

OFIS

Sanitary Engineering



L'ESSENTIEL

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A network of consulting engineers
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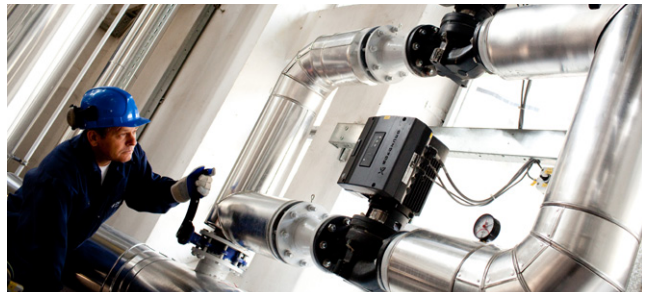
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Energy

Optimizing performance
(optimizing secondary heating
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" Our expertise at your disposal. "



Sabine Fauquez-Avon
Managing Director
OFIS

OFIS can provide building managers with solutions for two major concerns: firstly, the health and well-being of occupants, and secondly, the compliance and long-term integrity of real estate assets.

Health priorities for indoor areas are currently an issue on the rise, considering both the increasing numbers of Legionella cases and disorders relating to air quality such as allergies, asthma and yet more critical pathologies. Securing indoor facilities is still therefore a clear priority for decision-makers, not only when operating buildings, but also during the design phase.

Managing health risks, from assessing the situation to finding solutions, has become a particularly complex issue, and OFIS has developed unique expertise, establishing its position as the leader in France. OFIS is used to solving air or water quality crisis situations and can support its clients by running a preventive management plan and ensuring compliance with regulations in the form of diagnoses and effective solutions to match the building type and use, in any sector: buildings open to the public, health, education, tertiary buildings, industrial sites or housing.

This document includes examples of the wide range of situations where clients used our services. Some applications were primarily safety-based, whereas other sites required extra performance. By making sure we listened to our clients, we provided the right support for their strategies.

Check out this revised version of L'Essentiel OFIS and don't forget our website and social networks.

Happy reading!

OFIS professionals are qualified to carry out the assignments entrusted to them: be they simple, complex, traditional or exceptional tasks.

OFIS experts train themselves, perfect their techniques and share experiences on a daily basis in order to ensure clients receive the best possible service.

Thanks to the constant assimilation of new skills and technologies, OFIS teams are leaders in environmental and sanitary performance expertise.

Borderless expertise



60

employees

over 10,000

sites
audited

5.8

million euros in
revenues in 2018

over
1,400

active
clients

Our sites in France

- Head Office: +331 85 57 74 17
30, rue Madeleine Vionnet - 93300 Aubervilliers, France
- WATER Business Unit Paris & West: +331 85 57 74 17
Aubervilliers, Nantes, Bordeaux
- WATER Business Unit East region: +334 37 91 69 69
Wiversheim, Villeurbanne, Aix-en-Provence
- AIR Business Unit: +331 85 57 41 07
Aubervilliers



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Our certified skills

Expertises

RESEARCH

Audits and diagnoses; 6THEMIC© expertise; Sanitary technical inspections; Multi-fluid mapping; Sanitary log.

MEASUREMENTS

Sampling strategy; Samples (water, air, emissions, etc.); Continuous monitoring (water, air, energy, etc.).

TECHNICAL ASSISTANCE

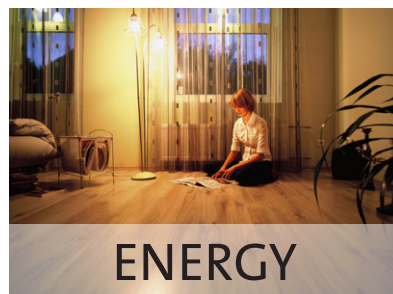
Project management assistance; Network balancing; Crisis management.

TRAINING

Inter or intra-company continuous development training.



Areas



Certifications

OFIS has been recognized as an expert by the CSTB (Centre Scientifique et Technique du Bâtiment - the French Scientific and Technical Center for Buildings) for the specific services and testing required for diagnosing water networks in buildings. OFIS is recognized as having "**Sanitary water network expertise**".

OFIS is OPQIBI-certified (Organisme Professionnel de Qualification de l'Ingénierie: Infrastructure Bâtiment Industrie - Industrial Building Infrastructure as per the Professional body for Engineering qualifications) for **indoor air quality diagnosis**.

OFIS Ouest holds COFRAC no. 1-6188 accreditation (details of scope available on the website of the French accreditation committee www.cofrac.fr) for **monitoring indoor air quality in buildings open to the public** (LAB REF 30), to meet the requirements of standard NF EN ISO/IEC 17025: 2005. This accreditation covers benzene, formaldehyde, carbon dioxide and the sampling strategy.

SANITARY WATER
NETWORK EXPERTISE



QB_24_REEX_001 to 006
<http://evaluation.cstb.fr>



Accreditation no. 1-6188
Scope available on www.cofrac.fr

■ Recognized know-how

Presentations during many professional events and research days:



HQE™ Performance

Annual meeting

Round table on "Indoor air quality: what action should be taken for buildings in use?"

Atmos'fair

Events, conferences, exhibitions and analyses on air treatment

Feedback on air quality in office blocks: air quality audits and continuous monitoring.

Pollutec exhibition

Lyon City Council - Press conference

Presentation of the Togeth'air project as part of the [R] Challenge.

Paris Healthcare Week

Trade fair on health facility management and transformation

Introduction to the particularities of sanitary engineering

Les rendez-vous de l'ECS

Trade fair on water in the hospital segment

Presentation on the maintenance of sanitary hot water networks

Hopitech Exhibition

Research and training days

Presentation on Pseudomonas risk prevention in health facility water networks

IHF research and training days

Trade fair organized by Ingénieurs Hospitaliers de France (IHF - French Hospital engineering group)

Publication and presentation on the prevention of Pseudomonas risks

■ OFIS morning sessions

OFIS organizes its technical morning sessions each year, providing an opportunity for construction professionals, research bodies, health authorities and recognized experts to discuss a range of topics with each other. These events provide an opportunity for all participants to improve their understanding of sanitary engineering in order to plan ahead for issues and raise awareness regarding these matters of public concern.

