



Dynamic and adaptive Water Treatment Plants
specially designed for municipal, touristic and industrial infrastructures

Waste Water Treatment Plants



Drinkable and Industrial Water

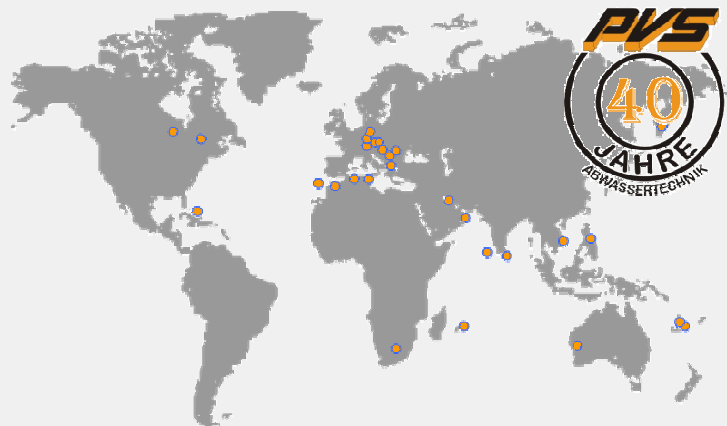


Company
presentation document

PVS, our expertise for the benefit of the environmental safety and high return on investment

With over 40 years experience in water treatment technology, with hundreds of references, PVS produces water treatment plants and advanced technology for the treatment of municipal or industrial water.

PVS is represented in many countries through a network of international partners. With over a third of its business outside of Europe, many customers appreciate the quality of our products and services from our local partners.



PVS designs reliable and efficient solutions focused on low operating costs for the treatment, purification and recycling of water or wastewaters. Our solutions are particularly well suited for decentralized municipalities, industrial and touristic infrastructures. Our plants are designed to:

- reach a **high yield of purification enabling efficient water reuse solutions**
- treat **variable charge loads** being **adaptive to changing economic circumstances**
- reach the **highest possible operating efficiency** and **lowest possible operating costs**.

Our philosophy is focused on one major point: reducing the impact inflicted by the water consumption, whether this impact is environmental, economical or social.

Certifications

In more than 40 years, we have obtained numerous certifications and awards. Our company is always at the forefront of innovation which allows us to differentiate ourselves in the market of water treatment.



PVS is certified according to ISO 9001, demonstrating the quality of our management approach and our commitment to continuous quality improvement. Our management and staff is highly ambitious to implement all the processes and approaches needed to provide a product quality that meets the requirements of our customers.



PVS is member of the technical water community "Gütegemeinschaft Wassertechnik" (GWT). This community validates processes and solutions according to very strict quality criteria to ensure the quality of proposed water treatment techniques. These criteria apply to:

- ✓ Production quality
- ✓ Engineering and product assembly for global water treatment solutions
- ✓ Quality of support and maintenance

But in our opinion, awards and certifications are not the most important things. Positive results, feedback and customer satisfaction are the most important elements we strive for. PVS attempts to study and understand the changing contexts in which each of our customers are evolving. The company and business structure of PVS allows us to adapt our products and services to each context with ease and flexibility.

Our approach, our solutions and our products comply with the strictest quality criteria and required objectives, in order to allow each of our customers to participate in a real economical policy of sustainable development.

PVS scope of supply – Water treatment projects



Decentralized, standardized Wastewater Treatment Plants, meeting highest demands, featuring fully automatic operation, even with fluctuating influent loads: PVS VOPROM process. Our plants are completely encased and produce no odor or noise. They may either be operated autonomously or using a report system which will monitor the plant's operation at any time. System plants are hygienically closed, white polyethylene tanks, for the Treatment of Wastewater up to a capacity of 5,000PE. The treatment allows to simplify Tertiary Treatment in order to produce recycled water.

Sizes from 5,000PE to 50,000PE, standardized VOPROM – SBR plants designed with concrete tanks.

The main goal of this alternative design is creating a higher local productivity by enabling local companies to take over the construction works, meaning that only the patented electro-mechanical parts and the control device will be delivered by PVS.

We offer assistance packages for both alternatives in the form of a training phase at the beginning, including visitations of existing plants, and following a successful project award, our clients will be extensively supported by our technicians. In addition to that there is a back-up package, with our employees remaining at your disposal for readjustments and After Sales Service (including remote maintenance and support of the plant via internet connection).



