OVIVO™
Bringing water to life℠

Deployable Water & Wastewater Solutions

creating value in water through innovation, creativity and expertise

ovivowater.com

A New Global Force in Water

As society and the global economy demand more and more from water, there is a growing requirement for ever more specialist applications to manage clean water, to create specialist process waters, to treat wastewater, to extract energy from wastewater and to champion the reuse of water.

The 2010 merger of Eimco Water Technologies, Enviroquip, Aqua Engineering and Christ Water Technology plus many smaller specialist firms allows Ovivo to offer a unique combination of advanced solutions, probably the most significant application knowledge base in the world and some of the best brains in the business.

Ovivo aims to become the water partner of choice for clients in the public and private sectors and the leading source of water expertise for engineers and consultants across the globe.

For further information, visit
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> *"Ovivo - creating value in water through innovation, creativity and expertise in clean water, process water, wastewater treatment, waste-to-energy and water reuse markets across 5 continents."*

Ovivo - bringing water to life

Our Role in your Industry

Ovivo is able to offer a range of alternative solutions for treating water at sea and on land and for meeting varied effluent quality discharge standards in field operations. Our highly qualified and experienced teams of process engineers appraise each proposed application and recommend the best available solution for each case.

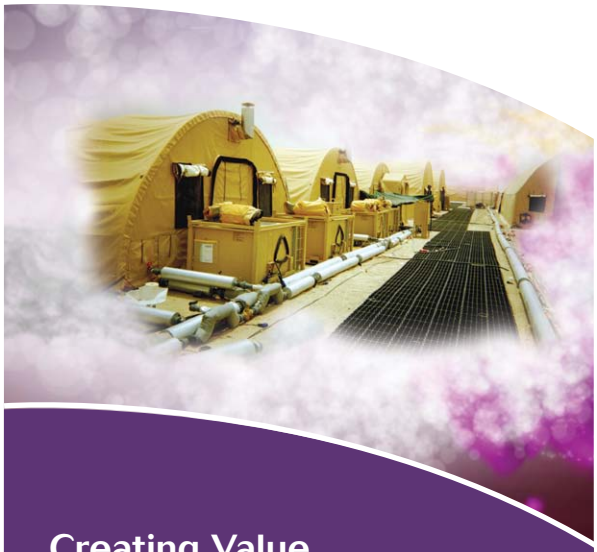
The Need for Deployable Water Management Solutions

Marine and military operations present specific water management challenges. At sea and on land, the health, agility and ability of armed forces and civilian support agencies depend on the reliable and secure supply of safe drinking water and the safe disposal of sewage. In order for them to operate effectively and responsively, Ovivo offers flexible, innovative water management solutions to purify and provide fresh water and to ensure the treatment of wastewater is trouble-free and secure.

Temporary military camps require water and wastewater management technologies that are highly mobile. In addition, disaster relief missions will require substantial water treatment capacity to minimize the debilitating impact of disease, often at remote locations. The diverse nature of modern military and relief operations requires equipment that is adaptable and enduring. Wherever there is a need and whatever the conditions or the nature of the mission, Ovivo is a reliable ally in the management of water resources in the frontline of disaster relief and military operations.

Ships and offshore facilities of all sizes require desalination and wastewater treatment solutions, and Ovivo is dedicated to managing freshwater resources on land and at sea.

Natural disasters are increasing both in frequency and magnitude. Although the number of overall deaths caused by natural disasters is decreasing, the number of those affected by severe disruptions to daily life, losses of livelihood and deepening poverty continues to increase. Following WHO recommendations, victims of disaster should be provided with drinking water within forty-eight hours of the onset of crisis to avoid dehydration and the promulgation of communicable diseases, many of which are water-borne. To avoid dehydration, each disaster victim commonly requires fifteen liters of water per day. Thereafter potable water needs to grow by three or fourfold during recovery phases before public services are restored.



Creating Value

"Ovivo's range of deployable systems are designed to be robust, for easy shipment and suitable for military and humanitarian users throughout the world."

Industries in which we work

Marine Water Treatment

Ovivo is committed to extracting maximum value from water management operations.

Heat recovery evaporators
To ensure low installation costs and a minimal footprint, Ovivo's evaporators are supplied as package units on a single base frame. Their reliability, ease of operation and ease of maintenance guarantee maximum water output for minimal human input.

Applications:
- Oil and gas offshore platforms.
- Industrial water applications.
- Naval vessels.
- Merchant vessels.
- Cruise liners.