Paris in 2016

Indoor air quality in buildings

- Construction materials and furniture: assess and plan for the effects of these materials on indoor air quality
- Indoor air quality in HQE buildings: key points from design to operations
- Good air treatment and ventilation practices

Bordeaux in 2017

Water and air networks in buildings: risks and solutions

- Bacterial pathologies carried by water networks
- Risk management in buildings in use and new buildings
- Indoor air quality: key points from design to operations

Aix-en-Provence in 2018

Maintaining air and water quality in collective housing

- Pathologies in buildings and the increase in the number of Legionella cases in 2018
- Good asset management practices and difficulties
- Interactions between building structures and air quality





WATER

As with any infrastructure, indoor water networks must be maintained, optimized, and renewed to maintain usage and water quality at all supply units.

Thanks to its experience, extensive references, certifications and qualifications, OFIS is currently the leading expert in optimizing water system management in buildings.

Assignments & clients

Legionella risk control

- Water network audit and monitoring - *Partage et Vie Foundation* page 10
- Legionella risk prevention - *Accor Group* page 11
- Defining a Legionella risk prevention plan
Tour du Midi (Belgium) page 12
- Continuous monitoring of water networks
Adèle de Glaubitz association page 13
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- Legionella risk prevention
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Compliance and performance

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Managing system assets

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Drafting reference manuals

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Improving skills

- Monitoring of water quality
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Water network audit and monitoring

Nursing homes

Partage et Vie Foundation



Our client's challenge - The Partage et Vie Foundation, a major operator in the nursing home and sanitary sectors, has been applying a bacteriological contamination risk control policy to water networks for many years. As part of this policy, the Foundation wishes for support in preventing Legionella risks.

>> Safeguarding water networks at nursing homes and sanitary sites



10
OFIS, Veolia

CLIENT BENEFITS

- Maintaining water quality -
- Complying with regulations -
- Establishing an order of priority for actions -
- Benefiting from expert support -

OFIS' SOLUTION - OFIS can provide its expertise in Legionella risk control for all of the sites run by the Partage et Vie Foundation in France, guaranteeing improved water quality in sanitary networks. Examples of the solutions provided:

- Annual technical audits for sanitary water networks;
- Assessment of maintenance operations and operating/monitoring conditions;
- Proposal of a tailor-made sampling strategy to ensure that the Legionella analysis results per site are correctly interpreted;
- Continuous monitoring of sanitary hot water temperature, which can be used to detect any preliminary signs of reduced water quality;
- Definition of a prioritized action plan after completing diagnoses including preventive, corrective and curative measures.

over 100

sites supported

4

years covered by assistance contracts

over 14

years covered by OFIS partnerships

Legionella risk prevention

Accor Group

Hotels

Our client's challenge - As a leader in the hotel sector in France and around the world, Accor has enhanced water quality monitoring in its facilities for many years. As part of its health risk management policy, Accor runs a preventive management plan for facilities with a legionella risk, including cooling towers as well as sanitary hot water networks. In parallel, the Accor Académie has undertaken a challenging health risk control training program for technicians.



>> Supporting a leading hotel group



OFIS' SOLUTION - Since 2006, OFIS and ACCOR have established a preferred partnership in order to meet the expectations of various hotels aiming to ensure that their clients are guaranteed a premium quality experience:

- Sanitary water system diagnoses and monitoring, with the development of compliance programs;
- Accor Worldwide's Technical Management team commissioned OFIS to establish its water quality maintenance standards (sanitary hot and cold water systems, cooling towers, swimming pools) for its facilities across the globe;
- The Accor Académie contracts OFIS to train and boost the skills of hotel technicians in sanitary hot water system treatment management, preventive legionella risk management for cooling towers and technical swimming pool maintenance methods.

CLIENT BENEFITS

- Constant water quality -
- Improved technical results for teams -
- Streamlined practices -

230

sites supported

over 1,900

hours of training

13

years covered by OFIS partnerships

Defining a Legionella risk prevention plan

Administrative buildings

Tour du Midi (Belgium)



Our client's challenge - Veolia has supported the Service Fédéral des Pensions Belges (Belgium pension service) with operating the Tour du Midi office block in Brussels for half a century. Veolia constantly aims to set the example in terms of managing health risks, and decided to launch a preventive sanitary and technical assessment program for water networks.

>> Launching a preventive risk assessment policy



12
OFIS, Veolia

CLIENT BENEFITS

- Proven performances for operating teams -
- Improved equipment awareness -
- A formal Legionella risk control policy
- Complying with regulations -

OFIS' SOLUTION - OFIS uses a tried and tested reference manual for assessing design, maintenance, operation and monitoring rules for sanitary water systems (hot water and cold water), and cooling systems (cooling towers). This manual was launched for the Tour du Midi, leading to:

- A technical diagnosis of the systems for sanitary compliance, including the identification of risk factors contributing to the proliferation and dispersal of Legionella in the environment;
- The definition of a prioritized action plan, based on local regulations, the requirements laid down in the Veolia Legionella reference manual and OFIS expertise;
- New sanitary logs for the various systems, helping the system manager to apply good servicing and monitoring practices, and comply with the national regulations in force.

4

sanitary
water networks

5

cooling
towers

over 300

criteria
audited

Continuous monitoring of water networks

Adèle de Glaubitz association

Specialist care homes

Our client's challenge - Legionella is a pathogenic bacteria and can develop in sanitary hot water systems if the temperature is between 25 and 45°C. On this basis, it is critical to monitor temperature in order to control health risks. The institute for the Blind in Still decided to opt for a real-time temperature monitoring system to ensure that any temperature variation is rapidly picked up, reducing the risk of Legionella growth.



>> Preventing Legionella risks in water networks



OFIS' SOLUTION - OFIS developed a new service to help managers responsible for Legionella risk control at the assigned facilities on a day-to-day basis: "Temp'Eau". This solution monitors water quality at all times and comprises:

- The installation and configuration of sensors throughout the water network;
- Using data with viewing options, a secure history and alert features;
- Issuing regular reports with action plans;
- Help with managing any non-compliant sanitary indicators.

CLIENT BENEFITS

- Easy system monitoring -
- Reliable traceability -
- Planned actions for non-compliance -
- Complying with regulations -

34

sensors installed

2

buildings monitored

2

bulletins issued every week

Cooling tower risk analysis

Industrial sites

ArcelorMittal (South Africa)



Our client's challenge - As part of its operating contract for ArcelorMittal in Vanderbijlpark, South Africa, Veolia is responsible for supplying treatment products and operating more than 40 water cooling circuits. Cooling towers must be designed, operated and maintained in compliance with trade standards; if this is not the case, they run a potential Legionella risk.

