actionable information at different scales. Furthermore, WizArt tracks progress and feeds an extensive reporting system shared by the community of stakeholders to enable operational monitoring, tracking of financial commitments and monitoring of expenditures.

# PROGRESS

## A FIRST IN THE IMPLEMENTATION OF THE DIGITAL TWIN IN THE OPERATIONAL PHASE

The idea of creating a digital duplicate of a building or structure from the design stage, which can ultimately be used for its operation, became a reality during the construction of Tours Duo in Paris. At the request of the investor, Ivanhoe Cambridge, Artelia built a very detailed BIM model which made it possible to create a digital DOE (completed works dossier) containing all the technical information required for operation. The digital DOE was then transformed (using Revit software) into a model that can be updated by the management software of the companies responsible for the buildings' operation and maintenance. This pioneering approach makes Tours Duo a cutting-edge achievement in BIM operations.



## CARBONEVAL FOR A BETTER UNDERSTAND OF PROJECTS' CARBON FOOTPRINT

The rapid decarbonisation of our economies has become the number one objective of the fight against climate change. In this context reducing the carbon footprint of development projects is a priority. Artelia's environmental specialists have been developing operational methods and eco-design tools for several years. These efforts have led to the creation of a decision-making tool, CarbonEval, which makes it possible to assess the carbon footprint of a project and identify the most virtuous scenarios over the entire life cycle of the structure.

## EVOLEN 2021 PRIZE FOR MONITORING STRUCTURES AT SEA

Each year Evolen (French association of companies and professionals serving the energy sector) rewards the inventiveness of companies through its innovation prize. In 2021 Principia (a subsidiary of Artelia) and Phimeca received one of the jury's special prizes for their tool for monitoring offshore structures. Using artificial intelligence technologies, the software exploits environmental data (swell, wind, etc.) recorded in real time to assess the damage to offshore installations. A tool that can be very interesting for the predictive maintenance of floating wind and oil equipment.

## CONTROLLING INDOOR AIR QUALITY TO CURB PANDEMICS

Over the past two years Artelia has assisted numerous clients in adapting to the health risks associated with the Covid-19 pandemic. One of the main focuses of these interventions has been to limit airborne transmission of the virus in hospitals, office buildings and educational buildings. This led our teams to undertake extensive research, in particular with students from École Polytechnique, in order to develop adaptation solutions for current buildings as well as for new projects. This effort is part of the in-depth work we are doing in conjunction with the CSTB (Centre Scientifique et Technique du Bâtiment) on indoor air quality (IAQ) and the reduction of bio-contaminants. The aim is to offer our clients high-performance solutions in all aspects of sustainable building.

*Respiratory pandemic and indoor aeraulics of classrooms, P. Carlotti, B. Massoulié, A. Morez, A. Villaret, L. Jing, T. Vrignaud and A. Pfister, Building and Environment, 2022.*

## INTEGRATING BIODIVERSITY IN DEVELOPMENT PROJECTS

Like climate change, eroding biodiversity is becoming a major issue that planning authorities must increasingly take into account in their projects. In 2021 Artelia implemented various solutions for nature in the city (Biodiversity label) and natural river restoration. The Group is also conducting studies on the eco-design of maritime structures.

Our teams worked on the materials, texture and positioning of the maritime protection blocks in order to find configurations that are conducive to the bio-recolonisation of structures while avoiding the proliferation of invasive species. Research carried out as part of a post-doctorate with the École nationale supérieure des mines in Alès has led to several scientific publications in international journals. Trials are currently being carried out at the Port-La-Nouvelle site in the Mediterranean and as part of the European Cherloc programme in the Channel.

*Influence of the Intrinsic Characteristics of Cementitious Materials on Biofouling in the Marine Environment, M. Hayek, M. Salgues, J-C Souche, E. Cunge, C. Giraudel and O. Paireau, Sustainability, volume 13. https://doi.org/10.3390/su13052625, 2021*

# CLIMATE CHANGE RESILIENCE

The latest IPCC report is clear. The profound upheavals already caused by climate change will increase in the coming years. Adapting to these inevitable changes (rising sea levels, increased frequency and intensity of extreme events) is an increasingly pressing challenge.

**Protecting an estuarine territory thanks to a soft solution for protection against erosion, flooding and marine submersion.**

*What the experts say...*

AURÉLIE LE DISSEZ
Assignment manager

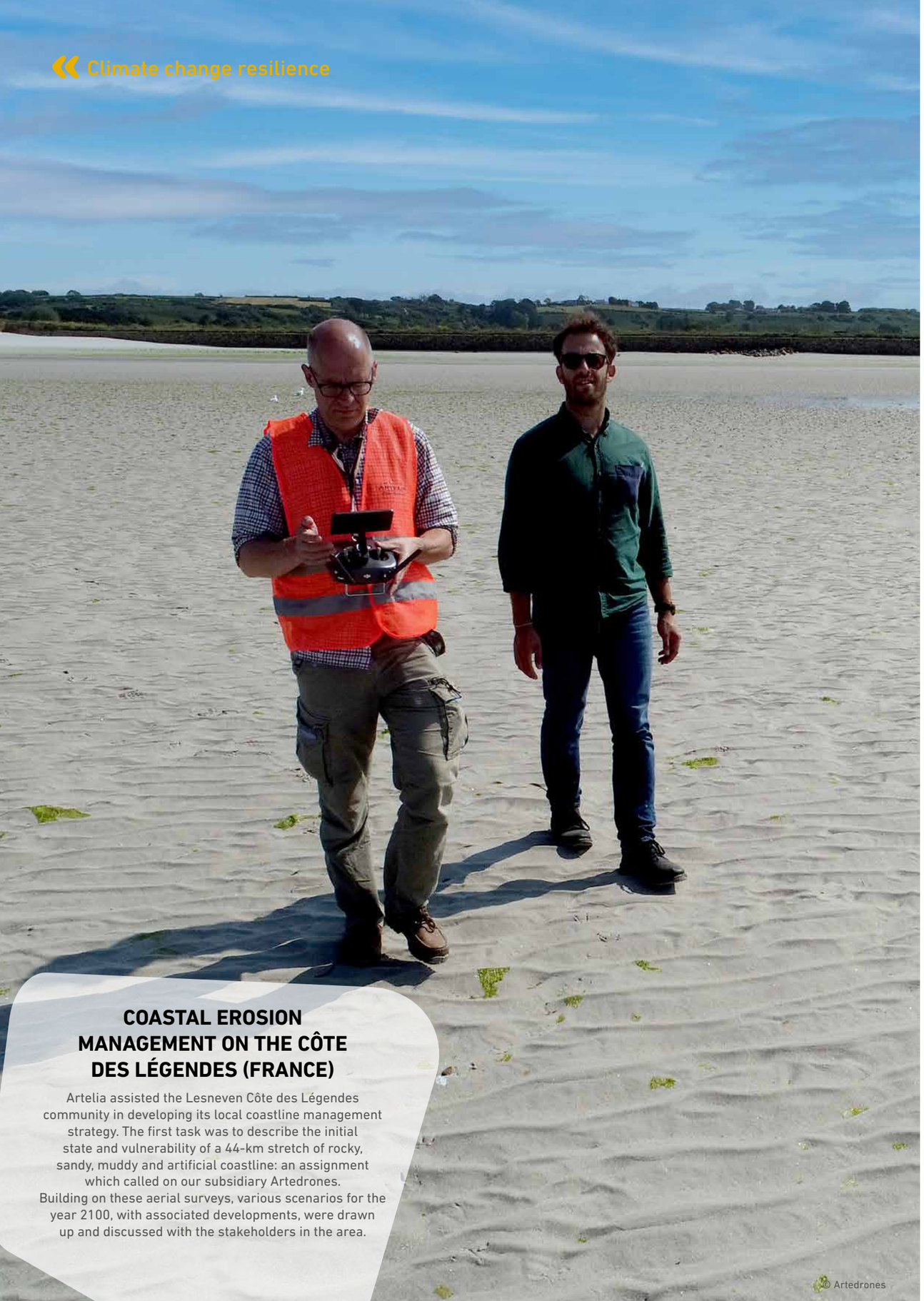
NICOLAS ZIMMERMANN
Project Supervisor

## STABILISATION OF GRAND LAHOU SANDY BELT (IVORY COAST)

Bandama, the Lahou-Kpanda municipality threatened by severe coastal erosion, is highly exposed to the risks of flooding and marine submersion. The village was chosen as a pilot site by the World Bank's WACA (West African Coastal Management) programme, which has launched an operation to reduce this vulnerability.

Since 2020 our teams have been carrying out modelling studies of the lagoon and coastal system for the Ivorian ministry of the Environment and Sustainable Development, testing different protection scenarios. This work has led to the concerted choice of a soft solution based on several developments: dredging channels in the lagoon, recharging and revegetating the sandy barrier, filling in the current channel and creating a new channel in a more hydraulically stable area.

In 2021 Artelia carried out design studies for this solution. To verify the stability of the structures over time, a physical sediment model and a numerical morphodynamic model have been developped. Maintenance works have also been anticipated to ensure the sustainability of the development.



© Artedrones

### COASTAL EROSION MANAGEMENT ON THE CÔTE DES LÉGENDES (FRANCE)

Artelia assisted the Lesneven Côte des Légendes community in developing its local coastline management strategy. The first task was to describe the initial state and vulnerability of a 44-km stretch of rocky, sandy, muddy and artificial coastline: an assignment which called on our subsidiary Artedrones. Building on these aerial surveys, various scenarios for the year 2100, with associated developments, were drawn up and discussed with the stakeholders in the area.

# ANALYSE RISKS AND REDUCE VULNERABILITY

Artelia helps public and private sector clients to identify climate risks and integrate them into their planning and development policies.

**7,440 sq. km**

The Entente Oise-Aisne manages flood prevention in an area of 7,440 sq. km with more than 800,000 inhabitants.

### FLOOD AND LANDSLIDE RISK ASSESSMENT IN CRITICAL AREAS (RWANDA)

Implemented jointly by the Rwanda Environment Management Authority (REMA), the Global Green Growth Institute (GGGI) and the Green Climate Fund (GCF), the National Adaptation Planning (NAP) programme aims to respond to the challenges posed by climate change. With the country's increasing urbanisation, resilience to floods and landslides is a central part of this programme. SHER, a subsidiary of Artelia, has studied these risks for specific watersheds in Kigali, Rusizi, Huye and Kamonyi. Using hydrological and hydraulic models it produced a risk map and developed mitigation proposals based in particular on nature.

### GLOBAL DIAGNOSIS OF THE OISE VALLEY'S VULNERABILITY TO FLOODING (FRANCE)

Entente Oise-Aisne is a public territorial basin institution (EPTB) in charge of flood prevention for an area of 7440 sq. km with over 800,000 inhabitants. The conurbation entrusted Artelia with identifying sources of vulnerability and assessing the probable impact of flooding in the Oise valley. Both technical and socio-economic, the diagnosis will provide a knowledge base for stakeholders in the area to develop prevention and crisis management plans.

### MASTER PLAN FOR RIVER FLOOD RISK MANAGEMENT IN ANTANANARIVO (MADAGASCAR)

The Malagasy government has launched a vast integrated sanitation programme for the agglomeration of Antananarivo (3.6 million inhabitants), one of the components aims better control river flooding risks. The project is under the control of the ministry of Land Management and Land Services with the participation of Agence française de développement and the European Union. Artelia was selected to work on this project and has updated the hydrology of the Ikopa basin and carried out an overall hydraulic study of the plain. In 2022 it will deliver a master plan for managing river flood risks in Greater Antananarivo, contributing to better urban planning.

