



WABAG Operations

Plant management for the private and public sector

sustainable solutions. for a better life.



LONG TRADITIONS OF PERFORMANCE

Around the world, the name WABAG is a synonym for innovative and successful water engineering solutions. For over 90 years, through our technologies and services, we have been making a major contribution to the provision of secure water supplies and wastewater treatment in the interests of both humanity and the environment.

Today, the WABAG Group is a leading multinational player with more than 30 companies and offices in 25 countries and a workforce of over 2,000 worldwide.

What makes WABAG a preferred partner?

- The provision of support throughout the entire plant life cycle.
- A comprehensive technology and services portfolio.
- Experience as a plant operator in every water treatment segment and in differing regions across Europe, Africa, the Near and Middle East, and Asia.
- Proven process know-how and expertise, as well as an understanding of entire plant systems.
- In-house R&D centres in Austria, India and Switzerland, which guarantee the optimisation and further development of technologies and services.





Tehran Southern WWTP, Iran:
Design-Build-Operate – 2,100,000 p.e.

Médéa WWTP, Algeria:
Design-Build-Operate – 162,500 p.e.

Beni Messous WWTP, Algeria:
Design-Build-Operate - 250,000 p.e.

As an international systems supplier, we offer sustained solutions for water treatment, wastewater treatment, sea and brackish water desalination, sludge treatment as well as water reclamation systems for both, municipal and industrial sectors.

A PARTNER DURING THE ENTIRE LIFE CYCLE

WABAG's extensive portfolio of supplies and services extends from consulting, design, financing and construction, to the operational management of plants and systems in the water and wastewater treatment areas. WABAG provides support as a partner throughout the entire plant life cycle and operates on a one-stop-shop basis, supplying everything from a single source.

WABAG – THE PARTNER FOR COST-EFFICIENT OUTSOURCING

As public authorities and industrial companies know from experience, water management is a demanding and responsible assignment.

WABAG provides public authorities and industrial companies with the know-how of an innovative specialist.

Through the delegation of operational management to competent partners such as WABAG, industrial companies can concentrate fully on their core business.

Moreover, public authorities which place the responsibility for the management of their water infrastructure in tried and tested hands, can rest assured, that their plants will also be ideally managed with regard to future challenges.



Design-Build-Operate
Kodungaiyur WWTP, India
110,000 m³/d, 10 years O&M

Water management – a challenging task.

Plant operation involves increased business management requirements and the technologies involved are subject to continual improvements. Moreover, at the same time, the related legal statutes are becoming steadily more stringent. In order to continual improvements, including the economic, technological and legal aspects, a growing number of public authorities and industrial companies are outsourcing their comprehensive activities in the water area to external partners such as WABAG.

WABAG UNDERTAKES THE OPERATIONAL MANAGEMENT OF:

Municipal water and wastewater treatment plants

Water reclamation and recycling plants

Industrial water and wastewater treatment plants

The operation of such plants demands comprehensive expertise and a systematic approach to investments in property, plant and equipment. As a result of our business and technical know-how, we can offer our customers efficient operational management of the highest standard.

We undertake overall responsibility for the technical or commercial management of water and wastewater treatment plants.

During day-to-day operations, our customers profit from:

- The extensive international experience of our experts
- WABAG's extensive technological competence
- The results of in-house research activities

We guarantee process safety, quality and optimisation in tandem with increased efficiency.





For WABAG efficient operational management commences at an early stage.

Our optimum management services include:

- Analysis
- Consulting
- Planning
- Engineering
- Purchasing
- Operational management
- Maintenance
- Plant optimisation
- Plant upgrade and enlargements
- Supportive operational management
- Project financing

REALISING SHARED OBJECTIVES

WABAG is available as a partner for complex solutions. Depending on customer requirements, we also assume responsibility for investment and financing tasks, whereby within the framework of our extensive range, we offer familiar models such as conventional outsourcing or the combination of construction work and operational management on a one-stop-shop basis in the shape of DBO and BOOT models.