Potable Water Production Plants using Reverse Osmosis Desalination Technology

The main characteristic of our plants in comparison with competitors on the market is the fact that we are able to provide prefabricated (containerized) plants with a maximal permeate production capacity of 1,500m³/d for each 40 foot container. We are offering these pre-assembled plants up to a capacity of 10,000m³/d, **with guaranteed energy consumption values of 1.7 to 2.3kWh/m³**, without reducing the highest permeate quality.



PVS Components and equipments

PVS MICROFILTRATION: Closed filtration plants, specially developed for municipal raw wastewater treatment plants in coastal areas and raw industrial high TS loaded effluents. Allowing to reduce the construction size of the WWTP.

PVS SLUDGE DEWATERING: Compact and high efficient sludge dewatering Systems which can be fully automated. We provide active dewatering solutions and also passive dewatering solutions.

PVS PUMPS: All types of pumps specially designed for water, wastewater and sludge applications.

We provide engineering, project analysis and guarantee that all technologies embedded in our solutions aim at improving the performance and minimizing the operating costs

PVS - Sewage treatment plant.

1- PVS choice of competence

Water treatment discipline requires technical and scientific knowledge. The PVS engineering team consists of water treatment and process specialists supporting engineers who will design the system. In our factory, we have developed a standardized construction and designing form, using our modular VOPROM reactors. It is easy to install and we can work with almost all type of construction companies.

Most importantly, this standardized design and construction form can be easily adapted to any site or local characteristics .

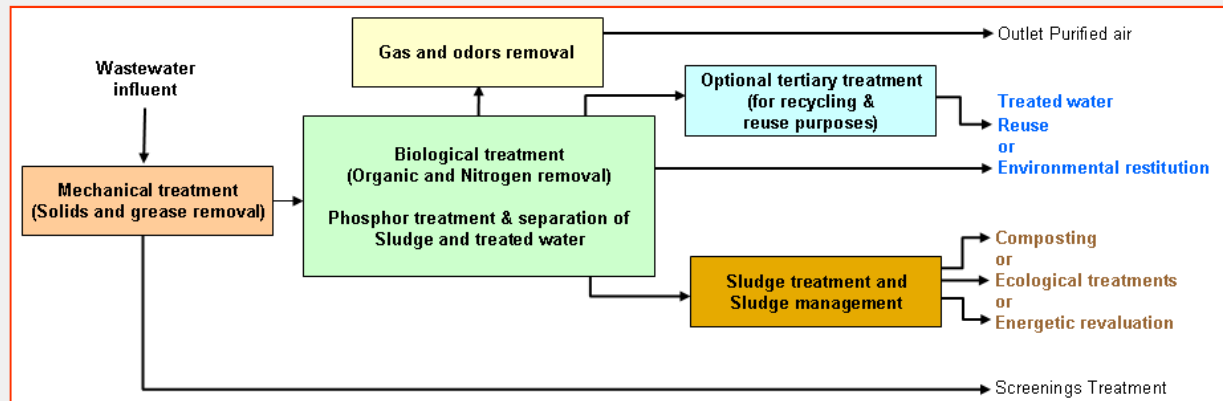
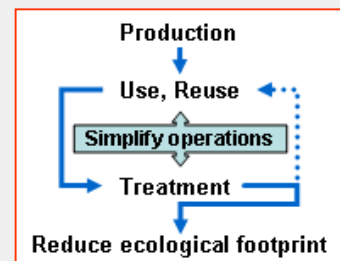


Diagram of a conventional PVS WWTP

2- Return on investment

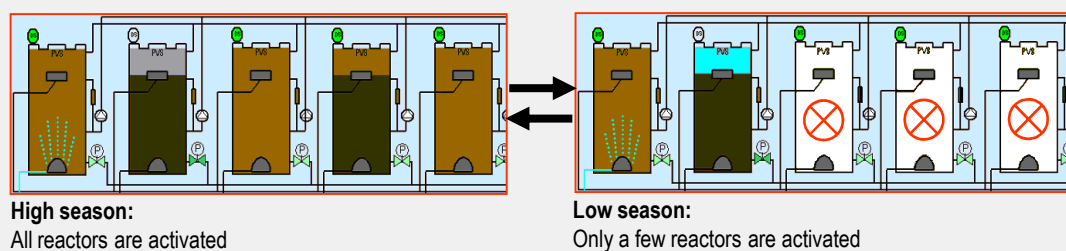
The goal of a sewage plant should be providing more value to end products of the WWTP (sludge, treated water). It is possible to gain energy from sludge and to reuse the treated water, respecting high sanitary objectives.

We will provide tailored solutions that consider all economical requirements. We are aware that the integration of innovative technologies is suitable only if profitability is achieved through these solutions as well.