# WITHSTANDING IMPACTS AND ENSURING BUSINESS CONTINUITY

Artelia is involved in the implementation of numerous flood and marine submersion protection schemes, in particular by deploying innovative, nature-based solutions.

## PROTECTING FORT BOYARD AGAINST SWELL (FRANCE)

Fort Boyard, a listed site and the setting for a famous TV show, has lost some of its protective structures over the years and is now very exposed to waves. At the request of the Charente-Maritime department Artelia studied the feasibility of restoring these protections. By analysing the wave conditions and delving into the history of the fort's construction, our teams were able to validate the relevance of an identical restoration of the breakwater, the berthing port and the original jetties.

## DESIGNING A PILOT FLOOD RETENTION SITE IN LA BASSÉE (FRANCE)

Protecting the twelve million inhabitants of the Île-de-France (Greater Paris) region from a major flood is one of the main concerns of Seine Grands Lacs. In 2000 the public territorial basin establishment began to think about increasing flood storage capacity upstream from the Paris region. It accordingly commissioned Artelia to design an experimental site with a capacity of 10 M cu.m at the confluence of the Yonne and Seine rivers. Combining hydraulic and environmental ambitions, this site will enable the temporary storage of water from the Seine to allow the Yonne's peak floods to pass.

## FLOOD MANAGEMENT AND HYDROMORPHOLOGICAL RESTORATION OF THE MADON RIVER BASIN (FRANCE)

The Meurthe-Madon public territorial basin establishment chose Artelia to manage the entire first action programme for the Madon river, whose floods regularly cause significant damage and sometimes victims. Five operations have been launched to reduce the vulnerability of the area to flooding by restoring the river's natural functions: return to the original course, removal of certain sills and creation of dynamic flood reduction zones, a channel and diking systems.

## COMBINING A NATURE AREA AND STORMWATER BASIN IN VALLENSBAEK (DENMARK)

Concerned about a probable increase in precipitation and flooding, as a result of climate change, the town of Vallensbeaek (population: 16,000) and HOFOR created a storm water basin (9,000 cu.m.) focusing on biodiversity. The basin is fully integrated in the coastal landscape and was designed not only for water retention and filtering functions but also as a natural space and area for the citizens to enjoy. Artelia's subsidiary MOE contributed to the design and implementation of this project.

© the municipality of Vallensbæk


# ENERGY TRANSITION

As a cornerstone of human development, energy is central to the sovereignty of nations and their climate change mitigation strategies. The current challenge to create a sustainable system is to reconcile autonomy, accessibility, decarbonised production, sobriety and energy efficiency.

**Contributing to the acceleration of the development of offshore wind energy worldwide**

*What the expert says...*

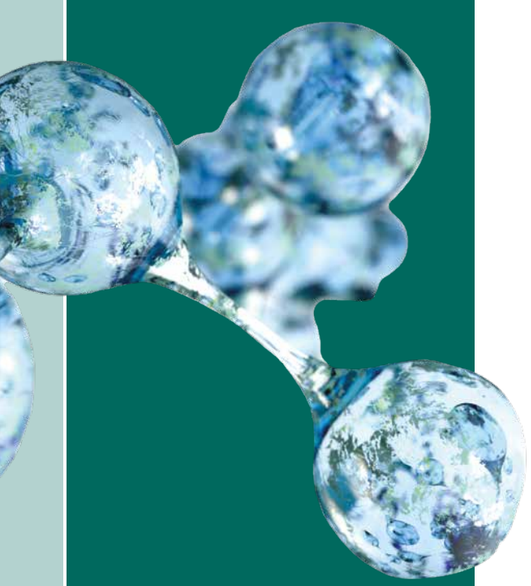
THIBAULT TRANCART
Principia Operations Director

## AN INNOVATIVE FLOATING PLATFORM TO HARNESS OFFSHORE WIND (SPAIN)

The use of marine energy is now considered essential to increase the proportion of electricity generated from renewable sources. Many people are banking on offshore wind power because the further away from the coast you are, the more constant and powerful the wind is.
However, moving offshore means increasing the depth of the oceans, which requires the development of efficient and cost-effective floating structures capable of supporting a wind turbine.

At the forefront of offshore engineering, Principia, an Artelia subsidiary, is assisting Marine Power Systems in the development of a flexible floating platform technology. The modular system is designed to reduce the platform's weight as much as possible and facilitate maintenance. It has the particularity of being able to accommodate a wind turbine, a wave system or both at the same time.

Principia is responsible for the detailed design, engineering and supervision of the fabrication of this platform, in partnership with Bourbon Subsea Services. A preliminary prototype, equipped with a 2 MW wind turbine, will soon be tested in real conditions at the BiMEP (Biscay Marine Energy Platform) test site in northern Spain.



PHOTOVOLTAIC PLANT WITH HYDROGEN STORAGE IN GUYANA (FRANCE)

Supported by Hydrogène de France, GEOC (Western Guyana Power Plant) is the first project in the world to combine a high-powered photovoltaic plant and an electrolysis unit to ensure massive storage of electricity generated in the form of hydrogen. Artelia is responsible for auditing the project in order to identify its strengths and weaknesses, assess the risks and validate the cost estimates.

## ENERGY STRATEGY OF THE TOULON PROVENCE MÉDITERRANÉE METROPOLIS (FRANCE)

Artelia has assisted the organisations in this area in drawing up their energy master plan for the year 2050. This strategic document is part of the city's Climate-Air-Energy Plan, which defines the sustainable development policies to be implemented in order to deal with the climate emergency.

# DESIGNING ENERGY SYSTEM TRANSITION

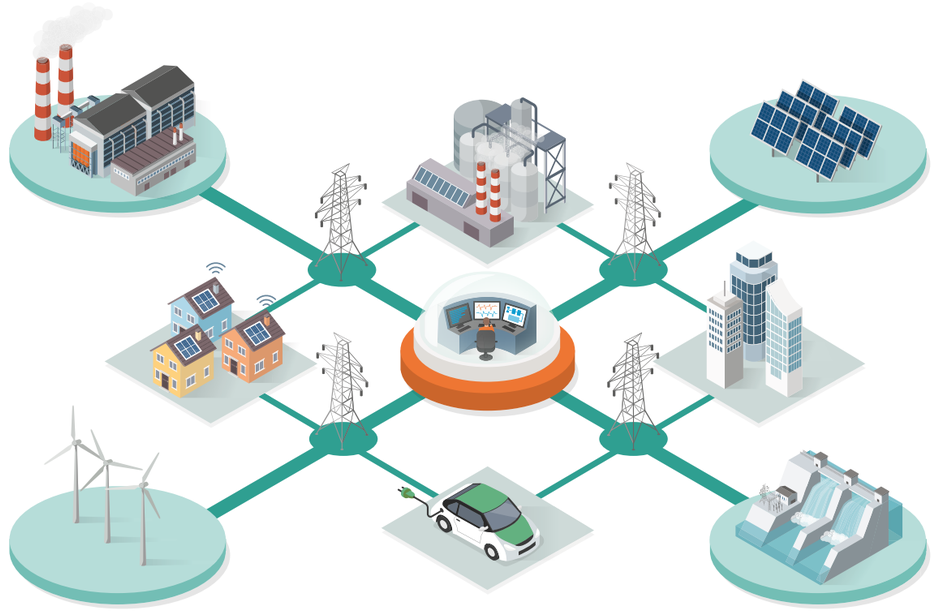
To help its customers make a successful energy transition, Artelia provides a team of experts dedicated to operational consulting and upstream studies of all energy systems.

### SMARTGRID AT MARSEILLE PROVENCE AIRPORT (FRANCE)

Aiming for energy self-sufficiency and «zero net carbon emissions» by 2030, Aéroport Marseille Provence has initiated an ambitious approach and commissioned the Adaltys/Finance Consult/Artelia consortium to support it. After drawing up an inventory of the site's energy system, our teams will study several possibilities (photovoltaic production, transport decarbonisation, heat and cold production) to identify the best scenario and propose a relevant contractual and financial package.

### POSITIVE ENERGY DISTRICT IN THE GRAND ARENA IN NICE (FRANCE)

Located at the entrance to the city of Nice near the airport, Grand Arena combines work, housing and living spaces in the same area. Concerned about the project's environmental footprint, its promoters asked Artelia to analyse the energy issues, define operational solutions (notably heat networks and photovoltaic production) and include them in the project's guide plan.



# PROMOTING EFFICIENCY AND REASONANLE USE

Artelia strives to reduce energy consumption in buildings and cities in response to energy and climate challenges.

### ENERGY PERFORMANCE OF THE TOWN OF ASNIÈRES (FRANCE)

In partnership with EDF subsidiary Dalkia, Artelia has signed an energy performance contract with the town of Asnières-sur-Seine. The consortium has undertaken to reduce primary energy consumption of the municipality's buildings by 20%. The Group's teams designed and launched the implementation of a building renovation plan covering 49 sites and including over 300 energy performance actions.

### ENERGY RENOVATION OF SECONDARY SCHOOLS IN THE PROVENCE ALPES CÔTE D'AZUR REGION (FRANCE)

In order to meet its carbon neutrality targets by 2050, the Provence Alpes Côte d'Azur region has launched an energy renovation programme for buildings under its jurisdiction. The aim is to reduce current consumption by 40% to 60%. Artelia is contributing to this effort by proposing to optimise investment operations for all secondary schools over the next ten years using a multi-criteria approach (energy, safety, regulatory compliance, comfort of use).

### TECHNICAL SUPPORT FOR THE CONTO TERMICO PROGRAMME (ITALY)

Artelia worked with Gestore dei Servizi Energetici (GSE), a company controlled by the Italian ministry of Economy and Finance, which plays an important role in the energy sector. Specifically, our teams carried out a technical-administrative survey of the Conto Termico application, a governmental incentive programme for energy efficiency aimed at administrations, companies and individuals.

# PRODUCING DECARBONISED ENERGY

Artelia is a world leader in hydroelectricity and is involved in the entire electricity generation process from decarbonated primary sources (hydro, solar, wind, biomass, nuclear)

## ALTIPLANO SOLAR: 200 MW OF PHOTOVOLTAIC POWER AT AN ALTITUDE OF 4000 M (ARGENTINA)

Argentina continues to strive to increase the share of renewables in its energy mix. In Salta province the developer Neoen commissioned a new photovoltaic power plant, Altiplano Solar, the second largest in the country. This plant will provide power equivalent to the annual electricity consumption of 215,000 people. Artelia provided complete Owner's Engineer services (development, construction, commissioning), a challenging task not least due to the high altitude of the site.

## THE WORLD'S LARGEST FLOATING WIND TURBINE (NORWAY)

Artelia's subsidiary Dr.techn. Olav Olsen has designed a floating platform (OO-Star Wind Floatern) as part of the Flagship project spearheaded by Iberdrola, one of the world leaders in floating wind power. The concrete structure has been designed to accommodate high-powered wind turbines (over 10 MW). A prototype will soon be tested off the Norwegian coast and will be the largest floating wind turbine in the world.

## REHABILITATION OF THREE HYDROELECTRIC PLANTS (GUINEA)

In order to meet the very high demand for electricity, the Guinean authorities have launched a rehabilitation programme for obsolete hydroelectric power plants and source stations. Artelia supervised the work and reviewed the engineering of the Banéah-Grand Chutes and Garafiri power stations, the reinforcement of the Kipé and Sonfonia substations, and the construction of the new Sonfonia Case substation.