We jointly develop individual solutions in line with demands with the aim of guaranteeing our contractual partners optimum performance in combination with the highest possible plant safety.



Design-Build-Operate

Nemmeli WTP, Chennai, India

Seawater Desalination (Reverse Osmosis)

100,000 m³/d, 7 years O&M

The ideal model for every requirement.



At present, the most important models for efficient operational management consist of:

CONSULTING

O&M

DBO

BOOT

Using these base models, we prepare an optimum quotation for each project in close cooperation with the customer.

CONSULTING

We offer consulting for the management of water technology plants. In addition to an appropriate analysis of current plant status and its management, objectives can be agreed that have to be met within a certain period.

O&M – OPERATIONS & MAINTENANCE

WABAG undertakes operational management within the framework of service contracts. We operate plants in teamwork with the existing personnel. As a trustworthy and competent partner, through our experts, we offer operational management that is both cost-efficient and professional.

DBO – DESIGN, BUILD, OPERATE PLANT CONSTRUCTION, MODERNISATION AND OPERATIONAL MANAGEMENT

As a reliable partner, we undertake the planning, construction and operational management of new plants. Moreover, for existing plants we plan and implement the necessary investments for refurbishing and extension on an autonomous

basis and then subsequently assume operational management responsibility.

During the planning phase, special attention is paid to future overheads. Predetermined and agreed conditions apply for the investments and operation by WABAG specialists. Existing ownership structures remain unchanged.

BOOT – BUILD-OWN-OPERATE-TRANSFER INCLUDING FINANCING

These models represent a complete solution for the financing, construction and operation of a plant. WABAG takes overall responsibility for the building and operational management of the plant, while at the same time securing the financing of the required investment using the available grant possibilities.

As an expert and partner, WABAG offers the best, complete solution from a technical and economic perspective as a full-line supplier. At the end of the contractual period, the plant becomes the property of the customer.





For us, prudence is more than an obligation

QUALITY MANAGEMENT

Water engineering plants are complex installations, which play a significant role in the protection of the environment and the natural resource water. It is precisely for these reasons that high levels of availability and the best possible security with regard to plant operations are of such importance. Within the scope of our projects, we offer structural safeguards through the implementation of the WABAG quality management system, which conforms with international standards (ISO 9001:2008).

HEALTH, SAFETY AND THE ENVIRONMENT (HSE)

At the same time, the environmental protection plants to be operated are also of an industrial nature. Therefore, they demand great care and the appropriate precautions in relation to the safety and health of the personnel. WABAG is well aware of this responsibility and has supplemented its management system with the areas of health, safety and the environment (HSE). The highest standards in these fields have been secured by successful ISO 14001:2004 and OHSAS 18001:2007 certifications.

*HSEQ-Management
ISO 9001, ISO 14001
OHSAS 18001*



Design-Build-Operate

Adana West WWTP, Turkey

Municipal wastewater treatment plant, anaerobic sludge digestion and biogas utilisation for energy production. 250,000 m³/d, in total 8 years O&M

COMPLETE WATER SERVICES FOR YOUR COMMUNITY

WABAG offers operators and owners of water and wastewater treatment plants complete packages with all the related services in line with specific requirements and graduated in accordance with scope.

WABAG water management services - for every phase of the water cycle.

WASTEWATER TREATMENT

- Collection networks
- Pumping stations
- Wastewater treatment & reclamation plants
- Sludge treatment plants
- Power generation
- Sludge drying and incineration
- Sludge disposal

WATER TREATMENT

- Raw water intake
- Pipelines
- Pumping stations
- Water treatment plants
- Desalination plants
- Distribution networks
- Laboratories

Major cities such as Istanbul, Adana or Mersin have entrusted their water management and/or wastewater management to WABAG.