>> Controlling contamination risks within cooling towers



14
OFIS, Veolia

CLIENT BENEFITS

- Identifying at-risk zones -
- Ensuring reliable action by operating teams -
- Meeting contractual commitments -

OFIS' SOLUTION - OFIS' proposed solution aimed to ascertain the factors which promote the spread of bacteria, Legionella in particular, in water systems:

- A risk analysis was conducted on the site's most critical cooling circuits. The systems were audited, focusing on five main topics: design, maintenance, operation, water treatment and monitoring and traceability operations.
- A prioritized action plan was defined including recommended structural and operational changes.
- Site advisors were trained in Legionella risks and cooling system audits to ensure a sustainable approach.

over 80

criteria
audited

11

cooling
towers

over 10

monitoring parameters
checked

Legionella risk prevention

École de Gendarmerie de Chaumont

Accommodation blocks

Our client's challenge - Legionellosis is still affecting our lives. The number of reported cases has reached record levels in France since 2017. École de Gendarmerie de Chaumont (52) contacted OFIS for support with its prevention policy. The military police school aimed to make the necessary structural changes to control Legionella risks in indoor water networks.



>> Launching the necessary structural changes



OFIS' SOLUTION - Managing Legionella risk requires in-depth knowledge of the systems. On this basis, OFIS proposed the following:

- Mapping the sanitary hot and cold water networks for a building;
- Researching the feasibility of balancing sanitary hot water networks;
- How to optimize network operation;
- Balancing sanitary hot water networks with metrological testing.

CLIENT BENEFITS

- Legionella risk prevention -
- Optimized operation for sanitary hot water networks -
- Extra input for the technical document database -
- Support decisions -

66

rooms

20

temperature sensors installed

< 5

Sanitary hot water outgoing/incoming pipe ΔT (°C) after balancing

Water network commissioning

Health facilities

Hôpital Européen, Marseille



Marseille
(Provence-Alpes-
Côte d'Azur)

Our client's challenge - Maintaining water quality when opening a hospital is crucial to health risk management. Société des Eaux de Marseille (SEM - Marseille water company) requested support when opening the Hôpital Européen in Marseille. An expert was assigned to assist the sanitary water system operator with guaranteeing water quality during the building's various commissioning phases.

>> Supporting commissioning phases



CLIENT BENEFITS

- Constant water quality -
- Easy system handover -
- Planned actions for non-compliance -
- Benefiting from expert support -

OFIS' SOLUTION - OFIS provided support for site teams during each key stage when opening the new building, eliminating the risk of contamination during operations:

- A pre-acceptance technical assessment to ensure the sanitary compliance of the hot and cold water systems;
- Checking the balancing of the sanitary hot water recirculating loops;
- Preparing procedures to maintain water quality;
- Defining water sampling strategies;
- Opening the sanitary log for the hospital;
- Regular inspections. The sampling plan is updated based on results and corrective/curative actions are proposed where necessary;
- OFIS teams ensured that the operator and future facility managers were fully aware of health risks.

560

beds

22

operating
theaters

24

months of
monitoring by OFIS

Water network compliance

Delacommune & Dumont

New buildings

Our client's challenge - When a new building is delivered, water-connection commissioning is subject to compliance with regulatory requirements in terms of water quality and public health. Pipes could potentially be contaminated before or after installation, which means that it is essential to disinfect the pipes after the works, before delivery, and to check the quality of the water supplied. Delacommune et Dumont, an installer since 1812, expects high quality and rapid services from its partners in charge of compliance.



>> Supplying impeccable quality water



OFIS' SOLUTION - In accordance with regulatory procedures for the commissioning of a connection to the public drinking water network, OFIS teams take action at worksites every week to:

- Check the compliance of private networks;
- Analyze the quality of the water supplied;
- Following the analytical controls, assess the effectiveness of disinfection and propose further actions if necessary;
- Issue a report to the installer after the inspection, certifying design regulation compliance or specifying reservations if non-compliance is detected, as well as recommended improvements.

CLIENT BENEFITS

- Guarantee system compliance for the future owner -
- On-time delivery -
- Complying with regulations -

over 300

technical inspections
per year

over 750

analytical controls
per year

5

dedicated operators
in the Île-de-France region

Hazardous substances discharged into water (RSDE) diagnoses

Collective wastewater networks

Veolia Eau France



Our client's challenge - Wastewater disposal zones can release significant amounts of micro-pollutants into aquatic environments. Laws aiming to reduce the amounts of these substances discharged, lost and emitted have been reinforced, and the project manager must be familiar with and consider such emissions within their assigned area. Several local councils contacted Veolia Eau France in this context OFIS to meet regulations on monitoring hazardous substances discharged into water (RSDE).



>> Reducing the volume of hazardous substances discharged into water



18
OFIS, Veolia

CLIENT BENEFITS

- Complying with regulations -
- Protecting the host environments -
- Improved awareness of regional activities -
- Decision-making input -

OFIS'SOLUTION - OFIS can provide its clients with documented research results on pollutant emissions achieved using a methodical and disciplined approach, involving:

- Identifying and mapping potential sources of significant volumes of pollutants upstream from treatment plants;
- Proposing a sampling strategy to confirm any assumptions;
- Drafting a council-level action plan to reduce these emissions.

9

studies
carried out

15

wastewater treatment
plants studied

over 15

substances
covered by researches

Air and water system technical compliance with sanitary regulations

Médipôle de Koutio (New Caledonia)

Hospitals

Our client's challenge - The new hospital in Nouméa, the Médipôle de Koutio, is an unprecedented project in New Caledonia, and represents over half of the health services available in the region. Médipôle decided that it would be preferable for its technical and hygiene services to be supported throughout the trial operation phase for hydraulic and air systems, before its initial patients arrived, to prevent any risk of contamination at start-up.



>> Safeguarding air and water networks before the first patient arrives



OFIS' SOLUTION - OFIS supported the Médipôle in Koutio prior to the arrival of the first patient, initially at the site, and later remotely:

- Air and water network technical compliance with sanitary requirements was assessed in the form of a risk analysis;
- Measurements were taken (temperature, flowrate);
- Corrective and preventive actions were proposed;
- A strategy was defined for monitoring and analyzing water quality (bacteriological and physico-chemical properties) and air quality (particulate content and airborne bacterial contamination) on this basis, to ensure that the sanitary conditions of the systems are maintained;
- Preventive maintenance and monitoring procedures were prepared for each specific site operating mode;
- A safeguarding protocol was defined for air and water networks in the event of a dysfunction, and if works are carried out in qualified areas.