Ovivo's heat recovery evaporators have been specifically designed to use the waste heat available from the cooling water systems of a ship's main propulsion or auxiliary diesel engines to convert seawater into fresh water. Producing fresh water on board a vessel reduces the capacity required to store fresh water.

The economic case for this is compelling, as that capability directly affects the fuel or cargo capacity of ocean-going vessels. However great your fresh water needs, Ovivo's evaporators can cope with the largest onboard demands, from small crews aboard naval craft and offshore installations to hundreds of staff and passengers on cruise liners.

Double- and triple-effect evaporators are available for applications where the quantity of waste heat is limited, particularly for higher fresh water capacities of up to 300m^3/day.

Multi-stage Flash Evaporators
Ovivo's range of multi-stage flash evaporators has been designed for operations that require large amounts of fresh water with low energy consumption. They work by feeding water into a vacuum chamber at a temperature higher than the saturation temperature of the chamber. Thereupon, instantaneous evaporation of some of the water takes place; this phenomenon is called flash evaporation and produces high quality fresh water from seawater.

Ovivo flash evaporators are supplied as package units on a single base frame, and each includes a steam boost feed heater, air ejector system, pump sets for seawater, distillate and condensate, instrumentation and automatic control systems, a control panel, chemical injection set, piping and valves.

Reverse Osmosis
Experience, quality and proven reliability are of the utmost importance in coping with aggressive environments. Ovivo's success as a leading supplier of reverse osmosis equipment to offshore platforms amply demonstrates the design proficiency and manufacturing excellence of the reverse osmosis and ultra-filtration membrane processes, which we use in all our desalination systems. It's not just offshore platforms that benefit by using our reverse osmosis plant. The most compact versions are ideal for installation on offshore patrol boats, small fishing vessels, tugs, yachts, ferries, cruise ships and all working boats/ships.

These units are specifically designed to individual specifications. They are designed to be robust and cope with rough conditions and varying feedwater qualities to give consistent quality and quantity.

Pre- and Post-Treatment
Ovivo's end-to-end capability enables operational management and maximizes water use from a single source, and we offer a full range of pre- and post-treatment packages to meet the varied field

requirements, and can cater for all variations of feed and product water specifications for either drinking or process water. Pre-treatment includes filtering and de-chlorination for initial pass-through. Post-treatments prepare the product water for its specific application.

Chlorination
Chlorine is a common, efficient and economical germicide for sterilization, but is unsuitable for use in confined spaces, and is difficult to dispense; therefore, marine systems generally use hypochlorite.

De-chlorination
During sterilization, to ensure a wide margin of safety, excess chlorine is often injected into water that is to be held in storage for extended periods. Where this is the case, de-chlorination is required before the stored water is passed to ships' services. De-chlorination is achieved by passing re-filtered water through a bed of activated carbon, which absorbs the excess chlorine and removes any traces of taste, odor or coloration that may be present.

Land-based Wastewater Treatment

Ovivo specializes in containerized wastewater treatment and water reuse systems for rapid deployment as either temporary or permanent installations. Given the extreme environments in which the modern military operations are conducted and humanitarian efforts are often required throughout the world, water is an extremely important asset and Ovivo strives to maximize its reuse.

Our Water and Sewage Process Plants (WASPPs) are totally deployable by land, sea or air to support the frontline efforts of military and humanitarian operations, and interconnecting pipework, fat and grease removal, pumping/vacuum stations and chemical-free process treatment are all offered as standard. The rugged, simple plug-and-play design of WASPPs facilitates rapid deployment to almost any location in the world. Their comprehensive water management features make them eminently suitable for military field operations, aid relief or construction camp use, whether on or offshore as standard twenty-foot and forty-foot ISO containers.

Reverse Osmosis
Our reverse osmosis units are specifically designed to individual specifications and are designed to be robust to cope with rough landing conditions and varying feedwater qualities to give consistent quality and quantity.

Submerged Aerated Filter (SAF)
Ovivo SAF systems reduce the risk of nuisance odors and waterborne disease. Containerized units are supplied in standard twenty-foot ISO containers. Non-containerized tanks incorporate lifting points for easy loading and off-loading from flatbed transporters and are sized for transportation in C130 aircraft. All associated pipework is packaged into wooden reusable crates and fitted with threaded union for ease of connection onsite. The Copa® SAF has a proven performance record supported by almost twenty years of development and deployment throughout the world. From initial installation, our SAF acts immediately to reduce biochemical oxygen demand and can be 100% effective within four weeks of start-up.