## KINGUÉLÉ AVAL HYDROELECTRIC SCHEME (GABON)

With a capacity of 34 MW, the new run-of-river facility located on the Mbei River is fully in line with the Republic of Gabon's strategy to increase the country's renewable energy mix to 80% by 2025. In partnership with EDF-CIH, Artelia is assisting project owner Meridiam with the construction of the dam (45 m high), the penstocks and the power plant.

## SANTIAGO PUMPED STORAGE POWER STATION (CAPE VERDE)

At the request of the Cape Verde ministry of Energy, Artelia studied the feasibility of a pumped storage power station on the island of Santiago. This energy storage facility consists on a daily cycle of using excess solar and wind power production to pump water from a low basin to a high basin, which can then be turbined when renewable production is low, particularly at night. The teams studied the entire design (hydraulic structures, equipment, evacuation line and dynamic integration into the electrical system) of this 20 MW facility, which is designed to meet the needs of the island's 275,000 inhabitants.

### GREEN ELECTRICITY FOR HEALTHIER AIR IN GRAND PORT MARITIME DE MARSEILLE (FRANCE)

Making port operations cleaner is one of the objectives of the public authorities and companies in the sector. One of the drivers for achieving this is to supply ships at the quayside with all the electricity they need, thereby avoiding the need to use their diesel generators to generate it. Artelia has started to carry out such a project for the GPMM. It includes the installation of two delivery stations of 18 MW each, the creation of a photovoltaic power plant (9 MW) using various existing buildings and the implementation of a 50/60Hz conversion/transformer station, which constitutes a first in France for these powers.

### FRAMEWORK CONTRACTS FOR TECHNICAL ASSISTANCE IN NUCLEAR ENGINEERING

Artelia signed two framework contracts for technical assistance with EDF. The first one, Edvance, concerns engineering services for new reactors (EPR, SMR) in several countries. The second, concerns nuclear, thermal and hydraulic engineering. Our teams will bring to these subjects their varied know-how in construction, civil engineering, general installation, mechanics, electricity, system design, control command, nuclear safety, radiation protection and environment.

### REGULATORY MONITORING OF 28 DAMS (FRANCE)

French legislation requires regular monitoring of dams to ensure they are operated under safe conditions. Artelia has been involved in the monitoring of three dams for the Roannaise de l'Eau combined syndicate since 2020, and has won the contract to monitor and inspect eleven others for Saint-Etienne-Métropole and fourteen for Société Hydro-Electrique du Midi. The Ausc$^2$ application developed by the Group is used for the capture, centralisation and preliminary analysis of monitoring data for some of these dams. For about ten dams with more complex behaviors, its Optimiz add-on is used for the statistical analysis of the data.

### PROTECTION OF WATER INTAKES OF NUCLEAR POWER PLANTS

Artelia conducted a complete thermal-hydraulic study, from feasibility to execution, for the design of a protective system for nuclear power plants during periods of extreme cold (anti-frasil parade). The study mobilised numerous skills (thermal, hydraulic, civil engineering, equipment, modelling). The system was implemented in the Cruas and Gravelines power plants.

# ACCESS TO ELECTRICITY FOR ALL

In order to reduce the gaps in access to energy around the world, Artelia contributes to numerous projects aimed at improving the generation, transmission and distribution of electricity.

### COMPREHENSIVE ELECTRICITY DEVELOPMENT PLAN (ZANZIBAR)

For its electricity supply the island of Zanzibar depends entirely on an undersea cable connected to the Tanzanian network. This situation is reaching its limits with growth in demand and the desire to make the supply more reliable. Artelia is working with the World Bank to develop a new energy strategy for the island's development. The objective is to build a low-cost plan for the production, transport and distribution of electricity that is based on renewable energies (photovoltaic and wind) combined with an electrochemical storage system. Our Group has also trained local players in the challenges of steering and managing the future electricity system.

### MARQUESAS ISLANDS ENERGY MASTER PLAN (FRANCE)

The Codim (community of municipalities in the Marquesas Islands) chose Artelia to assist them in their reflection on the future of energy in the archipelago. Our teams carried out an in-depth analysis of the situation and a projection of demand to 2040, taking account of the wide variety of needs and development projects under way. The master plan developed on this basis aims to achieve a renewable energy rate of over 75% in the energy mix of each island with configurations adapted to their respective situations (centralised network, microgrids, remote sites).

### REINFORCEMENT OF THE ELECTRICITY NETWORK IN BAMAKO (MALI)

The PASEM project (Projet d'amélioration du secteur de l'électricité au Mali), led by the Malian energy company EDM-SA, includes various electrification, standardisation and network reinforcement operations. Artelia was selected to carry out various project management missions concerning the reinforcement of the 225 kV network in Bamako. The assignment is divided into several parts: the construction of some twenty kilometres of lines (overhead and underground) and the creation or modification of several high-voltage substations. This work will allow 25,000 new subscribers to be connected to the electricity distribution network. This mission, which is currently under way, is part of the extension of the master plan study for the Bamako electricity network up to 2040, also carried out by Artelia.

# CONTRIBUTING TO THE ENERGY CHANGE IN MOBILITY

To help reduce the transport sector's carbon footprint, Artelia is resolutely committed to modernising fuel distribution networks in addition to its work in mobility engineering.

## NEW MULTI-ENERGY STATIONS PROVIRIDIS (FRANCE)

Since 2019 Artelia has been supporting the Proviridis Group, which specialises in the distribution of gas for vehicles, in the deployment of its multi-energy service stations: LNG (liquefied natural gas), CNG (compressed natural gas), hydrogen and electricity. In 2021, our teams were responsible for the design and execution of four new stations equipped with solar panels that meet the strictest health, safety and environmental protection requirements.

## INTEGRATING ELECTRIC VEHICLES IN THE GRID IN NEW CALEDONIA (FRANCE)

At the request of the South Province of New Caledonia, Artelia is developing a strategy for the deployment of electric vehicles on île des Pins, an elevated atoll of approximately 150 sq. km with a population of just over 2,000. In this highly suitable island area the idea is to operate a 100% renewable energy mix, combining photovoltaic production and Vehicle to Grid technologies (the ability to feed electricity from batteries back into the power grid). An analysis of the carbon, technical and socio-economic impacts is also planned.

## DEPLOYMENT OF THE ENI SERVICE STATION NETWORK (SPAIN)

Artelia is assisting the Eni Group to implement a new generation of service stations in Spain which includes the distribution of LNG and LPG, and various energy-saving and environmentally-friendly features (solar energy production, LED lighting, use of photocatalytic paint, etc.). Our teams have provided architectural design, engineering and project management for nine stations, including their catering areas, and have drafted the calls for tender for 30 other stations along the Mediterranean motorway.

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## CONVERSION OF A SHELL STATION TO 100% ELECTRIC (UNITED KINGDOM)

This iconic operation took place in Fulham Road, Greater London: the conversion of a traditional Shell service station to all-electric. In addition to replacing the petrol and diesel pumps with ultra-fast charging points (20 minutes), the aim was to implement a new station concept focusing on the quality of  reception (Waitrose and Costa Coffee lounge) and sustainable development (wooden framework, photovoltaic roof, low-temperature asphalt parking area, intelligent water and air management system). Artelia managed the entire project from design to planning, from demolition to reconstruction.

## CREATION OF CHARGING HUBS FOR ENBW ELECTRIC VEHICLES (GERMANY)

As one of Europe's leading energy companies, EnBW is investing heavily in fast-charging sites for electric vehicles with the aim of becoming a major player in the sector in Germany by 2025. The group commissioned Artelia to design a standard charging hub that is easy to implement. Our teams proposed a modular solution, combining technical efficiency and architectural quality, which was adopted by the client and will be rapidly deployed under our supervision at over 50 sites.

## CONSTRUCTION OF THE EMBLEMATIC Q8 STATION IN PADERNO DUGNANO (ITALY)

Recently inaugurated along the Milan-Meda motorway, the Q8 Kuwait Petroleum's flagship brand offers traditional fuels, LPG and electric vehicle charging points. The building itself with its clear Middle-Eastern design features a wide range of services (including food). It meets the highest environmental (use of recyclable materials, water and lighting management) and energy standards (near zero energy building). Artelia developed the concept and managed the implementation of the project, signing an energy performance contract with Q8.


# SUSTAINABLE USE OF RESOURCES

From water to materials, the overexploitation of natural resources and the associated carbon footprint are forcing us to rethink our planning practices. Careful usage and the fight against waste, reuse and recycling and the search for more environmentally-friendly construction solutions are the keys to sustainable development for humanity.

**Creating comfortable, affordable, healthy and low-carbon housing.**

*What the expert says...*

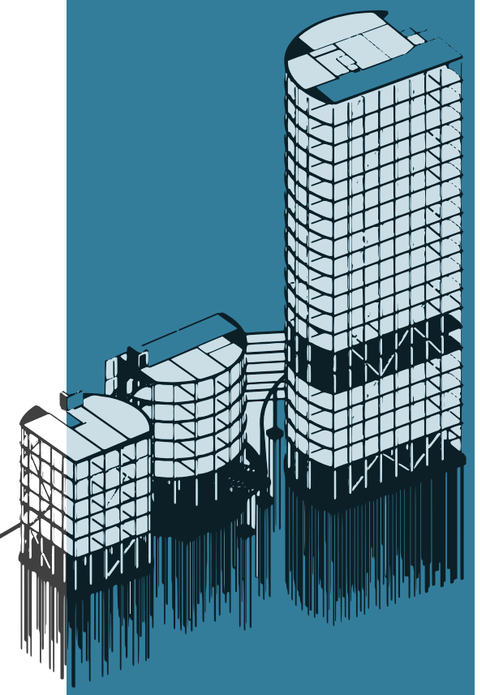
STEFFEN MAAGAARD
Corporate Technical Director
for Energy Design & Indoor Climate

## LIVING PLACES: A VISIONARY HOUSING CONCEPT (DENMARK)

Living Places is a housing concept that Artelia's subsidiary MOE is developing as part of a consortium with Velux, Effekt Architects and contractor Enemærke & Petersen. The aim is to create a new standard for more sustainable and healthier, single-family homes by developing a scalable and commercially viable concept.

The central idea is to reduce $CO_2$ emissions substantially without compromising a healthy indoor climate, fresh air, and daylight.. Firstly, we propose moving towards smaller houses, combined with shared spaces with other inhabitants, which offers the twofold advantage of reducing the carbon footprint and encouraging sociability. For the construction, we are considering wood and other bio-based materials, while maximising the use of natural light and other qualities that will ensure the healthiest possible indoor climate. We also prefer technical solutions that allow for economical energy management. The whole project must be simple to build, with costs under control, and must be scalable to integrate with different environments.

The first Living Places prototype will be built in the Jernbanebyen district in Copenhagen. It will emit less than 4 kg of $CO_2$ per sq.m. per year.



### TRÆ, A PIONEERING OFFICE BUILDING USING SUSTAINABLE CONSTRUCTION (DENMARK)

Artelia's subsidiary MOE teamed up with Lendager Group to design a 20-storey wooden office building (which is exceptional for a timber construction) made largely from recycled materials. The pioneering project has attracted the interest of the municipality of Aarhus, who has entered a partnership agreement for sustainable construction with the owner PFA and the developer Kilden & Hindby. The partnership has received financial support from the Klimafonden foundation which wants to encourage sharing advances achieved from this project.