3- Seasonality and cost control:

Most industrial facilities or touristic regions, have one common speciality: the "seasonality" due to touristic frequentation or production cycles. This involves variations in hydraulic loads and pollutants which are complex to manage for conventional sewage systems. PVS provides a very simple, effective solution, proven over 25 years, to manage this problem: We provide our WWTP with a "modular" design which makes it possible to adapt to changes in the treatment capacities and to dramatically reduce operating costs during peak periods.



And a dynamic process management ensures the efficiency of each treatment cycle in the reactor which is automatically adapted to influent loads. It allows a continuously high treatment quality throughout the whole year. This combination results in better performance and better cost control, ensuring that the plant will fit to your actual economic activity.

4- No pollution and high operational safety

Our treatment process is closed and meets the highest sanitary and hygienic standards. With a PVS wastewater treatment plant you are **guaranteed to have no noise, odors, or health risks associated with waste water** around the site.

Photo : Example of a biological PVS VOPROM reactor.
The system is fully closed and is at the forefront of sanitary restrictions (no contact with water)

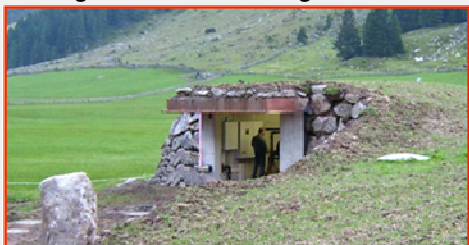


5- Perfect management of your environmental landscape

The treatment solutions we offer are among the most **compact and adaptable** you can find on the market for water treatment:

- Footprint less than 1.5 m² per m³ of daily treated water (or less than 0.25m²/PE)
- Ease of evolution by addition or removal of reactors
- Facilities are removable and reusable
- Treatment process can easily be integrated in a building

Underground bunker design



Technical room design



Classical PVS WWTP



Final outcome: a dynamic WWTP optimized for most situations.

Your goals Our response

Protect your environment and activities → High performance effluent treatment solution

Protect your investment → Scalable and adaptable to future needs

No negative impact on your business → No nuisances to your surrounding (**no odour, no noise**)
Hygienic and closed design
Self-regulating

Does not impact your infrastructure and landscape → Ultra Compact System
WWTP can be installed anywhere
And can be integrated into many type of buildings

Acquiring a return on investment solution → Possible upgrade for reuse of treated water
Recovery of waste or sludge as fertilizer or combustible
Modular operating costs for your business

PVS - High performance technologies for desalination

Fully adaptable design

PVS Reverse Osmosis units feature a modular design and can be integrated in open or closed containers ready for export. They are easy to install and can be connected/moduled in the form of parallel systems.

- Each container module can process from 100 to 1.500m³ of water per day.
- The system is completely prefabricated, easy to deliver and easy to install
- Integrated technologies allow to reduce the global electrical consumption dramatically



A particularly effective energy recovering system

PVS uses **premium materials** to recover the pressure of the pumping system.

Membranes, pumps, exchangers and pipes are all designed to share their material and share their size in order to **minimize any energy loss**.

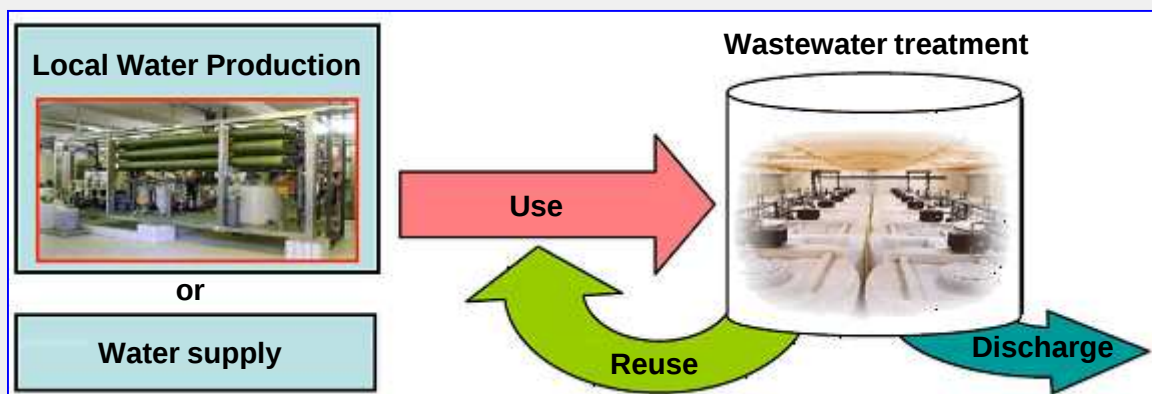
The years of research and development invested by PVS in the design of desalination systems allow us to be one first company **providing one of the most effective desalination plant available on the market**.