Operations & Maintenance in ISTANBUL

24-7 management of the wastewater from 16 million inhabitants

PROJECT Operations and Maintenance of Wastewater treatment plants and pumping stations in Istanbul
CLIENT Istanbul Water and Sewerage Administration (ISKI)
START O&M 1.9.2014

The Istanbul Water and Sewerage Administration (ISKI) has commissioned the WABAG specialists with the wastewater management of the entire Asian and European districts of the city with their population of some 16 million people.

A highly responsible assignment:

Maintaining a network of over 120 units: 9 pre-treatment plants, 52 biological wastewater treatment plants, 64 pumping stations.

Main wastewater treatment plants clean the bulk of the city's wastewater volume based on energy-optimized designs:

■ Tuzla WWTP	250,000 m³/d	Co-generation: 2 x 4,600 kW
■ Paşaköy WWTP	200,000 m³/d	Co-generation: 4,600 kW
■ Ataköy WWTP	400,000 m³/d	Co-generation: 9,200 kW

The anaerobic sludge treatment systems allow the use of biogas for energy generation purposes, providing a total output of 23,000 kW.



WABAG is an expert in the management of energyefficient wastewater treatment plants and has long-term DBO experience in this field.



Achieving shared goals through public-private-partnerships.

One example, a modern water reclamation plant for Namibia.

PROJECT	UJAMS Industrial Water Reclamation Plant
CLIENT	City of Windhoek
TYPE OF CONTRACT	BOOT
START O&M	2014
O&M DURATION	2014 – 2035

As the lead company in the new founded Ujams Wastewater Treatment Company (Pty) Limited (UWTC) joint venture, WABAG has implemented a project in the Namibian capital of Windhoek that has many unique aspects and creates a win-win situation for the city, the environment and the company itself.

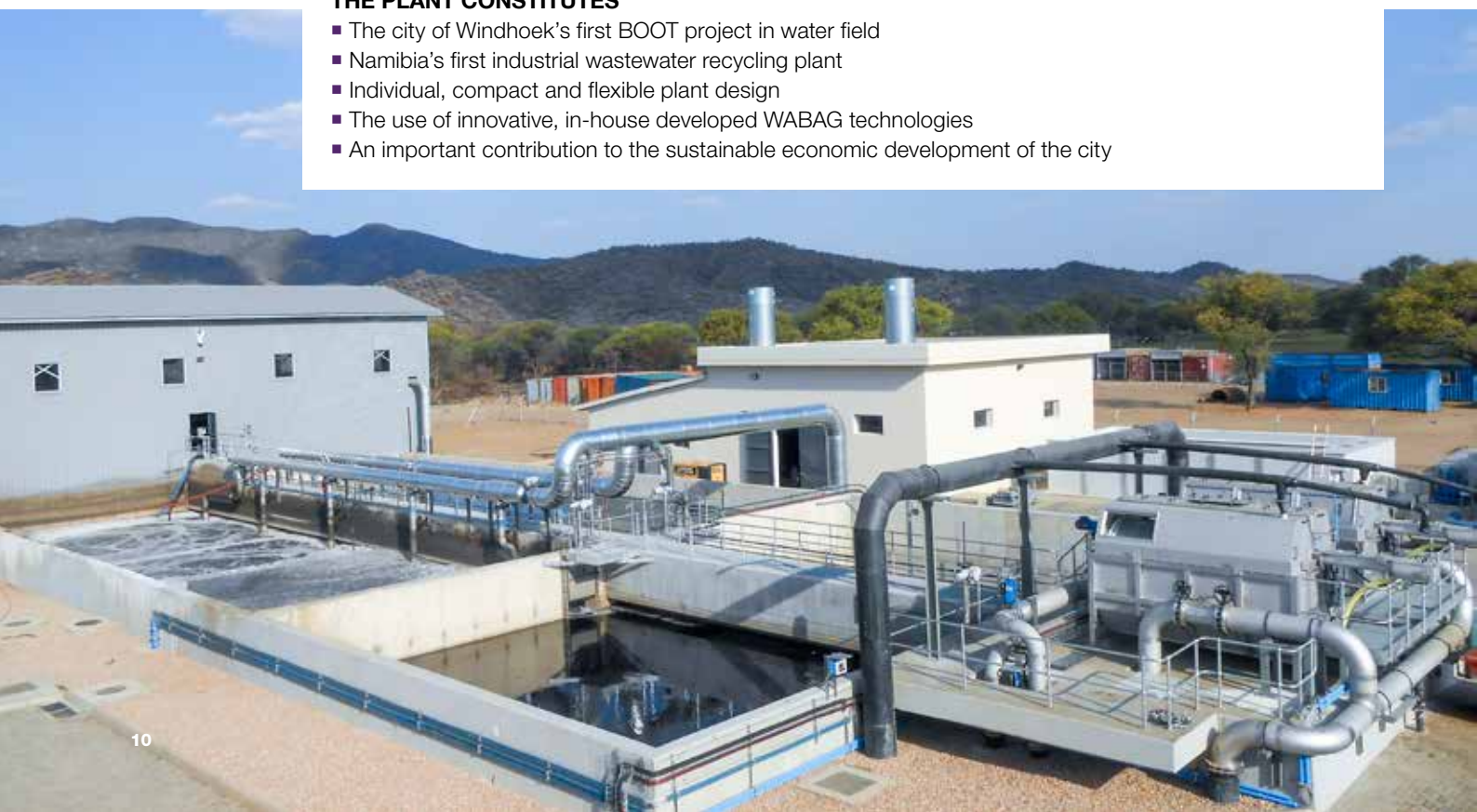
BOOT: Exemplary cooperation in Windhoek, Namibia