# REDUCE THE CARBON FOOTPRINT OF CONSTRUCTION AND PROMOTE THE CIRCULAR ECONOMY

Artelia is actively participating in the evolution of the construction industry towards a low-carbon economy through various drivers such as building scalability, the use of bio-sourced materials and their reuse.

### LAUNCH OF THE «URBAN RESSOURCES» REUSE PLATFORM

As one of the key drivers of the circular economy, reuse extends the life of a material or piece of equipment, thereby actively contributing to the preservation of natural resources and reducing the carbon footprint inherent in extraction and processing. To encourage this practice, Artelia has created urban Resources, a platform dedicated to the management of material reuse. Open to all, it enables the management of materials to be optimised between construction and deconstruction operations, by indicating availability, buffer storage locations, etc. This tool has already been used on several sites, including the renovation of the Adria tower in Paris-La Défense.

### MOVING THE LINES

Artelia has been involved in the development of the BBCA (low carbon building) labels for several years and contributed to their update in 2021.

In collaboration with the Lendager group, Artelia subsidiary MOE is designing a 20-storey wooden office building (exceptional height for wood)

### IMPLEMENTATION OF THE CIRCULAR ECONOMY WITH SEINE-SAINT-DENIS HABITAT (FRANCE)

With a portfolio of 32,000 homes, Seine-Saint-Denis Habitat is a leading social housing organisation that aims to play a leading role in implementing the circular economy in a territory of 32 municipalities with a total of 80,000 inhabitants. Artelia is supporting it by providing the tools required for this approach. The Group's specialists initiated a heritage diagnosis and an environmental, economic and legal assessment in order to be able to propose deconstruction or renovation operations in partnership with the Réavie association, a pioneer in reuse approaches.

### REUSE OF MATERIALS APPLIED TO THE RENOVATION OF TOUR ADRIA (FRANCE)

During the renovation of Tour Adria located in the Paris business district of La Défense, Artelia implemented an operation to reuse materials. As project manager for the entire dismantling and cleaning of the building (interior and façade), our teams organised a selective sorting of waste and set up a platform for reuse on site. Sanitary fittings, interior partitions (solid and glazed), doors (wood and steel) and granite façade slabs were accordingly refurbished and then offered for sale and reused on other sites.

### CONTRIBUTING TO THE ESTABLISHMENT OF LOW-CARBON PROCESSES THROUGHOUT A BUILDING'S LIFE CYCLE (FRANCE)

Artelia continued to provide its expertise to public and private players in order to facilitate the roll-out of low-carbon construction standards and regulations.

Our teams were closely involved in the work of the AQC (Agence Qualité Construction), which led to the publication of professional guides on best practice in terms of building reversibility. They participated in the research project on the circular economy led by the CSTB (scientific and technical centre for the building industry), by leading various working groups on short supply chains, lengthening the material cycle, carbon storage, and the principles of transformability, reversibility and deconstructability.

# SUSTAINABLE WATER RESOURCE MANAGEMENT

Artelia is involved in the entire water cycle, from capture to its return to the natural environment, encouraging a reasoned, shared and respectful use of this vital resource for humanity.

## PROTECTION OF WATER RESOURCES IN THE POUT CATCHMENT AREA (SENEGAL)

The aquifer system in the Pout area supplies water to the Dakar region while meeting the needs of a cement factory and extensive irrigated agriculture. Overexploitation of the resource has led to a drop in the water table. As part of Adapt'Action, a tool for adapting to the impacts of climate change, Agence française de développement commissioned Artelia to conduct a feasibility study for a project to improve the situation in a sustainable manner. Our teams drew up an inventory and analysed vulnerabilities with regard to various climate scenarios. They then contributed to the development of a strategy for the protection and sustainable management of the resource. This strategy is based on improved governance, an innovative artificial groundwater recharge system and the implementation of nature-based solutions.

## WATER QUALITY MONITORING IN LAKE TANGANYIKA (BURUNDI)

Shared by Burundi, the Democratic Republic of Congo, Tanzania and Zambia, Lake Tanganyika is one of the world's largest surface freshwater reserves. Improving its transnational management is the objective of the Latawama (Lake Tanganyika Water Management) programme, supported by the European Union and implemented by the Belgian Development Agency (Enabel). This project is based on the implementation of a water quality monitoring and control network to which Artelia subsidiary SHER contributed its expertise. Our teams developed a dedicated database and a web-based cartographic portal (WebGIS), enabling the entry, storage and sharing of this data.

## SUSTAINABLE DEVELOPMENT OF RURAL INFRASTRUCTURE (MAURITANIA)

As part of the RIMDIR programme (Strengthening Productive and Energy Investments in Mauritania for the Sustainable Development of Rural Areas), Artelia subsidiary SHER has produced an updated and evolving technical and economic reference framework that analyses the different types of rural infrastructure in the country. The reference system is structured into five themes: hydro-agricultural, pastoral and anti-erosion facilities, infrastructures for mobilising and storing surface water resources, and works to open up the country. Produced from a technical, economic and social perspective, this decision-making tool capitalises on best practice and feedback. Financed by the European Union and implemented by Enabel, it pools a large amount of data and information (ministries, consultancies, professional groups, NGOs).

## DRINKING WATER SUPPLY FOR THE INHABITANTS OF HANOI (VIETNAM)

Artelia is supervising the construction of a drinking water treatment plant in the Dan Phuong district of Hanoi. This infrastructure, which will draw raw water from the Red River, will have a treatment capacity of around 300,000 cu.m. per day and will be able to supply nearly two million inhabitants. It will meet the growing needs of the Vietnamese capital and offset the gradual closure of old groundwater treatment plants.

## MOBILISATION OF WATER RESOURCES FOR IRRIGATION IN REUNION (FRANCE)

The departmental council of Reunion awarded Artelia a contract to design irrigation networks and a project to reuse waste water from the Grand Prado waste water treatment plant. The project involves the creation of a 20-km water main, associated with 6 km of transfer galleries, 30,000 cu.m. of reservoirs and 24 crossings. As part of the MEREN operation (mobilisation of water resources in the eastern and northern micro-regions), this infrastructure will help secure agricultural production in this part of the island.

## HAISNES-LEZ-LA BASSÉE WASTE WATER TREATMENT PLANT AND STORM WATER BASIN (FRANCE)

Due to a problem with the current technical unit, the Bethune Bruay Artois Lys Romane conurbation decided to create a new 15,000 population equivalent waste water treatment plant and a 2,400 cu.m. storm water basin on its territory. Artelia is providing complete project management for this project, which will solve the problem of accidental discharge during heavy rainfall and helps preserving the natural environment.


# ADVANCED INDUSTRIAL FACILITIES

Reducing the carbon footprint of its activities while continuing to meet the growing needs of our societies is the current challenge facing the industry. This means constantly striving for efficiency in organisation, energy and resource consumption, control of environmental impact and production security.

**Helping major energy companies in their transformation to a low-carbon industry.**

## *What the experts say...*

SAMUEL CUNIN
Project director

GUILLAUME GRANGE
Project Supervisor

### CONVERSION OF THE REFINERY TO «ZERO OIL». TOTALENERGIES DE GRANDPUITS (FRANCE)

Located in Seine-et-Marne, some 50 km south-east of Paris, the Grandpuits refinery has begun its conversion to a zero-oil platform in order to move towards a more environmentally-friendly production process and become an oil-free platform, moving into other activities such as the manufacture of biofuels and bioplastics, plastic recycling, and production of photovoltaic energy. Our Group was mandated by TotalEnergies to draw up the detailed drafts of two parts of this conversion.

We studied the integration of a plastic waste recovery unit (Pyrolysis), an investment in partnership with the Plastic Energy company. This unit will make it possible for plastic waste to be converted into a recycled raw material which will then be transformed into polymers with properties identical to those of virgin polymers, and in particular compatible with food use. At the same time we implemented the remodelling of all the existing facilities on the site (utilities, load/product logistics, buildings, control systems, electrical networks, the so-called 'NPO' scope) to ensure conversion and prepare for the installation of new units.

# OPTIMISING PRODUCTION INFRASTRUCTURE

Manufacturers are continually modifying and modernising their production facilities. Artelia assists them both in  buildings and manufacturing processes.

## CONSTRUCTION OF A TECHNIC ULTRA PURE CHEMICAL PLANT (FRANCE)

The US Technic Group is a global supplier of products for the electronics industry. It decided to develop high value-added products in France, in particular very high performance and extremely pure cleaning products for the semiconductor sector. Technic chose to locate on the disused Brenntag industrial site in Amiens. Artelia is in charge of the rehabilitation and reconstruction of the site, from the preliminary design to the commissioning of the new plant. In 2021, our teams quickly assimilated the design and installation constraints inherent in this highly specialised manufacturing process and carried out the preliminary studies for the new entity.

## STMICROELECTRONICS FACTORY EXTENSION IN BOUSKOURA (MOROCCO)

STMicroelectronics a franco-Italian company specialising in the design and manufacture of semiconductors, commissioned Artelia to extend its Moroccan plant in Bouskoura (Casablanca region) which tests and assembles electronic components for the automotive industry. Completed in less than a year, the project entailed equipping the top floor of the building with utilities (electricity, refrigeration, special fluids) to install a new 7,000 sq.m clean room (ISO 7 air treatment).

## INCREASE OF A PRODUCTION LINE FOR NOVASEP (FRANCE)

Novasep Chasse-sur-Rhône, a fine chemicals company specialising in the manufacture of active pharmaceutical ingredients, asked Artelia to study the extension of one of its products manufacturing capacity. The Group's teams worked on the project preliminary design, working on the various stages of the manufacturing process (purification, crystallisation, isolation, drying) and all associated utilities.

## CREATION OF A BATTERY GIGAFACTORY BY ENVISION IN DOUAI (FRANCE)

The manufacture of batteries, an essential component in the development of electric mobility, has become one of today's industrial priorities. To secure the supply and equipment of its future electric cars (R4 and R5), French carmaker Renault teamed up with Chinese manufacturer Envision to create a mega plant in Douai, in northern France, capable of producing the equivalent of 9 gigawatt hours (GWh) of batteries per year. Artelia was chosen to assist the project manager in carrying out the conceptual studies for the facility.

## IMPROVEMENT OF THE STEAM CRACKER AT THE BERRE-L'ETANG SITE (FRANCE)

A global company specialising in the chemical sector, Lyondellbasell commissioned Artelia with a study to replace fifteen heat exchangers at its steam cracker in Berre-L'Étang (southern France). The aim is to improve the facility's reliability and operational and environmental performance (reduced fuel consumption, greater flexibility of use). This project was deployed during the major 2022 shut-down of the petrochemicals hub, which is continuing its development into an ever more integrated and optimised platform.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### DESIGN OF A REFRIGERATION SYSTEM FOR SABELLA TIDAL TURBINES (FRANCE)

Sabella, an integrator specialising as a current-generated energy operator, plans to test two experimental 250 kW tidal turbines in the Gulf of Morbihan in 2023. Artelia is taking part in this innovative operation by studying the refrigeration system for the electrical converters on board the tidal turbines. Our teams have mobilised a wide range of expertise (thermal, hydraulic, operating safety, corrosion, biofouling, etc.) to develop the preliminary design of the system.

# CREATING HIGH-TECH EQUIPMENT AND FACILITIES

Artelia fields teams specialising in creating laboratories, turnkey tools and data centres to address the major challenges of research, innovation, automation and big data.