- Up to **95% energy recovery**
- High efficiency pressure systems
- Automatic process control (fluid flow, pressure and quality)
- **Energy consumption of 1.7 kWh to 2.3 kWh** per cubic meter of water produced
- System is **70% more efficient** than conventional desalination plants



PVS Water & Management

As a specialized company in water treatment, PVS offers **complete solutions tailored to your business**. Our solutions will let you gain full independence from the local distribution network and allow a perfect management of the water cycle - **from production of drinking water up to wastewater treatment and reuse** -



PVS – ECO Reverse Osmosis technology

The local development of entrepreneurial activities offers many benefits: jobs, tourists, new purchasing power, socio-economical improvements etc. Especially in regions where water is scarce, an independent water supply is a key point in securing economical growth. Whether the development is economical, environmental or social, it is important to ensure supplies: water is a part of it.

1 - The autonomy of the water production

A common feature of all touristic regions, hotels and production industries, is a high water consumption. Autonomy of the water production allows to overcome environmental and social premises: groundwater or rivers are no more affected, and there is no more impact on water consumption for local people. This independence ensures a perfect control of costs, ensures independence of supply, and **reduces the risk of downtime**. The technologies we offer are designed to **reduce the cost of water production** and therefore ensure a **competitive advantage**.

2 - The quality of produced water and adjustments for its use

A Reverse Osmosis plant provides particularly clean water, suitable for specific applications, such as:

- Hospitals, laboratories, industries: Water **suitable for industrial production** processes.
- Wash water **protecting machines** and equipment.
- Drinking water, hardness is automatically rehabilitated in order to obtain a **delicious drinkable water**.

It is also easy to separate in different water production lines (for example kitchens, machinery, process water, drinking etc..).

3 - "PVS-ECO" desalination: reducing operating costs

The key point of our technological development in our desalination systems is to minimize operating costs. The energy consumption for water production in our plants is minimized through the **standard integration of energy recovery systems**. Last generation membranes require less maintenance and offer a long production life. Our primary objective is minimizing operating and production costs of our systems in order to provide a real economic benefit for our customers.

4 - Return on investment

The return on investment is based on production costs and the costs of local water. We will strive to complete all necessary studies specific to your project to assess the technical and commercial viability.

Results: High Yield Water purification plants.

Your expectations	Our response
Seeking water supply independence	→ High-efficiency purification stations PVS ECO
Water quality continuously adapted to your needs	→ Ability to adjust the quality of the permeate (filtered water) Continuous operation with self flows
Investment profitability	→ Energy recovery Using high quality materials for a long life cycle Ultra Compact System Easy to operate
Sustainable Development	→ PVS "Water management" Global Water Management from production to processing and recycling

Examples : Touristic infrastructures

Example 1: Water treatment for an island hotel infrastructure

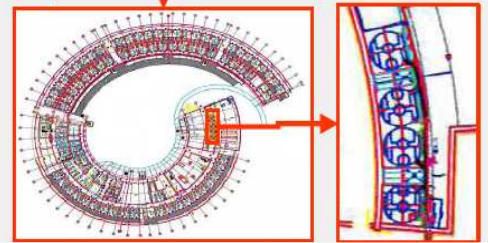
Resort of 50 villas, 2 restaurants

Treatment without nuisance

- Exceeding regulatory requirements
- Treatment without odor or noise emissions
- Limitation of discharges by recycling and reuse
- Reducing energy consumption through a dynamic and modular operating process allowing treatment adaptation to the occupancy rate.

Save and return

- Energy savings: With the adaptive modular operation and considering the rate of occupancy, **energy savings of up to 50%** are possible during the low season.
- Approx. **45% of water savings** due to water reuse (i.e. watering garden areas)
- Savings on construction costs and space.
Footprint reduced to almost 35m².
- Due to water reuse, 30% of savings on the desalination investment (smaller plant) and reduction of emissions by the desalination plant.



Example 2: Wastewater treatment plant and Reverse Osmosis for a tourism complex

Hotel 460 rooms, 500 residences, 60 apartments, shops and restaurants ...

Treatment without nuisance

- Compliance with the most stringent regulatory requirements (treatment of N and P)
- Treatment of waste without odor or noise emissions
- Recycling and reuse of discharges
- Flexible, modular operation according to the occupancy rate.
- Production of additional drinking water with a desalination plant
PVS ECO 600m³/d

Savings and return

- Energy savings: due to dynamic modular operation, adaptable to occupancy rate, up to 60% energy savings are possible in low seasons.