CLIENT BENEFITS

- Constant water and air quality -
- Easy system handover -
- Planned actions for non-compliance -
- Limited crisis management expenses -

10

months of
monitoring by OFIS

645

beds

over 100

air treatment
units

Public network efficiency

Drinking water supply networks

Bordj Bou Arreridj (Algeria)



Our client's challenge - In partnership with the national Algerian Water and Environmental Research department (NEE), Seureca was selected by the Algerian Water Company (ADE) to assist the Algerian town of Bordj Bou Arreridj with a drinking water supply and distribution network renovation project. The water tanks are filled every other night in this region which is not enough to meet human and environmental water needs. The network empties throughout the day according to consumption needs and as a result of leaks.

>> Optimizing drinking water network operations in water stress zones



20
OFIS, Veolia

CLIENT BENEFITS

- Establishing an order of priority for actions -
- Improved quality of service -
- Enhanced equipment awareness -

OFIS' SOLUTION - In order to gain a global vision of drinking water network operations within a water stress zone and to optimize operations, OFIS allocated field teams from a range of sectors to a measurement campaign at different parts of the network:

- Instantaneous measurements were taken by day and night, aiming to determine key water data (flowrate, pressure, reservoir levels);
- Continuous measurements were taken using various types of probes connected to loggers;
- Data for the two main town zones (north and south) were compared and drinking water supply network losses were assessed.

over
180,000
inhabitants

over
50
measurement points

over
47,000
data items collected and processed

Pool diagnosis

Grand Auch local council

Municipal swimming pool

Our client's challenge - Water park facilities (swimming pools, water-sport centers and leisure centers) have to deal with chloramine contamination. This can create health problems for both facility professionals and facility users. As part of the Auch swimming pool operational-contract renewal, Grand Auch local council requested an operational conditions and facilities maintenance assessment with the aim of including these issues in the new contract.



>> Optimizing pool operations and maintenance



OFIS' SOLUTION - OFIS provided the following services thanks to its expertise in water treatment, air treatment and sanitary conditions:

- A sanitary and technical water, air and swimming pool hygiene diagnosis in order to identify the potential elements which create and spread chloramines;
- Simultaneous water quality (free chlorine, total chlorine, combined chlorine, pH, temperature) and air quality measurement campaigns (air supply and renewal rate, temperature, hygrometry, trichloramines);
- Schematic swimming pool water and air treatment system flow charts;
- A summary comprising a risk level assessment and proposed future preventive and curative solutions.

CLIENT BENEFITS

- A global vision -
- Protecting users' health and well-being -
- Constant water and air quality -
- Optimized operating expenses -

over 130

criteria
audited

over 110

measurements
taken

500:

maximum simultaneous
users

Water savings diagnosis

Health facility

Trento hospital (Italy)



Our client's challenge - Siram, a Veolia energy subsidiary, is the Italian leading supplier of energy services in the health sector and provides comprehensive fluid and energy management services for over 200 hospitals and healthcare facilities. When renewing the operating contract for the Santa Chiara Hospital (Trento), Siram decided to offer its client a performance contract based on potential water savings, which had to be assessed.

>> Targeting means of boosting performance and saving water



22
OFIS, Veolia

CLIENT BENEFITS

- Optimized water use -
- Establishing an order of priority for action plans -
 - Optimized investment -
 - A customized operating contract -

OFIS' SOLUTION - Drawing on the experience gained in many sites, OFIS can study building resource use for sites such as health facilities and propose optimization solutions which are compatible with controlled health risks:

- A structural system study and a hydraulic system performance assessment (flowrate and pressure measurements, overnight recordings and basic leak detection);
- Site use data analysis;
- A sanitary hot water network balancing study was also carried out in order to assess potential water savings as a result of improved flow distribution;
- OFIS defined an action plan with several water saving options, prioritized according to investment type and return time (Capex/Opex analysis).

6
buildings
audited

over 50
flowrate and pressure
measurements

**over
35,000 m³:**
potential water savings

Water savings diagnosis

Association des Bailleurs du Mantois

Social housing districts

Our client's challenge - Controlling water consumption in rental buildings is a key priority for social landlords aiming to help their tenants reduce their consumption. The Association des Bailleurs du Mantois has launched a program to improve water management in its rental buildings located in Mantes-la-Jolie as part of an initiative for investing in the future run by the Agence nationale pour la rénovation urbaine (Anru - national agency for urban renovations).



>> Improving water management in rental buildings



OFIS' SOLUTION - OFIS is recognized for its expertise in water savings in the private sector and holds a solid database. As such, the firm was selected to analyze the rental set-up of seven landlords and provide for solutions to optimize the situation:

- Summary of water consumption readings for over 5,000 dwellings;
- The results were matched with the operating analysis and system management techniques, as well as with the communications initiatives launched targeting tenants;
- Potential water savings were estimated;
- Suitable action plans were defined for each housing company and each context.

CLIENT BENEFITS

- Optimized water use -
 - Effective use of available data -
 - Users are involved -
- Developing a common approach -

7
social
housing companies

**over
5,000**
dwellings

over 24
months of data
analyzed

Loss of thickness diagnosis

Drinking water supply networks

Veolia Eau France



Our client's challenge - The water equipment used by local councils varies and is frequently aging. Veolia Eau collects and distributes water in Toulon and decided to assess the condition of its equipment, some of which was installed in the early 1930s, with a view to planning suitable renovation and protection policies depending on how critical a loss of thickness would be for pipes.



>> Planning to replace pipes



24
OFIS, Veolia

CLIENT BENEFITS

- Study options during water service -
- Optimized operating expenses -
- Factual data -

OFIS' SOLUTION - OFIS carried out non-destructive testing on the city's drinking water supply pipes:

- A comprehensive diagnosis of losses of thickness for several steel pipe sections with diameters 600 and 800;
- The external pipe surfaces were measured in view of ensuring long-term network usage;
- Summary including detailed profiles and images of the different measuring points.

1930

year of installation

600-800

pipe DN

0

water outages

Lead-in-water diagnosis

Efdis

Housing

Our client's challenge - As a registered social housing company, Efdis is aware of the health risks associated with the presence of lead in drinking water and is concerned about regulatory compliance. Therefore, they have decided to adopt a challenging, preventive approach for 50 of their residences in the Paris region. OFIS supported Veolia Eau while providing services for the housing company.