### CONSTRUCTION OF AN AUTOMATED LNG LOADING BAY AT THE MONTOIR-DE-BRETAGNE LNG TERMINAL (FRANCE)

As an expert in liquefied natural gas (LNG), Elengy operates three regulated LNG terminals in France. LNG is an available and immediate decarbonisation driver, an effective substitute for coal and petroleum products: Elengy thus contributes to the energy transition of energy suppliers and the entire transport sector. In order to increase the LNG loading capacity of its Montoir-de-Bretagne facility (Grand Port Maritime Nantes-Saint-Nazaire), Elengy has entrusted Artelia with a twofold mission: to build an automated bay for loading LNG tankers and to automate the existing bay. Group specialists carried out the preliminary design studies and are providing the EPCM services (detailed design, procurement assistance and construction management).

### INCREASING USE OF VIRTUAL REALITY

In 2021 Artelia enhanced its virtual reality tools to offer its customers a constructive 3D immersive experience that makes it easier to understand distances, volumes and the multiple components of a project. Used for design, ergonomics, safety, maintenance and even training, virtual reality provides real added value in the management of industrial engineering projects.

### INNOVATION CENTRE FOR EXTRACTIVE METALLURGY IN ORANO (FRANCE)

Artelia delivered the new CIME (Centre for Innovation in Extractive Metallurgy) building, located in Bessines-sur-Gartempe. Covering a total of 8,600 sq.m. on three levels, it consists of laboratories dedicated to the development and improvement of ore extraction processes and the treatment of effluents and polluted soils. This comprehensive project management mission required the integration of strong regulatory and environmental constraints combining chemistry and radiation protection (Installation Classified for the Environment - ICPE - nuclear subject to authorization).

### LIMITING THE ENVIRONMENTAL IMPACT OF SALMON FARMS (NORWAY)

With extensive experience in the engineering of this type of farm, Artelia's subsidiary Dr. techn. Olav Olsen has developed a new closed cage concept that protects fish from parasites and infection while avoiding leaks and the environmental pollution they could cause. The concept is based on a system of thin walls and fibre reinforcements, reinforced with steel where necessary.

**ENVIRONMENTAL MANAGEMENT OF THE SIMANDOU PROJECT INDUSTRIAL PORT AND RAILWAY (GUINEA)**

The Guinean government initiated a project to exploit iron deposits in the Mount Simandou chain, which includes the creation of a major industrial port in the Morébayah estuary and a 600 km railway line. Artelia is conducting the environmental and social impact assessment of the entire port and railway project with a multidisciplinary team of more than 25 specialists (hydrosedimentary, water and air quality, hydrogeology, terrestrial and marine acoustics, societal engineering, aquatic and terrestrial biodiversity, industrial risks and crisis management, climate change, waste management, landscape, etc.). This study is being carried out in accordance with Equator Principles, an international benchmark for responsible financing that imposes strict rules on ESG (Environmental, Social and Governance) criteria. Artelia teams in France and Guinea are also responsible for providing assistance to the project owner during the construction phase in the areas of the environment and ecological and social management of this large-scale project.

# MEETING THE MULTIPLE NEEDS OF INDUSTRY

Artelia assistance covers a wide range of needs, including environmental studies, site development and renovation, facility protection and logistics.


## CONSTRUCTION OF THE CAINIAO LOGISTICS INDUSTRIAL PARK (VIETNAM)

Cainiao, a major logistics player in Asia, chose Artelia to assist with the development of its infrastructure. Our teams built six warehouses (120,000 sq.m.) to meet the client's priorities: high flexibility (for future automation) and a good level of quality at a reasonable price. They carried out all the architectural, civil engineering and structural studies, and designed the mechanical, electrical, fluid and fire-fighting systems. Artelia also managed the permit applications and prepared the technical tender documents.

## CREATION OF THE DELIN PROPERTY LOGISTICS CENTRE IN ILLESCAS (SPAIN)

Delin Property, a major Dutch logistics company, decided to create a new hub on the outskirts of Madrid and chose Artelia to build it. The complex consists of three buildings (66,000 sq.m.), which have been awarded the BREEAM Excellent label. Responsible for the design, authorisation and turnkey management of the works, our teams deployed numerous sustainable solutions, including thermal zoning, an air quality plan, consideration of the life cycle of materials, high-performance thermal and acoustic insulation, low-emission heating, lighting control, rainwater recycling, bicycle parking and an electric vehicle charging point.

## CONSTRUCTION OF AN AUTOMATED LOGISTICS PLATFORM FOR SCADIF (FRANCE)

Artelia subsidiary SDZ, which specialises in intensive and automated logistic infrastructures, has assisted one of the E. Leclerc group's purchasing centres, Scadiff (Société coopérative d'approvisionnement l'Île-de-France) to create a high-performance platform using the latest technologies, particularly in terms of automation. The 66,400 sq.m. logistics plant will include a warehouse dedicated to the storage of fresh, ultra-fresh and frozen products (at -25°C), a warehouse for dry products, a conventional reception and dispatch area and two high-level cells for the automated processing of pallets and parcels using robots.

## SAFETY AND INNOVATION A PRIORITY FOR SHELL MOBILITY IN THE PHILIPPINES

Artelia has achieved very good results in its Shell Mobility Capex contract in the Philippines. Firstly, in terms of safety, the milestones of 1,000 FIS days (without any significant incident or fatality) and then 5 million person-hours without FIS have been reached in 2021 as part of an investment programme involving almost 2,000 workers on 200 different projects. This is the result of a constant effort in supervision and training, including all subcontractors, and is fully in line with Shell's "Goal Zero" for safety. The year also featured the deployment of the Shell CXF concept in the country, which aims to develop services (relaxation, catering, vehicle maintenance) within the country's service stations. Our teams also won the Shell Green Innovation Award by opening the first station built entirely of eco-bricks.

## MAINTAINING SHELL STATIONS IN THAILAND

Artelia maintains the assets and facilities of over 400 Shell service stations throughout the country, managing various programmes and events. Our Group uses rigorous execution plans, experienced teams and appropriate EM+ tools. We have also initiated predictive (data-driven) maintenance and set up a dedicated call centre for retailers. This organisation allows us to minimise equipment downtime and generate substantial savings on our client's operating expenses.

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# MULTIMODAL MOBILITY

With its very heavy carbon footprint, the transport sector is at the heart of the debate. Relying on electricity and hydrogen to replace oil, encouraging public transport and active modes of transport to reduce energy expenditure, and better connecting cities and rural areas by proposing an efficient and easy-to-understand intermodal mobility offering are the areas of development currently being considered to reduce this footprint while proposing a sustainable transport system accessible to all.

**Contribute to the development of efficient and accessible collective electric mobility.**

## *What the experts say...*

OLIVIER COLOMBAT
Transport director
Urban transport and infrastructure

JOANNES BROSSARD
Project director

## CREATION OF THE T9 TRAMWAY LINE FOR THE LYON METROPOLIS (FRANCE)

The Lyon city authorities and SYTRAL Mobilités (transport authority) are expanding their public transport offering with the creation of three additional tramway lines. One of them, the T9, will connect the municipality of Vaulx-en-Velin (55,000 inhabitants) to the existing network of Lyon and Villeurbanne, serving its main districts. The entire infrastructure will comprise 8.8 km of new tracks, 12 stations and a new crossing over the Jonage Canal. It will carry up to 38,000 passengers per day with a tram every 10 minutes. It is scheduled to enter service in the first quarter of 2026.

In partnership with Villes & Paysages and Lavigne-Cheron Architects, Artelia is providing full project management for this project, managing the infrastructure, engineering structures and systems. Several of our teams are already working on this project, which combines several areas of expertise (transport, engineering structures, roads and networks, stormwater management, eco-design, soft mobility, etc.). We are proud to manage this project, which will soon make life easier for many inhabitants in the conurbation and is a step in the direction of sustainable mobility, emitting less greenhouse gas.

non contractual view

# DEPLOYING DIVERSE URBAN MOBILITY

Relying on diversified public transport systems that are correctly inter-connected among themselves and with active individual modes of travel has emerged as the best way to achieve low-carbon mobility.

## T11 EXPRESS TRAM-TRAIN EXTENSIONS (FRANCE)

The T11 express tramway, which entered service in 2017, carries nearly 32,000 passengers per day between Le Bourget and Épinay-sur-Seine, two municipalities in the greater Paris area. The Île-de-France Region has decided to make the extension of this line one of its priorities. The project involves a double extension:  5.6 km of track and three stations to reach Noisy-le-Sec in the east, 11.7 km of track and four stations to reach Sartrouville in the west. Artelia will be assisting one of the project's owners, SNCF Réseau, in the implementation of this project until it is brought into service by 2032.

## BUILDING MOBILITY IN THE NEW ENGHAVE BRYGGE DISTRICT (DENMARK)

The former port and industrial area of Enghave Brygge in Copenhagen is to be transformed into a new urban district featuring a metro station, promenades, roads, lanes and several canals that have to be dug. Artelia's subsidiary MOE will manage the design of transport infrastructure, geotechnical studies, traffic planning and civil engineering relating to the construction of bridges and canals. It will also coordinate health and safety and site accessibility issues.

## ORGANISING THE MOBILITY OF THE DUNES DE FLANDRE SITE (FRANCE)

Dunes de Flandre is an exceptional ecological and heritage site. Bordering the North Sea, it extends over 13 kilometres and attracts more than two million visitors each year. In search of the «Grand Site de France» label awarded by the Ministry of Ecology, the Dunkirk urban community commissioned Artelia to draw up a reception and visitor plan for the site. The aim is to understand visitor flows and mobility according to places of interest and then propose concrete strategies for organising the discovery of the area by managing visitor traffic and parking as well as possible, and above all by promoting convincing alternatives to the car that are tailored to the challenges of preserving the natural environment.

## OPTIMISING THE URBAN INTEGRATION OF THE NEW LIGHT RAIL LINE IN CANBERRA (AUSTRALIA)

Artelia was retained as Design Challenger to work on the extension of the Canberra light rail system. With 11 km of track, the new section crosses a very sensitive parliamentary zone, which poses certain technical and planning challenges, well known to our Group because of the requirements of French projects. Our teams are providing their expertise on specific issues such as ground power supply (wireless sections), equipping rolling stock with batteries, integrating power plants in buildings or underground, creating green tracks and visual and technical integration in a sensitive urban environment.

## FOUR BHLS LINES TO SUPPORT THE MONTPELLIER TRAMWAY (FRANCE)

Aware that the tramway will not be able to serve all of the 31 municipalities in the conurbation at an economically acceptable cost, and wishing not to leave any territory out of the mobility loop, Montpellier Méditerranée Métropole is considering the creation of five bus lines with a high level of service (BHLS). TAM (Transport de l'Agglomération de Montpellier) has entrusted Artelia with the preliminary study for this 54 km network. With 60 electric vehicles, it will serve 110,000 inhabitants. Our teams, already responsible for the project management of line 5 of the tramway currently under construction, are working to determine the best route for this BHLS, integrating ambitious objectives for urban integration, traffic calming and the promotion of soft mobility.

## COMMISSIONING OF THE URBAN CABLE CAR IN SAINT-DENIS DE LA RÉUNION (FRANCE)

Since 2016 Artelia has been assisting Cinor (inter-municipal community of the north of La Réunion) in the implementation of this 2.7 km urban cable car project, which is intended to link two densely populated districts in the city. It was therefore with great satisfaction that our teams witnessed the final tests and the commissioning of the infrastructure, which should accommodate 6,000 users per day. With a moderately priced ticket and a complete journey that takes 14 minutes, this cable car is a realistic alternative to the use of the car.