Membrane Bioreactor (MBR)
The MBR system commonly supplied by Ovivo can be connected easily to ablution and kitchen wastewater discharge points, enabling safe containment of effluent to its final point of discharge after treatment. The system can be moved using the PLS/DROPS system and will fit into C-17, C-5 and AN-124 aircraft. The containerized wastewater unit's MBR technology, when deployed in conjunction with a disinfection system, is capable of providing an effluent suitable for reuse as flush water or for irrigation. The wastewater treatment system is simple and robust, requiring minimal operator intervention and maintenance.

Ovivo's membrane bioreactor technology is well suited to treating contaminated NBC washdown water, which is collected from a containment berm and fed to the MBR, for separation of contaminated waste sludge from the water. The waste sludge can be collected and sent for disposal, preventing release into the environment and minimizing the requirement for large supplies of water.

Mobile Potable Emergency Water Treatment Units (EWTU)
Ovivo's mobile potable EWTUs support emergency intervention units and relief agencies by producing clean water in the following quantities.

The EWTU is built into two standard seaworthy ISO twenty-foot containers for rugged handling and for harsh operating and storage environments. An operation container holds installed water treatment systems including pre-filtration and ultrafiltration units, RO membranes, pumps, control valves, piping, instrumentation and control interfaces, chemical dosing pumps and chemical tanks, grounding connections and a ventilation system. An auxiliary container stores emergency power supply units, a mobile raw water pump station, flexible connection hoses and couplings, operation chemicals, a water quality field laboratory set, emergency spare parts, tools and documentation amongst other things.

	Hydrocompact EMU 025	Hydrocompact EMU 050
Production after ultrafiltration (ltr/h)	2,500	5,000
Production after RO (ltr/h)	2,000	4,000

They are robust and mobile for easy transportation and adaptable for use in any situation to accommodate raw water intake from a variety of sources including poor quality fresh and low salinity seawater. Where salinity in seawater or brackish water exceeds 5,000 mg/l, a desalination module is available.

State-of-the-art membrane filtration and desalination technology guarantees minimal chemical consumption. The EWTU's straightforward design, flexible operation and easy maintenance provides a low-cost solution that ensures successful project implementation and long-term sustainability. In approximately five hours from offloading to water production, EWTUs produce drinking water from raw water that meets both WHO and NATO's STANAG 2136 standards.

Case Study

Wastewater Treatment, New South Wales, Australia

Background
Following substantial completion of the Parramatta Rail Tunnel in early 2007, groundwater seepage into the main tunnel sump averaged 10 liters per second. This water contained concentrations of iron in excess of 30mg/liter and manganese was measured at a few ppm. Turbidity levels were also relatively high. Before it could be discharged to the Lane Cove River, the water had to be treated.

Process
Preliminary oxidation of the water at an elevated pH converts soluble iron and manganese into particulate oxides. The oxidized water is then pumped to an Ovivo EnviroDAF™ system. A coagulant and a small dose of polymer are added to the water to assist the clarification process. Clarified water then passes via polishing filters prior to discharge to the Lane Cove River.

The sludge removed from the clarifier is discharged into a sump from where it is pumped to a flocculation tank and subsequently dewatered in an Amston Filter Press. The filter press reduces the volume of sludge by more than 95%, generating a cake which has a dry solids concentration of 40%.

Performance
Since the plant's initial start-up, the system has operated trouble-free with excellent results.

	Turbidity	Iron
Raw water	40-150 NTU*	10-50mg/l
Treated water	<3 NTU*	<0.3mg/l

(*Nephelometric Turbidity Units)

How we created value

- Ovivo's EnviroDAF™ system significantly reduces iron and manganese pollution in wastewater discharges.
- Ovivo's Amston Filter Press reduces sludge volume by 95%.
- Sludge dewatering produces a cake which is easier to dispose of than slurry, reducing costs.
- Protection of the environment.

Case Study

Gray Water Deployable Water Treatment

Brief
The shipboard Gray Water Treatment plant is designed with two trains; each train consists of a common feed system, an ultrafiltration (UF) and low pressure Reverse Osmosis system (RO) system. Each UF train treats up to 65% (325 m^3/day) of the total gray water flow (500 m^3/day total) and each RO train treats up to 65% (309m^3/day) of the total flow (618 m^3/day effluent from gray water ultrafiltration units and 200 m^3/day black water permeate).

Solution
Gray water enters the system through a strainer which screens out objects larger than 104 microns. It is then recirculated in the collection tanks and dosed with hypochlorite using a static mixer.

A further strainer filters out all objects larger than 57 microns before gray water enters the ultrafiltration (UF) treatment system trains.