>> Eliminating residents' lead exposure



OFIS' SOLUTION - OFIS conducted a well-structured and pragmatic approach to assessing current equipment installed in buildings and the risk of user exposure to lead in water:

- Onsite identification of all lead sections in sanitary hot and cold water networks;
- Technical overview of all data obtained;
- Tailor-made renovation program with an estimated budget for the works required.

CLIENT BENEFITS

- Compliance with regulations -
- Protecting occupants' health -
- Establishing an order of priority for investments -
- Adding value to real estate assets -

50

sites
audited

2

months
of work

**over
10,000**

tenants affected

Corrosion prevention guidelines

Industrial sites

British Petroleum (Sultanate of Oman)



Our client's challenge - Veolia operates British Petroleum's (BP) raw water treatment plant in the Khazzan gas field in south-west Muscat, in the Sultanate of Oman. Due to local water quality issues, the operator considers that systems face a life-long risk of corrosion.

>> Preventing industrial corrosion



26
OFIS, Veolia

CLIENT BENEFITS

- Structured risk prevention -
- Optimized operating expenses -
- Standardized, reliable techniques -
- Improved equipment awareness -

OFIS' SOLUTION - OFIS produced a corrosion prevention guide which provides guidelines and serves as a tool to safely prevent corrosion during the plant's operational phase, including:

- Assessing the existing water network set-up;
- Defining risk analysis criteria and assessing the associated risk levels;
- Identifying corrosion-related factors and threats;
- Defining preventive actions to avoid any critical situations;
- Determining performance indicators and set targets;
- Defining any remedial action required if thresholds are exceeded.

over 1,500

facilities
assessed

over 20

suggested
targets

6,000 m³/d

maximum volume
of water treated

Water quality monitoring

Société d'exploitation des eaux du Niger (SEEN - Niger water operator)

Drinking water supply networks

Our client's challenge - In recent years, Société d'Exploitation des Eaux du Niger (SEEN - Niger water operator), which operates and maintains water engineering structures in Niger, has launched a monitoring program for drinking water quality throughout the country. The operator decided to boost the expertise of their teams in this context, to optimize water quality monitoring.



>> Improving the reliability of water quality analytical controls



OFIS' SOLUTION - Registered as a training provider for around 20 years, OFIS contributed to optimizing water quality monitoring at the request of Seureca, by passing on skills:

- Customized training sessions were developed to match the local context;
- SEEN employees were trained in Niamey (production, network and laboratory staff) focusing on the basic concepts of water quality and drinking water network sampling methods;
- Hands-on workshops were organized at sites to allow staff to handle equipment in operating conditions;
- The new knowledge acquired was assessed.

CLIENT BENEFITS

- Ensuring reliable analysis results -
- Improved technical results for teams -
- Standardized techniques at national level -
- All parties are involved (sampling and laboratory staff) -

20

employees
trained

over 100

analyses
in the field

21

hours of
training



ENERGY

Given its environmental and sanitary performance expertise, OFIS offers a comprehensive range of consumption and usage optimization solutions for buildings.

OFIS is the preferred choice for building managers: we provide development plan support by identifying cost efficiencies and maintaining residents' health and well-being.

Assignments & clients

Optimizing performance

- Optimizing the secondary heating network
Clos Fleuri residential building page 30
- Optimizing the secondary heating network
Termoelectrica (Moldavia) page 31
- Optimizing the chilled water network
Hélique building page 32
- Building environmental and sanitary profiles
Pinel Psychotherapy Center page 33

Optimizing the secondary heating network

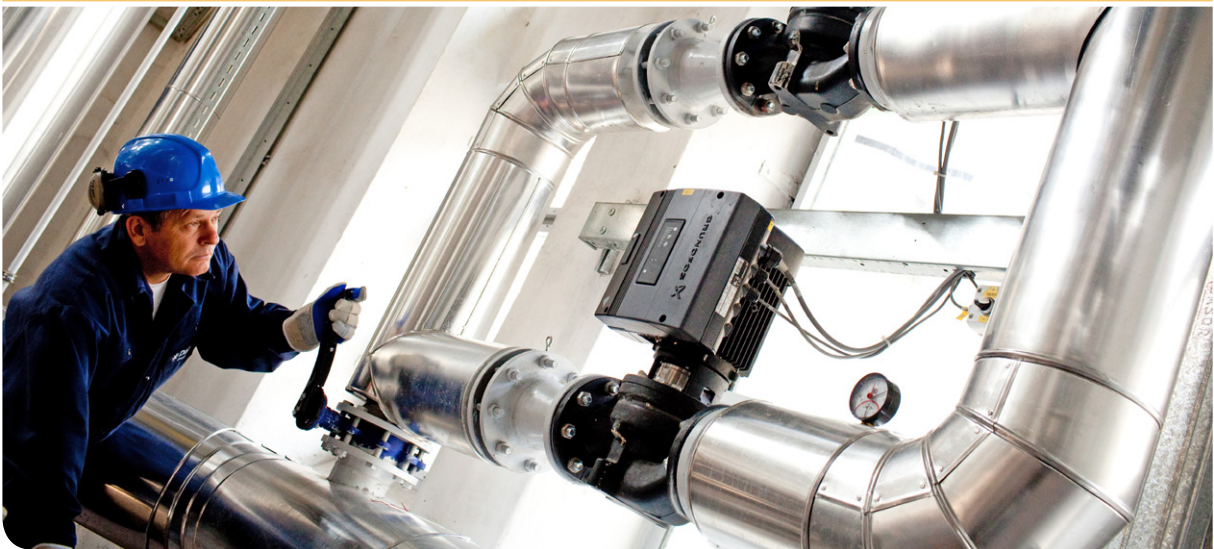
Collective housing

Clos Fleuri residential building



Our client's challenge - When it comes to collective housing, a potential source of energy savings involves optimizing heating network performance. Following a full heating network overhaul in the Clos Fleuri residential building in Montesson, Promaiga SN aimed to provide its client with a detailed heating network balancing assessment which also took user comfort into account.

>> Collective heating energy savings



CLIENT BENEFITS

- Optimized energy use -
- Improved occupant well-being -
- Formal set-up procedure -

OFIS' SOLUTION - OFIS defined a pragmatic approach to combining occupant well-being with energy savings:

- Onsite heating system readings, while identifying standard building and accommodation characteristics (insulation, ventilation, etc.);
- A hydraulic heating network simulation, including heat loss and flow calculations to be applied to the network;
- Network distribution diagrams with adjustment devices indicated;
- Onsite adjusting of balancing components, located at the base of the column;
- A complete report when the work is finished.