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## EXPERIMENTAL ECO-DESIGN ON THE PORT-LA-NOUVELLE CONSTRUCTION SITE (FRANCE)

Artelia has continued its project management work on the modernisation and extension of the port of Port-La-Nouvelle, a project led by the Occitanie Region. Work to create new dykes, the excavation of the basin and the creation of the storage area for heavy packages progressed at a good pace. As part of this work, and in particular the construction of the northern embankment, our teams have implemented three experimental sections of ACCROPODETMII artificial blocks with different structures and roughness. The objective is to identify which of these configurations is the most favourable to the colonisation of the blocks by marine flora and fauna.

# CONNECTING CITIES, REGIONS AND CONTINENTS

The smooth running of our societies depends on complex domestic and international transport systems combining road, rail and air. Our teams contribute to making these three modes more efficient, safer and more sustainable.

### SELECTION OF THE BEST PROVIDER TO OPERATE TWO RAILWAY LINES IN THE SOUTH REGION (FRANCE)

Région Sud (Provence-Alpes-Côte d'Azur) wishes to improve the quality of service of the regional express trains (TER) on the Marseille-Nice line and the Nice rail hub, which together account for 33% of regional traffic. In order to ensure the competitive tendering procedure, which will become compulsory for TER services from December 2023, the regional authorities selected Artelia to assist in drawing up concession contracts, a mission that includes conducting the call for tenders and providing consultancy services on all technical aspects relating to future maintenance sites.

### OPERATION OF THE ACCROBERMTM CONCEPT IN THE PORT OF DIBBA FUJAIRAH (UNITED ARAB EMIRATES)

In partnership with Sixco, CLI (Concrete Layer Innovations), an Artelia subsidiary specialising in marine protection shells, has for the first time implemented its economical ACCROBERM™ artificial block concept. Installed at the foot of the shell to ensure maximum stability of the structures, these models were deployed as part of the 260-m extension of one of the dykes in the port of Dibba Fujairah. A new model, ACCROBERM™ II, with an ecological focus, is currently being tested on the French coast as part of the Cherloc demonstrator.

### UPGRADING OF THE OISE RIVER (FRANCE)

River transport has been on the increase for several years and, along with rail, offers an alternative to road transport for some types of product. Steered by VNF (Voies navigables de France), the Mageo project (upgrading the Oise River to the appropriate gauge) is part of this dynamic and aims to improve navigability in northern France. Artelia is managing this project, which involves raising the gauge of the tracks from 3 to 4 metres between the towns of Compiègne and Creil, a European gauge that allows convoys carrying up to 4,400 tonnes of goods to travel.

# BUILDING SAFE AND SUSTAINABLE FUNDAMENTAL ENGINEERING STRUCTURES

Key elements of transport infrastructure, engineering structures must incorporate significant changes in construction techniques, monitoring and safety. From design to construction, monitoring to instrumentation, Artelia specialists cover every requirement.

### DESIGN OF THE ESPERN BRU BRIDGE IN OSLO (NORWAY)

This new bridge plays a central role in the project to transform a former industrial port area in the municipality of Hamar north of Oslo into an urban district. Spanning a railway line, the bridge will provide an important link between the new district and the city centre while also ensuring easier access to various construction sites during the work. The 114-m-long structure, with cycle and pedestrian lanes, will be built by an international team within Artelia Group, with subsidiaries Dr techn Olav Olsen, MOE and Artelia Philippines involved in the design.

### CREATION OF A FOOTBRIDGE RESERVED FOR SOFT MOBILITY IN AGDE (FRANCE)

Artelia subsidiary RFR Structure et Enveloppe was awarded the contract to build a footbridge over the Hérault river. Intended to link the park and its château to the urban promenade leading to the heart of the old town, this structure will be dedicated to pedestrians, cycles and only service and emergency vehicles. This proposal was developed in partnership with the Guillermin agency (landscape architect), Gaxieu (VRD BET), ATU (VRD: modelling), A. Chaloin (DPLG architect) and Transmob (transport).

### NEW SOLUTIONS FOR EFFICIENT BRIDGE MAINTENANCE

Artelia and its subsidiary Quadric, which specialises in engineering structures, have been selected as part of the call for "Connected Bridges" projects launched by the French government, an operation designed to develop safe, effective and economical methods and tools for bridge maintenance. Our Group will thus be able to accelerate the development of two of its solutions currently under study, one for "detecting corrosion of stays and cables using autonomous sensors" and the other for "monitoring masonry structures under current traffic and exceptional convoys".

# MORE LIVABLE CITIES

In a world of continuous urban growth and increasing climate change pressure, cities must modernise and secure the physical infrastructure base on which their sustainable functioning depends. But they must also think and organise themselves to be pleasant and desirable places to live, well integrated into their territory.

**Enhance heritage and promote nature in the city to create safe and peaceful spaces open to all.**

*What the expert says...*

MATTHIEU PAUZIÉ
Head of the Development-Transport hub

## GRAND PARC CANAL: DEVELOPING THE CANALS OF THE METROPOLIS (TOULOUSE)

Toulouse Metropole is leading a major project to develop and enhance the Canal du Midi, the Canal de Brienne and the Canal Latéral to the Garonne. Entitled Grand Parc Canal, this operation is being carried out in partnership with VNF (Voies navigables de France). It covers some thirty kilometres of canal spread over four municipalities and aims to promote nature in the city and biodiversity, to embellish and enliven the banks, while making it safer for cyclists and pedestrians. These general objectives will be refined thanks to the survey carried out among the inhabitants to better understand their expectations.

Already involved in the Grand Parc Garonne project, Artelia will be responsible for defining the urban guide plan and project management for this project, which involves several teams (traffic simulation, engineering structures, infrastructure, BIM). The Canal du Midi and the Canal de Brienne, are listed as UNESCO World Heritage sites and are truly exceptional areas that are exciting to work on.

# MANAGING LARGE STRUCTURAL PROJECTS

Artelia can grasp the urban ecosystem in all its complexity and diversity and helps design more sustainable neighbourhoods and cities by offering very concrete planning solutions.

## REDEVELOPMENT OF THE LACANAU WATERFRONT (FRANCE)

Like many other coastal towns, the seaside town of Lacanau on the Aquitaine coast is now threatened by oceanic erosion. The municipality has therefore initiated a prospective study on the notion of an ocean town by trying to project itself to 2050. As a stakeholder in the environment and urban and maritime infrastructures, Artelia has contributed to the definition of an urban development project for the waterfront that incorporates the principles advocated by the municipality of modularity, reversibility, greening, relocation, frugality and sobriety. Our teams are thus working on the creation of a light and reversible belvedere that can be easily modified.

## ECOLOGICAL TRANSITION AND TERRITORIAL PROJECTS IN WESTERN FRANCE

Artelia is assisting 15 conurbations in the departments of Mayenne, Sarthe and Maine-et-Loire (approximately 400,000 inhabitants) in drawing up their CRTE (Contract for Recovery and Ecological Transition). This mechanism, which brings State and local authorities together, aims to promote the ecological, economic and social transition of the territories. In partnership with the various territorial players, our teams led the reflection process, drew up diagnoses, synthesised the strategic orientations and drafted the territorial projects, taking into account their multiple dimensions (housing, trade, mobility, economic and digital development, ecology and environmental protection, education, culture, health and sport).

## REQUALIFICATION OF THE UPPER TOWN OF BONIFACIO (FRANCE)

Perched on a cliff at the southern tip of Corsica, the town of Bonifacio is an exceptional site that welcomes over two million tourists every year. Launched in 2017, the rehabilitation of the upper town had multiple ambitions, touching on infrastructure, the economy and heritage. After four years of work, the challenge has been met. The water and sanitation networks have been rehabilitated. Multiple facilities have been modernised (electrical network, public lighting, fibre and Wi-Fi, etc.), while respecting the architectural and historical character of the area. Public spaces have also been renovated and enhanced with refreshing, planted areas that give pride of place to local species. In partnership with ADP Architecture, Artelia was the project manager for this project.

## REQUALIFICATION OF THE SEA PROMENADE IN LA BAULE (FRANCE)

The town of La Baule-Escoublac decided to rethink and redevelop its famous seaside promenade, the configuration and ageing elements of which no longer meet the expectations of local residents or tourists. Encouraging soft and active mobility, creating new spaces for conviviality, services and activities, rebuilding the link between the seaside and the garden city, while meeting the challenge of the ecological transition, are the preliminary axes of the new project that the municipality is developing in consultation with the inhabitants. Artelia will serve as project manager for the next eight years.

© Drone Rune

## CLIENT CONSULTANCY FOR THE CITY OF COPENHAGEN (DENMARK)

Artelia subsidiary MOE has won a major consulting framework agreement with Dall & Lindhardtsen for a large part of the future construction projects of the city of Copenhagen (estimated budget: DKK 250 million). Our teams will provide client consultancy for the construction, renovation and redevelopment of schools, childcare centres, sports and cultural facilities.

## CREATION OF THE PRESTIGIOUS BOKA PLACE DISTRICT (MONTENEGRO)

Artelia has established a new branch in Montenegro to support existing and future projects in the Balkans region. One such project is the creation of Boka Place, a mixed-use residential, hotel and leisure neighbourhood in the luxury superyacht marina, Porto Montenegro. Set organically around a central square, the development comprises elegant residences, a new hotel franchise (SIRO), shops, restaurants, a cinema and a sports and wellness center, all nestled in landscaped outdoor spaces.

## ARTELIA'S NEW URBAN ENGINEERS

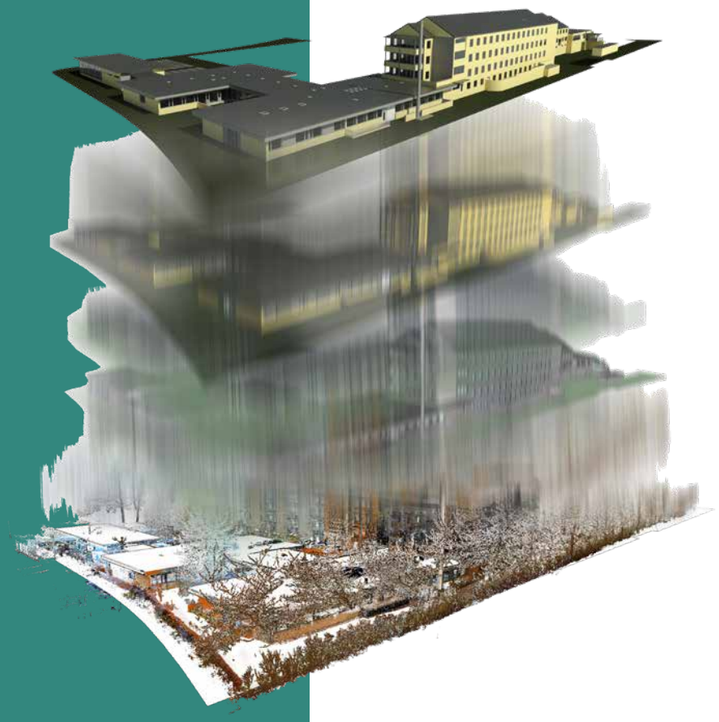
The OPQU (Office professionnel de qualification des urbanistes) has recognised 14 Artelia employees for their skills and experience in this field. On this occasion, the newly qualified urban planning engineers drafted a manifesto that presents the Group's vision for urban planning.