Namibia's first industrial water recycling plant was completed in the course of exemplary cooperation between the private and public sectors. WABAG not only financed the project through a long-term loan from the German DEG, but also supplied innovative, in-house developed technologies for a facility that offers sustainable recycling.

Wastewater from various production companies in the Ujams Industrial Park is subjected to high-grade purification and moreover, the WABAG joint venture has provided the professional management of the plant since its start-up in 2014. This assignment is part of a BOOT agreement and is scheduled to last for a period of 21 years until 2035.

THE PLANT CONSTITUTES

- The city of Windhoek's first BOOT project in water field
- Namibia's first industrial wastewater recycling plant
- Individual, compact and flexible plant design
- The use of innovative, in-house developed WABAG technologies
- An important contribution to the sustainable economic development of the city



Reference examples

TEHRAN SOUTHERN WWTP, IRAN DBO: DESIGN-BUILD-OPERATE

Large-scale wastewater treatment plant in Tehran. Mechanical/biological treatment, trickling filters and disinfection. Anaerobic sludge digestion including biogas utilisation for energy production.

Capacity:	450,000 m ³ /d 2,100,000 p.e.
Start-up:	2009/2010
O&M period:	2010 – 2014 (42 months)



NEW GOREANGAB WTP, WINDHOEK, NAMIBIA DBO: DESIGN, BUILD AND OPERATE

Direct potable reuse

Advanced multi-barrier system (nine treatment steps) for the production of drinking water from treated municipal wastewater. O&M provided by operating consortium WINGOC.

Capacity:	21,000 m ³ /d
Start-up:	2002
O&M period:	2002 – 2022 (21 years)



MERSIN: COMPLETE WATER & WASTEWATER MANAGEMENT FOR THE CITY OF MERSIN, TURKEY

OUTSOURCING

Water services for 1,4 million people

Drinking water treatment:

■ Berdan WTP:	390,000 m ³ /d
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Wastewater treatment:

■ Karaduvar WWTP:	189,523 m ³ /d
■ Tarsus WWTP:	61,272 m ³ /d
■ 5 small WWTPs:	1,000 – 12,300 m ³ /d

Start of O&M:	1.1.2015
O&M period:	2015 – 2018 (36 months)



PETROM, ROMANIA

INDUSTRIAL OUTSOURCING

Operation and maintenance of the Petrobrazii refinery effluent treatment plants for the Romanian oil & gas company OMV PETROM SA, involving simultaneously plant modernisation and upgrade activities.