136

dwellings

17

columns

over 190

balancing components

Optimizing the secondary heating network

Termoelectrica (Moldavia)

Collective housing

Our client's challenge - Setting up a city heating network is a key strategic program for regions and making sure the needs of the various buildings connected to the network are fully understood is essential. Seureca assisted Termoelectrica, the urban heating firm from Chisinau in Moldavia, as part of a World Bank contract. This contract included optimizing the energy used by collective housing heating networks.



>> Targeting energy savings and occupant well-being



OFIS' SOLUTION - Energy use was optimized by balancing the heating networks inside some buildings:

- Identification of all balancing components and networks, and the characteristics of the building structure;
- Calculated heat loss;
- Network flowrates measured;
- Set preliminary adjustments for balancing components;
- Development and adjustment of the balancing components fitted at the base of the network column;
- Measuring equipment skills passed on.

CLIENT BENEFITS

- Optimized building energy needs -
- Improved expertise for technical teams -
- Customized heating network design -

6

buildings audited

over 120

valves adjusted

8

% energy savings

Optimizing the chilled water network

Office block

Héliaque building



Our client's challenge - As part of its operating contract, Dalkia is in charge of temperature control for the Héliaque office building in Paris. Despite satisfactory control in general, unpleasant noise was reported on some floors. The operator aimed to rapidly fix malfunctions, limit excessive energy consumption, and ensure maximum user comfort.

>> Stabilizing chilled water network temperatures



32
OFIS, Veolia

CLIENT BENEFITS

- Correction of malfunctions reported -
- Optimized energy use -
- Improved occupant well-being -

OFIS' SOLUTION - In this complex case of imbalanced chilled water networks, the field method (floor-by-floor adjustments) was inadequate if a homogeneous distribution of chilled water was to be achieved. OFIS' overall study included:

- An audit of the site's chilled water facilities to determine the cause of the temperature discrepancies and noise pollution ;
- A simulation of the entire hydraulic network to set flowrates for every valve on every floor, considering all system specifications;
- Balancing the chilled water network to reduce noise pollution and thermal imbalance by optimizing the pressure and flowrate distribution.

320

m³/h:
theoretical network flowrate

1,330

fan-coil
units

2,760

kW
in cooling

Building environmental and sanitary profiles

Lavaur hospital - Pinel Psychotherapy Center

Health facility

Our client's challenge - The Pinel Psychotherapy Center at Lavaur Hospital must adhere to Haute Autorité Sanitaire (French National Authority for Health - HAS) certification. The 2010 version includes quality and environmental safety objectives. An environmental and sanitary building overview enables the facility, which has already launched a global environmental impact reduction project, to meet the environmental criteria as outlined in the HAS guidelines.



>> Meeting HAS environmental requirements



OFIS' SOLUTION - OFIS developed 6THEMIC© - an assessment tool for environmental and sanitary performance inside buildings. This tool includes:

- A multi-parameter approach to key factors in buildings such as water, energy, air quality, comfort, health and waste;
- An assessment of each item according to different criteria: consumption levels, design, maintenance, follow-up, awareness campaigns and communications, etc.
- An invaluable decision-making support tool to provide managers with a global and transversal vision of the major environmental and health issues which interact in buildings;
- Relevant monitoring indicators with an effective visual display;
- A consistent improvement plan.

CLIENT BENEFITS

- A global view -
- Aligned priorities -
- Compliance with regulations -
 - Informed decision-making -
 - Optimized investment -

6

criteria analyzed

15

buildings audited

over 150

measurements used

A modern office lobby with a large digital display wall showing 'Resourcing the world' and a reception desk. The display wall is composed of several panels, with the central panel displaying the text 'Resourcing the world' in white on a purple background. The surrounding panels show colorful cityscapes. Below the display wall is a reception desk with two staff members. In the foreground, a group of men in suits are standing and talking. The ceiling is a grid of recessed lights, and the walls are a mix of wood and glass.

AIR

Air pollution (indoor and outdoor) is a major public health issue.

OFIS expertise in evaluating and optimizing indoor air quality aims to reduce occupant exposure to air pollutants, protect their health and ensure that buildings are comfortable, all as part of client support.

Air quality is also a key factor outdoors, and OFIS can offer its diagnosis and remedial solutions for private and public operators. OFIS can propose the right solutions for complex issues such as ambient air in general, and in specific industrial facilities.

Assignments & clients

Indoor air quality control

- Indoor air quality audits
Société Générale page 36
- HEQ™ Operations Certification
Sodexo Énergie et Maintenance page 37
- Mandatory monitoring of indoor air quality
Nice Côte d'Azur Council page 38
- Continuous monitoring of indoor air quality
Bordeaux City Council page 39

Compliance and performance

- Ventilation system efficiency
Veolia Eau France page 40
- Chloramine and trihalomethane exposure measurements in air
Pays d'Aix page 41
- Health risk control in air and water systems
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- Acceptance and optimization of air and water systems
Veolia head office - Le V page 43

Managing external pollution

- Odor emission source audit
Veolia Eau page 44
- Population exposure to air pollution
Veolia Foundation & Médecins du Monde (Philippines) page 45

Drafting reference manuals

- Legionella risks & Indoor air quality
Veolia Technical & Performance Division page 46
- Air quality and climate change
Climate-KIC page 47

Indoor air quality audits

Tertiary buildings

Société Générale



Our client's challenge - Société Générale has monitored indoor air quality in its office blocks for many years now. The company decided to contact an independent body in order to assess the efficiency of the ventilation systems installed in its buildings.

>> Preventing any reduction in indoor air quality



36
OFIS, Veolia

CLIENT BENEFITS

- Constant well-being and air quality -
 - A comprehensive overview of ventilation systems -
- Guaranteed operating performance -
 - Changes tracked over time -

OFIS' SOLUTION - OFIS organizes preventive indoor air quality audits every year to support Société Générale:

- Onsite enquiry and a set sampling strategy;
- Measurement campaigns covering physical (temperature, relative humidity, particles, etc.), chemical (formaldehyde, benzene, etc.) and microbiological (bacterial flora, fungal flora, etc.) data;
- Detailed reports including analytical results with graphs and comments, conclusions and recommended action plans.

17

sites
monitored

over 200

points
analyzed/year

8

years of
monitoring by OFIS

HEQ™ Operations Certification

Sodexo Énergie et Maintenance

Tertiary buildings

Our client's challenge - With the aim of achieving environmental excellence in its building operations, Sodexo Énergie et Maintenance is committed to proactively monitoring the indoor air quality of the Le Verdi office building in Suresnes. The client's objective is to comply with the various NF (collective certification brand) HEQ™ Tertiary Building targets in the Sustainable Use section.