Each UF train is equipped with backwash pumps, tanks and dosing pumps for backwashing the UF membranes and for cleaning operations. Each train features a dedicated air blower to provide air scour for the UF membranes during backwash.

Before entering the RO trains, permeate from the two UF Trains flows to break tanks where it is mixed with the ship's black water system permeate.

Chlorine is removed from the feed to the RO Trains.

Membranes in each RO train separate the water into permeate, which will meet potable water standards, and wastewater (concentrate). Normally, the gray water treatment plant operates as a single pass RO system, but the RO Trains can also be configured to provide double pass treatment.

Concentrate is sent either to a black water sludge tank or to an overboard discharge tank. Treated permeate is drawn from the RO permeate tank and fed through a UV disinfection unit to treated water tanks for use.

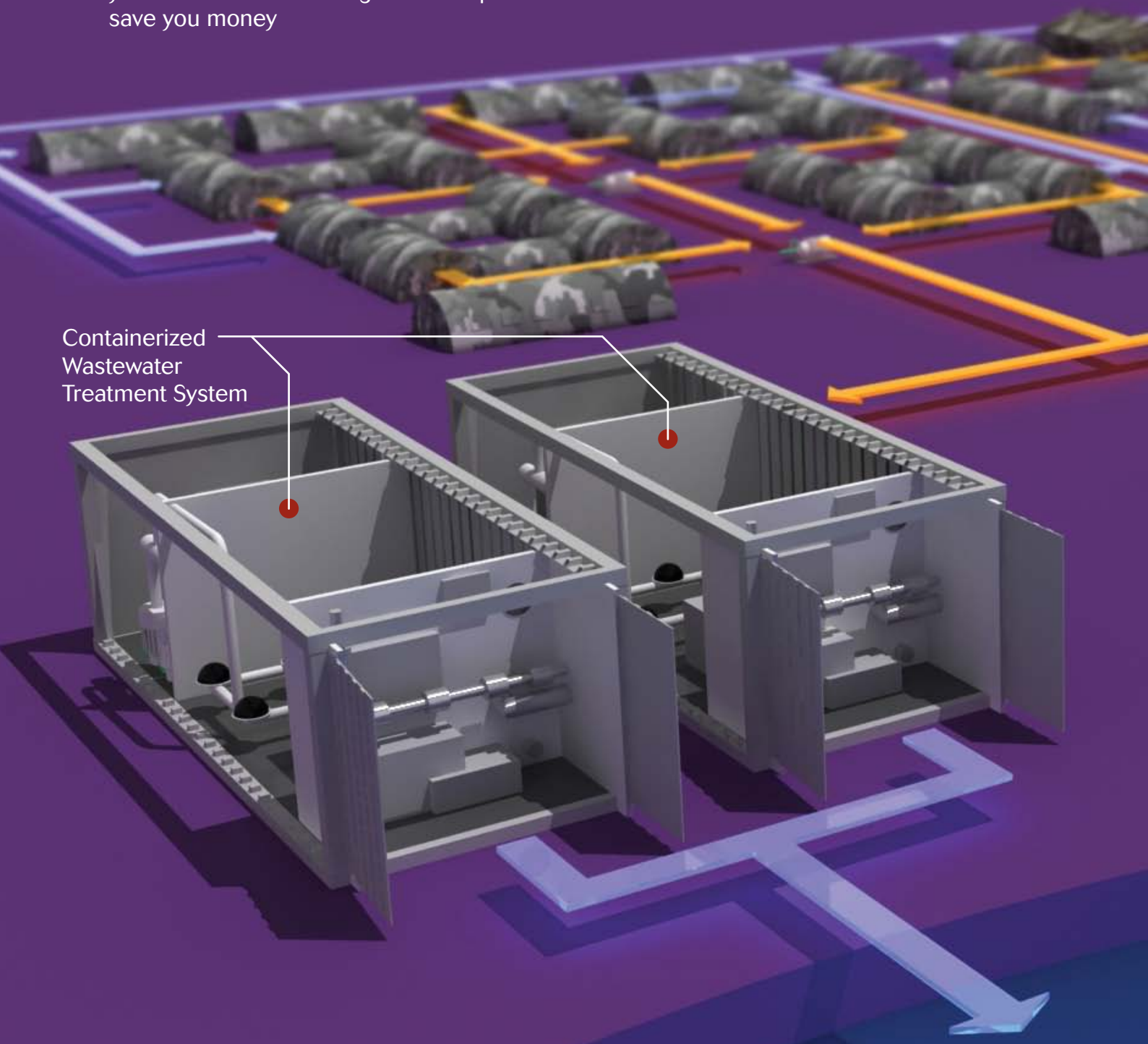
Outcome
The system is currently installed aboard two cruise ships, with two more installations in the works. Since switch-on of the new plant, it has continued to operate trouble-free and within its operational parameters.