## RENATURATION OF THE BRANCH OF THE CROSS NEAR LILLE (FRANCE)

Branche de Croix, a waterway that has been completely artificialized over the decades and through development, is to be restored to a high quality walking and recreation area. Métropole européenne de Lille retained Artelia with the complete project management of this operation, which includes the removal of the old structures, the renaturation of the Dragon port, the opening up of the river, its cleaning and the landscaping of its banks. The work is scheduled to start in early summer 2022.

## URBAN SPACE PLANNING FOR BORDEAUX METROPOLE (FRANCE)

Artelia is the project manager (technical, financial and administrative monitoring) for the redevelopment of public spaces and roads in two urban renewal projects in the Bordeaux metropolitan area: cité Carriet housing estate in the municipality of Lormont and the Joliot Curie area in the towns of Cenon and Floirac. The aim of these two projects is to improve inhabitants' quality of life by supporting soft modes and local uses, landscape and ecological continuity, and the good climatic functioning of the areas. Various concrete actions have been carried out to reinforce pedestrian and cycle continuity, create new convivial spaces, plant vegetation with a preference for local species, and reduce the impermeability of surfaces and heat islands.



# DEPLOY HIGH-QUALITY URBAN ENGINEERING

Whether water, waste, energy or human movement, controlling flows is fundamental to creating functional and pleasant cities. Artelia has proven expertise in all these areas of urban engineering.

### DIGITISING 354 BUILDINGS IN LYNGBY-TAARBÆK (DENMARK)

Artelia subsidiary MOE has advised the city of Lyngby-Taarbæk on a major digitisation project. A portfolio of 354 buildings totalling 233,000 sq.m. was converted into point clouds. Point clouds are used to create 3D models that can be used in various space planning and renovation projects. Our teams helped city authorities specify their needs, manage the design and digitisation tenders and train staff to check delivered models.

### EXTENSION OF THE HEATING AND COOLING NETWORK OF THE PARIS-SACLAY URBAN CAMPUS (FRANCE)

Inaugurated in June 2019, the fifth-generation network in Paris-Saclay is based on both the use of geothermal energy and heat recovery from the cooling of buildings with specific cooling needs. One of the largest in France, it thus makes it possible to use local energy, more than 60% of which is renewable and emits four times less CO2 than a conventional solution. Artelia is working on the extension of this exemplary network on behalf of the Paris-Saclay public institution. Our teams are in charge of project management for the entire development (networks, stations and production facilities), which will eventually supply 2.15 million sq.m. with 63% renewable and recovered energy. This operation is part of the European D2Grids project, which aims to encourage these fifth generation heating networks.

### CREATION OF THE BETHUNE STORM WATER BASIN (FRANCE)

Located in the centre of Bethune, this storm water basin with a capacity of 10,000 $m^3$ will reduce the pollution discharged into the natural environment during heavy rainfall. In addition to its functional qualities, it will also have to fit perfectly in the urban environment. Artelia is responsible for the complete project management (basin, spillways, architectural and landscape quality) for the Bethune Bruay Artois Lys Romane agglomeration community. Launched during the year, the work is scheduled for completion in February 2023.

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# REGENERATION OF THE BUILT ENVIRONMENT

While the reduction of the carbon footprint is part of the regulations and certifications in many countries, the construction sector must also adapt to the emergence of new ways of working and to changing requirements and aspirations in terms of housing, commerce, training, communication, leisure, culture… This is a fundamental issue that affects all buildings, in all their functional diversity, and requires the implementation of appropriate solutions.

**Tackling the housing shortage by a qualitative conversion of current buildings.**

*What the expert says...*

GILLES THIERRY
Director of the Real Estate Services Branch

## AN AMBITIOUS CONVERSION OF OFFICES INTO HOUSING IN BOULOGNE (FRANCE)

Converting office space into housing is an interesting solution for making up for the lack of housing while adopting a sustainable approach focused on extending the life of existing buildings. The conversion of the building at 50-56 rue Marcel Dassault in Boulogne, sponsored by  insurance company and project owner BNP Paribas Cardif and developer OGIC, is exemplary in this respect.

This 6,400 sq.m. office building built in 1988 and now obsolete as far as companies are concerned is to be transformed into 79 homes (30% of which are social housing) with cellars, parking spaces and outdoor areas. The project aims to achieve a high level of certification and low-carbon labelling (HQE, BBCA Rénovation, BBC Effinergie) thanks in particular to thermal insulation from the outside and heating by heat pump. In addition to this high environmental standard, the building is designed to adapt to current and future uses by its occupants thanks to the flexible design of partitions, an asset that will further extend its lifespan and thus reduce the ecological footprint of the project. The new building also aims to receive the BiodiverCity label, with a 40% in-situ vegetation rate.

Artelia is assisting BNP Paribas Cardif with a project management assignment covering the main aspects of the project (architectural quality, technical choices, environment, low carbon, economy and project management). After studying the feasibility and programming of the project and finalising the property development contract, we will monitor studies and works until delivery.

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### RENOVATION OF STORTORVET 7 IN OSLO (NORWAY)

Together with contractor Vedal, Artelia subsidiary Dr.techn. Olav Olsen has been involved in the renovation of one of the major building complexes in the Norwegian capital's city centre. Stortorvet 7 comprises five buildings (30,000 sq.m.) and was built in seven stages between 1890 and 2000, which made restructuring particularly complex. Following a major works program (additional floors, new atrium, glass roof, etc.), it has significantly improved performance (BREEAM very good) and its range of services (restaurants, accommodation).

# RENEWING LIVING AND WORKING SPACES

With changing expectations and regulations in terms of comfort, ergonomics, energy performance and connectivity, many homes, offices and shopping centres have become obsolete. Renovating, converting or replacing them are a major challenge to which our teams contribute on a daily basis.

### RENOVATION OF ENEL HEADQUARTERS IN ROME (ITALY)

Artelia is responsible for managing the project and directing works and is overseeing the transformation of the Italian energy company's current headquarters (seven buildings, 80,000 sq.m.) into an exemplary tertiary complex that is aiming for LEED and WELL certification at Gold level. For this purpose, Studio Citterio-Viel has implemented the concept of a city building with numerous social areas, zones dedicated to well-being, green spaces and services (crèche, gym, canteen, auditorium).

### RESTRUCTURING OF TOUR CRISTAL IN PARIS (FRANCE)

Real estate company Tishman Speyer has focused the renovation of Tour Cristal (28,000 sq.m.) on the current concepts of flexible spaces, work comfort, connectivity and services. It commissioned Artelia to coordinate studies and manage project organisation, planning and project management. The project involves a major restructuring that includes a complete change of façade, the redevelopment of all office floors and the creation of new spaces (cafeteria, fitness centre, co-working areas, terraces and green spaces).

### REFURBISHMENT OF THE VETRA BUILDING IN MILAN (ITALY)

Built in the 1960s in the heart of Milan, the Vetra Building is a two-part building totalling 27,000 sq.m. At the request of Axa Investment Managers, Artelia managed its complete redevelopment (façade and interior) by mobilising its sustainable building specialists to obtain the highest level of LEED certification (Platinum). The best functional strategies were deployed in this respect (water saving, energy efficiency, indoor air quality, use of eco-materials, etc.).

## CONSTRUCTION OF TOUR TRIANGLE IN THE PARIS 15TH ARRONDISSEMENT (FRANCE)

Located right next to the Porte de Versailles exhibition centre, Triangle is a 94,500 sq.m. building designed by Herzog & de Meuron, winner of the Pritzker Architecture Prize. Its shape is the result of remarkable urban integration that preserves the views of local residents, concentrates the shadows cast on the roof of the exhibition centre and improves the connection between Paris and Issy-Les-Moulineaux.

A mixed-use project par excellence open to the city thanks to 3,500 sq.m. of accessible terraces and loggias, Triangle will feature offices, local shops and several living spaces: a hotel, a panoramic restaurant, a belvedere, a conference centre, a crèche, a health centre and a cultural centre. As a low-carbon building, Triangle incorporates a number of innovations, including the use of low-carbon concrete and recycled aluminium for the façade (for more than 50% of the quantities), a double-skin bioclimatic façade, 1,000 sq.m. of photovoltaic panels, and a geothermal system based on groundwater. Artelia, as the project's project manager, will ensure compliance with a very demanding programme in terms of certification and labelling (BREEAM, E2C1, BBC Effinergie).



## CONSTRUCTION OF THE ALEXANDERPLATZ TOWER IN BERLIN (GERMANY)

Property management company Covivio awarded Artelia a contract to oversee the construction of a 130-m high tower on Berlin's famous Alexanderplatz. The 60,000 sq.m. mixed-use tower, designed by Sauerbruch Hutton architects, will offer innovative workspaces, a kindergarten, commercial spaces and residential areas. As a highlight, the building will feature a 1,600 sq.m. roof terrace with a garden area.

## DELIVERY OF BRIDGE, THE NEW ORANGE HEADQUARTERS IN ISSY-LES-MOULINEAUX (FRANCE)

Designed by Jean-Paul Viguier, this eight-storey, 56,000 sq.m. complex is highly representative of current aspirations in terms of openness, fluidity and connectivity of work spaces. Designed around a huge atrium topped by a glass roof, the building is abundantly planted and incorporates a former Eiffel hall that has been completely renovated. Artelia was the general contractor for the operation.

## WORKPLACE COMFORT STUDY FOR SAINT-GOBAIN (FRANCE)

After having entrusted Artelia with the tasks of mutual technical design office and environmental project management assistance, the Saint-Gobain group commissioned it to assess the reality of the comfort offered by its new headquarters in Paris La Défense. Delivered in 2020, the building has obtained very high levels of certification: exceptional HQE, exceptional BREEAM, LEED Platinum, Effinergie+. Through physical measurements and surveys of occupants, our teams collected multiple data (thermal, acoustic, air quality, productivity, etc.) to draw up a precise and detailed assessment of expected and perceived comfort.

## EXTENSION OF THE NICE LINGOSTIÈRE CARREFOUR SHOPPING CENTRE (FRANCE)

Serving over 700,000 inhabitants, plus nearly four million tourists during the summer, this hypermarket is a major economic player in the Nice region. The 50,000 sq. m. extension, for which Artelia was the project manager, will accommodate 50 new shops. In addition to architectural harmonisation designed by Wilmotte & Associés, particular attention was given to the redevelopment of the green spaces, with the roof being greened, the overhead car parks being redesigned with trees, and a green space being created along the roadside, which will also be used to create vegetable gardens in partnership with schools.

## TRANSFORMATION OF THE BRANCH NETWORKS OF BANQUE DE FRANCE AND CRÉDIT COOPÉRATIF (FRANCE)

Our specialists in multi-site operations led a transformation plan for some fifty Crédit Coopératif branches in order to adapt them to the Bank's new businesses and improve their visibility. They also acted as delegated project managers (including payment) for the deployment of a new branch concept for Banque de France in 50 of its locations.

## INAUGURATION OF THE 500TH BASIC FIT ROOM (FRANCE)

Artelia has been supporting the development of this Dutch gym chain in France and Spain since 2016. As general contractor, our Group was responsible for the creation of 21 gyms in 2021, including the one in Nanterre, the 500th in France, which was opened by the multi-medal-winning judoka Teddy Riner.