>> Complying with the HEQ™ operational guidelines



OFIS' SOLUTION - OFIS supports its clients as part of an HEQ™ policy on sanitary quality targets for air (target 13) and odors (target 11):

- Air quality measurement campaign to monitor indoor air chemical and microbiological parameter conformity (bacterial flora, benzene, nitrogen dioxide) and to ensure that there were no dysfunctions in the ventilation system;
- Digital simulation of internal air flow in several typical rooms in the building, in order to check that the ventilation system can flush indoor air in workspaces in an optimal manner. This study aims to focus on airflow distribution as per the provided ventilation data.

CLIENT BENEFITS

- Protecting occupant well-being -
- Continuous improvement policy (The Le Verdi building was certified in 2009 and has now obtained the 'Excellent' standard under the HEQ™ guidelines.)
- Optimized operating expenses -

10

spaces
checked

2

HEQ™
targets

over 500

m²
audited

Mandatory monitoring of indoor air quality

Buildings open to the public

Nice Côte d'Azur Council



Our client's challenge - Recent changes to air quality monitoring regulations in buildings open to the public have required local councils to assess aeration methods and monitor indoor air pollutants. As part of this policy, Nice-Côte d'Azur Council entrusted Veolia's Pôle Innovation 2EI and OFIS with testing innovative indoor air quality monitoring services for buildings.

>> Testing sensors for improved ventilation



CLIENT BENEFITS

- Complying with regulations -
- Referencing innovative solutions -
- Planning for changes to regulations -
- Adding input to action plans -

OFIS' SOLUTION - OFIS is supporting the French city of Nice with many innovative air quality projects thanks to its extensive experience:

- Indoor air quality audits in nurseries, schools and office buildings, as per the provisions of the decree of 30 December 2015;
- Potential improvement areas suggested;
- A continuous monitoring strategy has been defined for the target premises;
- Implementation of a continuous air quality monitoring plan over a twelve-month period in order to assess the effectiveness of the ventilation system settings and recommended good practices;
- The local council was assisted in the process of finding improvement areas for indoor air quality at its sites.

6

buildings audited

17

continuous measurement probes

12

months of monitoring by OFIS

Continuous monitoring of indoor air quality

Bordeaux City Council

Council offices

Our client's challenge - Indoor air quality monitoring is essential to identifying potential air treatment unit dysfunctions and is key to preventive maintenance. MTO Eurogem assists Bordeaux City Council with its multi-technical building maintenance contract. OFIS was chosen to monitor air quality in Bordeaux's community building.



>> Ensuring user health and well-being



OFIS' SOLUTION - OFIS can provide a comprehensive, easy and effective air quality monitoring service for buildings:

- A suitable sampling strategy for the site;
- Multi-parameter measuring devices are installed to monitor indoor air quality;
- Data can be viewed via a 24-hour web portal;
- Alerts were programmed for each parameter in line with trade standards and rules;
- A quarterly report is drafted, including an explanation of how data is interpreted for each device;
- The council is supported with its action plan for improving indoor air quality.

CLIENT BENEFITS

- Constant top-notch air quality in buildings -
- User reassurance -
- Planned actions for non-compliance -
- Operating performance monitoring -

48

months of monitoring by OFIS

10

measuring devices installed

7

parameters monitored

Ventilation system efficiency

Wastewater treatment plants

Veolia Eau France



Our client's challenge - The procedures used in wastewater treatment plants create chemical and biological pollutants which must be prevented from spreading to protect plant employees and ensure local residents have no cause for concern. Preventive measures include adapted ventilation design. Veolia Eau France decided to study the operation of the ventilation systems installed in seven wastewater treatment plants in the Eure region.

>> Assessing air renewal efficiency in wastewater treatment plants



40
OFIS, Veolia

CLIENT BENEFITS

- Protecting site personnel health -
- Objective & reliable measurements -
- Compliance with regulations -
- Operational action plan -

OFIS' SOLUTION - OFIS teams can assess the efficiency of wastewater treatment plant air renewal, including:

- Mapping aeraulic extraction networks, including the positions of all exhaust vents;
- Flowrate measurements for all locations, ensuring compliance with air renewal requirements in each specific working area;
- Smoke tests for operator workstations with a high exposure risk for chemical pollutants. These tests can visually indicate air movements and any stagnation;
- A risk analysis was also carried out on the extraction networks to identify any dysfunctions and provide corrective actions if necessary;
- An action plan to rebalance the systems and ensure effective air renewal levels.

7

wastewater treatment plants
inspected

over 250

measurement
points

over
130,000
m³ of extracted air

Chloramine and trihalomethane exposure measurements in air

Pays d'Aix

Public swimming pools

Our client's challenge - Regulatory requirements apply to pool buildings in terms of monitoring air quality. Pays d'Aix has evaluated the health risks of the indoor swimming pools it manages for many years, particularly exposure to chloramines and trihalomethanes (THM) in air.



>> Assessing worker and bather exposure



OFIS' SOLUTION - OFIS organized several summer and winter measurement campaigns to ensure air quality criteria are maintained in swimming pools:

- Air was sampled at various locations to obtain a representative overview of actual exposure for workers and bathers;
- Result interpretation reports were issued, with a comparison with regulatory exposure limits, and previous values;
- Action plans were drawn up if thresholds were exceeded; and these action plans may aim to improve either air or water treatment.

CLIENT BENEFITS

- Protecting the health of bathers and workers -
- Compliance with regulations -
- Improved treatment system efficiency -

12

swimming pools tested

over 100

measurements taken

24

months of monitoring by OFIS

Health risk control for air and water systems

University hospitals

Montreal teaching hospital (Canada)



Our client's challenge - Veolia has been entrusted with operating Montreal hospital in Canada. Before operating an "occupied" new building, Veolia decided to launch specific maintenance procedures to ensure that air and water quality standards were satisfied at delivery.