PetroBrazii WWTP: Capacity: 30,000 m³/d
O&M: since 2008



PANIPAT, INDIA

DBO: DESIGN-BUILD-OPERATE

Operation and maintenance of the water recycling plant at the Panipat refinery and petrochemical complex in India, completed by WABAG. The produced water is re-used for boiler feed water.

Capacity: 21,600 m³/d
Start-up: 2006
O&M: since 2006



ALANDUR WWTP, INDIA

BOOT: BUILD-OWN-OPERATE-TRANSFER

Sewerage network.
Pumping stations.
Municipal wastewater treatment plant.

Contractor: First STP Private Limited
Consortium: VA TECH WABAG Ltd.
and IVRCL, India
Capacity: 24,000 m³/d
90,000 p.e.
Construction period: 2001 – 2003
O&M period: 2003 – 2017



Good reasons for selecting WABAG as a partner.

- Fixed operating costs throughout the duration of the contract
- A reduction in personnel and operating costs
- Secured high levels of plant availability
- Guaranteed optimum water quality
- Optimised operating procedures through commercial and technical competence
- Guarantee of strict adherence to all statutory requirements
- Precise contractual regulation of obligations for a defined period of time
- Training and integration of the available specialist personnel
- Expert consulting during investment decisions and access to the results from WABAG's research centres
- Plant modernisation in line with the state-of-the-art technologies



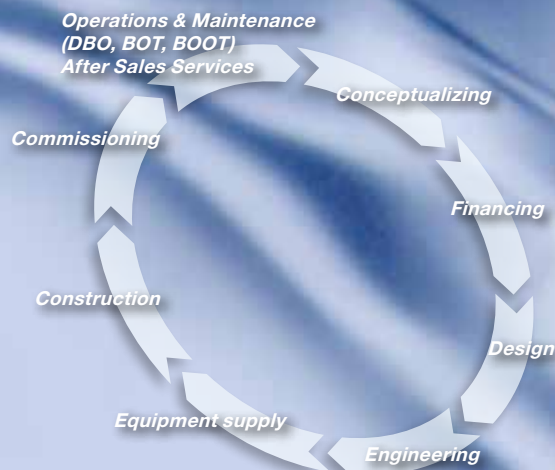
WABAG offers sustainable solutions for:

- Drinking water treatment
- Industrial and process water treatment
- Sea and brackish water desalination
- Water reclamation
- Municipal used water treatment
- Industrial used water treatment
- Sludge treatment

WABAG is one of the world's most innovative water treatment companies with know-how in specific technologies and in-house developed processes such as:

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| ■ Fine sieving | MICROPUR® |
| ■ Biofiltration | BIOPUR® |
| ■ Moving bed biology | FLUOPUR® |
| ■ Activated sludge processes | Hybrid™, MICROPUR-CAS® |
| ■ Sequencing Batch Reactor (SBR) | CYCLOPUR® |
| ■ Membrane bioreactor | MARAPUR®, MICROPUR-MBR® |
| ■ Membrane filtration | RO, MF, UF, NF CERAMOPUR®, CERAMOZONE® |
| ■ Denitrification | BIODEN®, ENR® |
| ■ Oxidation processes | ADOX®, BIOZONE® |
| ■ Adsorption processes | CARBOPUR®, PACOPUR® |
| ■ Anammox | DAMOPUR™ |
| ■ Thermal desalination | MED, TVC, MVC, MSF MED XXL™ |
| ■ Deep bed filtration in various designs | |
| ■ Energy-optimised sludge treatment | ENOPUR®, BIOZONE-AD® |

The WABAG Group represents a leading multinational player with companies and offices in 20+ countries and a focus on emerging markets in Europe, Africa, Middle East and Asia.



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