Savings in water production compared to the price of municipal water

- Water Reuse: approx. \$ 1.3 savings* per m³ of reused water (for green spaces).
- Water purification station: approx. \$ 1* savings per cubic meter of produced water
- Footprint reduced to 0.1m²/PE (for the whole WWTP)
- Return on investment: between 4 and 5 years.

* all included (equipment project investment, maintenance, energy at \$ 0.21 / kWh calculations on 20 years of operation)



Perfect landscape integration, an excerpt of our references:

A PVS WWTP is housed within a closed building. This building can either be built for this purpose or it is possible to use an existing building.

A closed building offers several significant advantages, since the entire equipment and components are protected from external influences:

- Climate changes, rainfall, temperature and wear caused by external elements.
- The building is not publicly accessible, therefore strangers cannot enter the plant.
- The building will also prevent noise from leaving the plant

Our plants feature one of the lowest existing footprints on the market:

- The space required for the plant ranges from only 0.1m² to 0.25m² per PE.
- The small footprint ensures a discreet landscape integration.
- A footprint this small makes it possible to install a PVS plant in almost any environment.

Examples of WWTP:



Alpine Plant : 200PE

- Required space: 45m²
- Nitrogen and phosphorus treatment
- Underground design
- Cold winter (down to -30°C, -22°F)



Skiing Station: 500PE

- Required space : 35m²
- Altitude: over 3000m, 1865miles
- Hard climatic conditions, low available oxygen
- Nitrogen and phosphorus treatment
- Dosing and physicochemical adjusting
- Ultra compact sludge treatment



Municipal Plant: 600PE

- Mechanical pre-treatment: fine screening
- Nitrogen and phosphorus treatment
- Autonomous plant
- Cold Winters (down to -20°C, -4°F)



Cheese and milk industry

- Required space: 220m²
- 250m³/d
- Mechanical pre-treatment: fine screening
- Dosing and physicochemical adjusting
- Nitrogen and phosphorus treatment
- Autonomous plant



WWTP for industrial Site (Qatar)

- 300m³/d,
- Required space: 220m²
- Pre-treatment: fine screening, neutralization, dosing and physicochemical adjusting
- Reuse of treated water
- Internal automated sludge treatment system



Wastewater Treatment Plant (New Caledonia)

- Required space: 225m²
- Mechanical pre-treatment: fine screening
- Nitrogen and phosphorus treatment
- Sludge dehydrated through gravity filter system and low-energy outdoor drying (up to 90% DM)



Municipal Water Plant: 2.500PE

- Required space: 525m² (including sludge tanks and dewatering unit)
- Mechanical pre-treatment: fine screening
- Nitrogen and phosphorus treatment
- Interactive reference, please see our website:
<http://www.pvs.at/englisch/produkte/3d/3d.html>



Agro industrial site (wine production):

- Required space: 330m²
- Reuse and rehabilitation of existing infrastructure
- 650m³/d
- Nitrogen and phosphorus treatment
- Complete management and recycling of wastewater (Microfiltration, disinfection) for water reuse (green areas)
- Sludge composting on reed bed system.

Many other references are available on our website: www.pvs.at
<http://www.pvs.at/englisch/referenzen/referenzen.html>

Contact

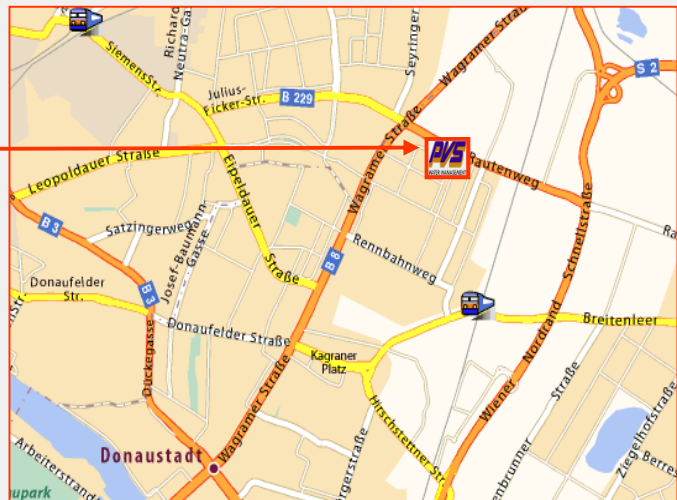
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Location plan:



**Our entire team remains at your disposal
and will be glad to welcome you or to receive your inquiry!**

Water and environment

are a long term economic capital!