>> Preparing for operational health risks during construction



42
OFIS, Veolia

CLIENT BENEFITS

- Preventing contamination risks from day 1 -
- Integrating good practices in maintenance procedures -
- Proposing a joint action plan with the hospital -

OFIS' SOLUTION - OFIS' expertise enabled Veolia to be fully prepared for any operating constraints within the hospital's water and air quality maintenance system:

- Analysis of the hospital's sanitary water network preliminary design plan in order to identify critical sanitary points and propose technical improvements;
- Onsite analysis of risk factors relating to air treatment facilities, and a specific investigation into heat recovery systems using thermal wheels fitted in the air treatment units;
- Preventive and curative procedures designed specifically for the site were drafted for Legionella risk control, and a preventive maintenance program was prepared for air treatment systems.

over
268,000
m² of surface area

39
operating
theaters

over **36**
months of technical
assistance from OFIS

Acceptance and optimization of air and water systems

Tertiary buildings

Veolia head office - Le V

Our client's challenge - "Le V", the new Veolia head office in Aubervilliers, provides employees and clients with a top quality workplace and welcoming environment. The building is compliant with the requirements of European environmental certifications (HQE, Breeam), and aims to set the example in terms of construction and usage. Veolia Énergie France, the building operator, decided to obtain support for this process.



>> Achieving environmental excellence in buildings



OFIS' SOLUTION - OFIS can monitor air and water quality according to tailor-made standards from delivery and throughout the building lifecycle:

- A series of cold water analyses to approve pre-delivery disinfection operations;
- A series of sanitary hot water analyses at the different usage points;
- A series of routine air analyses for indoor spaces and air treatment systems as part of building operations;
- Continuous indoor air quality monitoring to optimize control systems and check that occupant health and comfort are guaranteed over time.

CLIENT BENEFITS

- Guaranteed air and water quality -
- Proven system sanitary performance -
- Optimized operating expenses -
- Planned actions for non-compliance -

over 50

check points

11

air quality parameters

40

water quality parameters

Odor emission source audit

Districts and population groups

Veolia Eau France



Romans-sur-Isère
(Auvergne-
Rhône-Alpes)

Our client's challenge - Some molecules can lead to unpleasant odors or be considered as an olfactory nuisance, including at trace levels. What's more, odor perception is a complicated business, depending on individual sensitivities and the ambient environment. Odors released by the wastewater treatment system can be detected from some areas. Veolia Eau realizes that this issue can reduce quality of living for local residents and has launched a diagnosis, monitoring and prevention policy for unwanted odors in treatment plants, particularly at the Romans-sur-Isère site.



>> Identifying potential sources of unwanted odors



44
OFIS, Veolia

CLIENT BENEFITS

- Continued well-being for local residents -
- Reassurance for local residents -
- Improved facility performance -
 - 100% transparent communications -

OFIS' SOLUTION - OFIS took the following approach to identifying potential sources of unwanted odors and checking their effects on the nearby environment:

- System audit and source map for unwanted odors;
- Ad hoc air quality measurements using field devices and continuous measurements (H2S) thanks to a set of five sensors installed inside the plant and on the premises of a local resident;
- Definition of an action plan aiming to improve odor emission control;
- Availability of an odor emission display.

6

potential
odor sources identified

5

continuous
measurement sensors

3

months of continuous
H2S monitoring

Air pollution exposure for local populations

The Veolia Foundation & Médecins du Monde (Philippines)

Districts and population groups

Our client's challenge - Médecins du Monde has taken action in four poor urban areas in Manila, in the Philippines, since 2012. The substantial number of respiratory disorders recorded in squats was revealed in a field study completed by the NGO in 2017. The Veolia Foundation, which has partnered Médecins du Monde since 2012, sent voluntary experts to assess the local population exposure to air pollutants.



>> Assessing local population exposure to air pollutants



OFIS' SOLUTION - OFIS puts its air quality expertise to good use for humanitarian projects, supporting the Veolia Foundation teams:

- Investigations targeting local populations, NGOs (joint projects with Médecins du Monde) and local institutions.
- A sampling strategy;
- Air quality measurement campaigns targeting many typical households, alongside ambient air measurements at strategic locations in the area covered;
- Proposed initial actions to reduce the exposure of local populations to the main air pollutants, and suggested options for long-term improvements.

CLIENT BENEFITS

- Improved consideration of air quality in the day-to-day lives of local populations -
- Raising awareness of air problems among institutions -
- Assessing the level of exposure faced by local populations -

over 40

households
audited

over 90

measurements
taken

8

air quality
parameters monitored

Legionella risk Indoor air quality

Drafting reference manuals

Veolia Technical & Performance Division



Our client's challenge - Health and safety are key requirements for Veolia, for its staff and clients worldwide. The Group must set an example when it comes to safeguarding air and water systems around the world. On this basis, the Technical & Performance Division aims to promote and advertise Legionella risk control practices and how to effectively manage indoor air quality.

>> Safeguarding air and water systems worldwide



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OFIS, Veolia

CLIENT BENEFITS

- Sharing knowledge in-house -
- Improved technical results for teams -
- Easy interactions between the different parties -
- Streamlined practices -

OFIS' SOLUTION - OFIS has gained extensive expertise in how to prepare reference manuals to safeguard air and water systems.

OFIS has developed operating tools with the support of the Veolia network of international experts. These tools are designed to help operational units around the world reduce their risks and improve the performance and safety of their systems for operators, clients and the population at large:

- Drafting best practices;
- Drawing up audit matrices;
- Issuing sanitary logs;
- Preparing training materials.

25

best practices
created

over 270

audit
criteria

over 20

Veolia experts
involved

Air quality and climate change

Climate-KIC

Districts and population groups

Our client's challenge - Pollutants are emitted in human activities. These pollutants can have short-term local effects (air pollution) and/or medium-term global effects (climate change). Climate-KIC, the largest public-private partnership for climate innovation in the European Union, is now aiming to bring together air quality and climate change specialists in order to identify actions which would bring benefits in both fields and assist elected officials with decision-making.



>> Promoting an integrated approach to "Air quality / Climate change"



OFIS' SOLUTION - OFIS led a collaborative investigation with Proambiente, an Italian consortium of public institutions and private firms, focusing on the benefits of an integrated approach to air quality and climate change. This investigation aimed to:

- Identify major air pollutants with an impact on both climate change and air quality, and the primary emission sources of these pollutants;
- Identify the main measuring methods for pollutant emissions to assist local authorities with understanding how to monitor air quality and comply with the European Framework Directive on ambient air quality;
- Assess the impact of some climate change mitigation provisions applied in Europe in urban areas on air quality.

- CLIENT BENEFITS**
- Incorporating air quality considerations into climate-related discussions -
 - Aligned priorities -
 - Access to viable proposals -
 - Promoting actions to help with both issues -

4

greenhouse gases studied

over 10

air pollutants studied

40

mitigation actions considered

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