## REDESIGN OF SEAT CUPRA DEALERSHIPS (SPAIN)

Car manufacturer Seat commissioned Artelia to revise the architectural design of its international "Cupra Garage in the city" dealerships with a strong sustainable approach. Cupra has teamed up with the Seaqual initiative (a collaborative community working to counter plastic pollution) to manufacture series seats for its first all-electric model.

## 2,600 TOTALENERGIES SERVICE STATIONS (FRANCE)

Artelia is piloting the deployment of the new TotalEnergies brand design throughout France. This operation is due to be completed in june 2022. At the same time, our teams continue to work for the energy company on the development of its network of electric vehicle charging points.

## DELIVERY OF TOURS DUO IN PARIS (FRANCE)

Artelia has fully fulfilled its assignments in BIM management, global technical design studies, study coordination, general project management and assistance with contracting for the environment and certifications in the construction of this two-tower complex (106,000 sq.m.) located on the banks of the Seine, close to the Austerlitz train station and the Périphérique ring road.

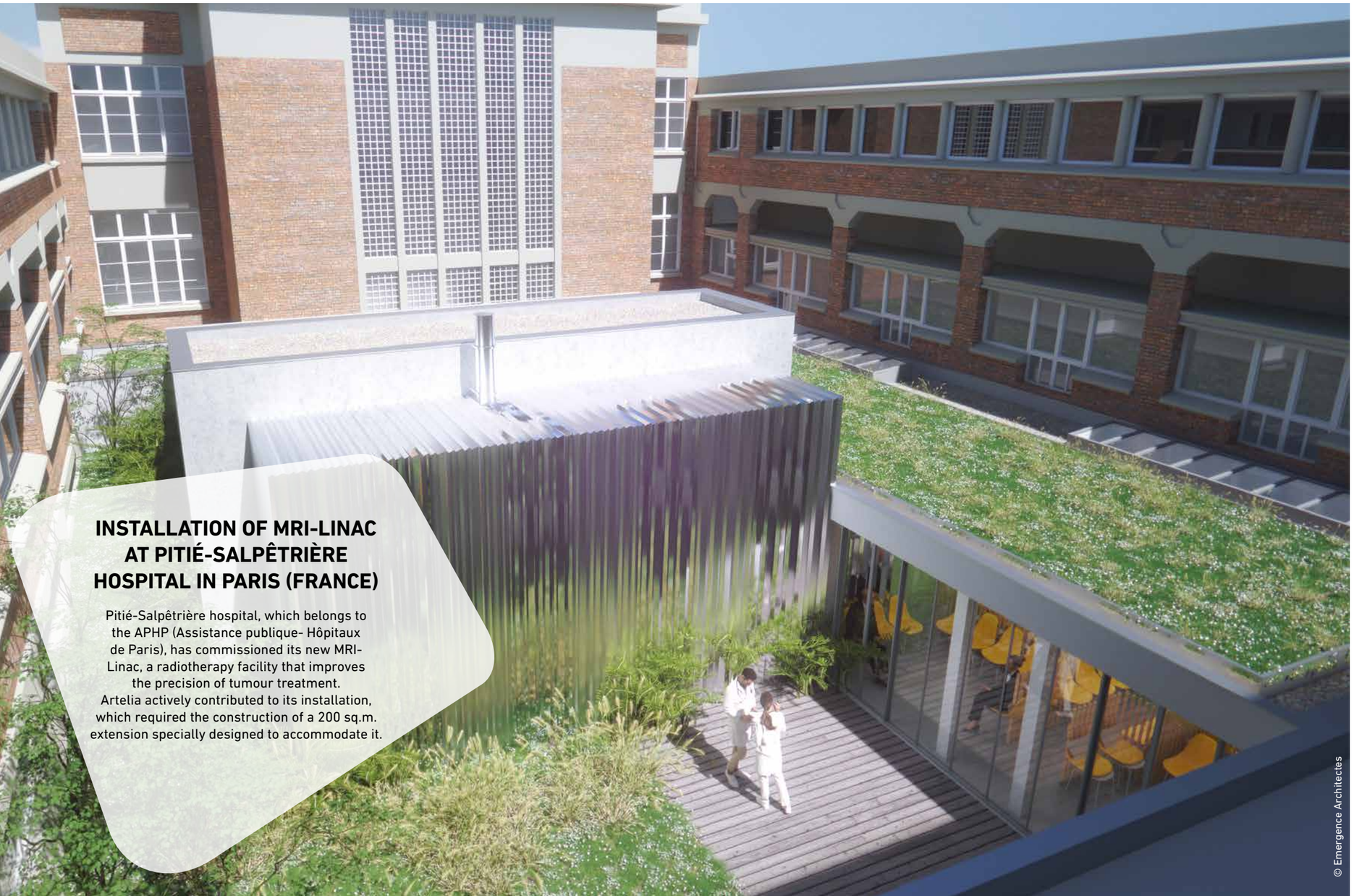
While DUO1 is mainly designed for office activities, DUO2 hosts a hotel, a restaurant and a skybar on the upper part. Both towers meet the highest standards in terms of comfort, health and well-being of users (WELL Platinum) and are expected to achieve exceptional environmental and energy performance under LEED Platinum, HQE Exceptional and Effinergie+.

Now the third largest building in the capital after the Eiffel and Montparnasse Towers, this achievement is an architectural and technical pioneer.

© Thomas Padilla

# REINVENTING HEALTH CARE FACILITIES

The architectural, functional and technical improvement of healthcare facilities is one of Artelia's major areas of expertise, which it implements in many countries.



© Emergence Architectes

## INSTALLATION OF MRI-LINAC AT PITIÉ-SALPÊTRIÈRE HOSPITAL IN PARIS (FRANCE)

Pitié-Salpêtrière hospital, which belongs to the APHP (Assistance publique- Hôpitaux de Paris), has commissioned its new MRI-Linac, a radiotherapy facility that improves the precision of tumour treatment. Artelia actively contributed to its installation, which required the construction of a 200 sq.m. extension specially designed to accommodate it.

## REDEVELOPMENT OF EPSOM AND SAINT-HELIER UNIVERSITY HOSPITALS NHS TRUST (UNITED KINGDOM)

With nearly 900,000 patients a year, this Surrey hospitals trust is reorganising its services and has entrusted Artelia with estate rationalisation operations. Our teams are managing a project to relocate the New Epsom and Ewell Community Hospital (NEECH) and The Poplars Centre (neurorehabilitation) within Epsom General Hospital. This involves the complete refurbishment of the Langley Wing and construction of a three-storey extension to provide care, reception and accommodation facilities. A bridge has been constructed to transit patients to and from adjacent acute hospital facilities.

## A NEW FACILITY FOR INFECTIOUS DISEASES AT THE HOSPICES CIVILS DE LYON (FRANCE)

Artelia participated in the creation of a building to house the infectious diseases department of the Croix-Rousse Hospital, a facility of the Hospices civils de Lyon. The complex comprises 45 rooms, including two with high isolation and 12 depressurised rooms with airlocks. It also houses a screening centre.

## DELIVERY OF THE EXTENSION TO THE ROYAL COLLEGE OF SURGEONS (UNITED KINGDOM)

Artelia managed the cost of the redevelopment of this prestigious surgical teaching and research centre in London. Behind the carefully preserved historic façade, a new seven-storey building (BREEAM Excellent) houses classrooms and meeting rooms, a library and museum, community and social spaces, in a modern, high quality environment.

### FROM OFFICE TO HOTEL, CREATION OF THE MAMA SHELTER IN ROME (ITALY)

From feasibility studies to completion, Artelia managed the transformation of an office complex in the centre of Rome into a 4-star Mama Shelter lifestyle hotel. The two original buildings (15,000 sq.m.), which were completely restructured and connected by the basement, now house 217 rooms, a restaurant, a terrace bar, a fitness and spa area, a car park, two meeting rooms and an outdoor garden.

# MODERNISING HOTEL AND LEISURE COMPLEXES

From luxury to lifestyle, from hotel networks to leisure complexes, from new construction to renovation, Artelia offers an expert, innovative and sustainable approach to the hotel industry.

### RENOVATION OF THE FIRE SAFETY SYSTEM IN THE DISNEYLAND PARIS HOTELS (FRANCE)

Artelia is managing and coordinating the modernisation of fire safety systems at the Santa Fe and Cheyenne hotels (1,000 rooms each). Our teams will also be working on the complete replacement of the fire systems at the Ranchloop building, located in Disney's Davy Crocket Ranch area.

### CONSTRUCTION OF THE SUNBAY PARK HOTEL & RESORT PHAN RANG (VIETNAM)

Located on the edge of Phan Rang Bay in southern Vietnam, this very large hotel complex (3,300 rooms and flats) is one of the first «aparthotels» in the country. Rated 5*, it offers a very high level of services, both architecturally and functionally (World Architecture Awards 2019) and in terms of services (9 swimming pools, 3 sports halls, 3 spas, 9 restaurants, etc.). Artelia was responsible for the project management and cost management of this vast operation, which included the construction of three buildings of 40, 48 and 55 floors representing more than 300,000 sq.m. of floor space.

© Sunbay Park

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### LONDON'S KIA OVAL TRANSFORMED (UNITED KINGDOM)

Since 2015, Artelia has been involved in the redevelopment of this world-famous ground, expanding capacity and transforming facilities. In 2021, our teams supervised the creation of a three-level grandstand, adding an extra 2,500 spectator seats, and building a standalone conferencing and hospitality suite to house reception, shop, ticket office, bars and restaurants. The project further establishes the Kia Oval as one of the primary international cricket grounds and generates greater revenue for the club, with elite facilities like the 900 $m^2$ Lock Terrace. With its own bar and restaurant area, it offers a breathtaking view of the ground and the city.

# PROMOTING CULTURE, HERITAGE AND SPORT

Artelia assists universities, museums, theatres and sports facilities in modernising their facilities in order to preserve their heritage and offer users ever more attractive and rewarding environments.

### REFURBISHEMENT OF THE FORMER HEADQUARTERS OF THE DAILY NEWSPAPER L'HUMANITÉ (FRANCE)

Artelia is carrying out a technical assistance mission for the OPPIC (Operator of the heritage and real estate projects of the culture) in view of the refurbishement of the former headquarters of L'Humanité. Designed by the architect Oscar Niemeyer and located opposite the Basilica of Saint-Denis, this building is registered as a Historic Monument. It will be refurbished according to current standards, combining energy and environmental performance, while respecting the heritage value of the building. Artelia's teams are assisting OPPIC throughout this prestigious operation, which aims to restore the building's tertiary function after years of vacancy.

### NEW TEACHING CENTRE AT BIRKBECK UNIVERSITY OF LONDON (UK)

Artelia worked closely with the client and design team to manage the costs of the extension and refurbishment of Cambridge House. The 1920s building now houses six floors of modern, high quality teaching and learning spaces, including a 180-seat lecture theatre. Sustainability efforts (green roof, rainwater collection system, photovoltaic panels) have earned it a BREEAM Excellent rating.

### RESTORATION OF HÔTEL DE LA MARINE IN PARIS (FRANCE)

Artelia carried out a twofold mission, working with both the lessor and the lessee, on this prestigious building in Place de la Concorde. The Group's teams were involved in the complete renovation of the historic building and also provided support to the Al Thani Collection in the development of their new exhibition galleries and ancillary premises. This foundation is dedicated to promoting art and culture by supporting museum projects.

**PLEASE REFER TO OUR ANNUAL PUBLICATIONS :**

- Extra-financial performance report
- Artelia essentials
- Financial statements