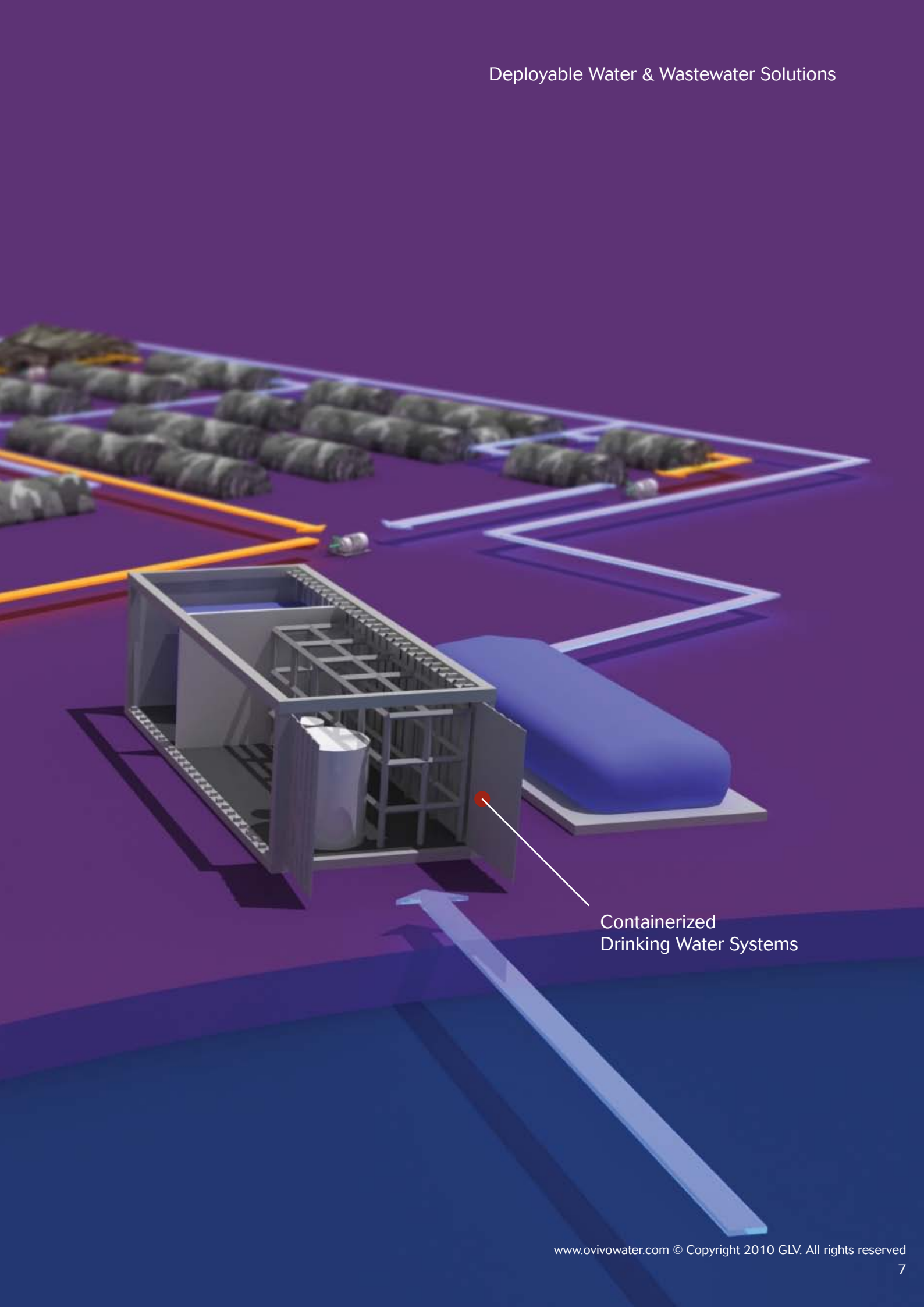
How we created value

- Assured efficiency and cost-effectve operation.
- All the gray water is treated, each train of the 2 train system can treat 65% of the total flow, providing back-up redundancy.
- 200m^3/d of Black Water Permeate treated.
- The system is capable of treating 130% of the average gray water flow.
- System is treating to the strictest water guidelines in the marine industry.

Our Deployable Water processes

Discover the ways we can help you with your wastewater challenges and help save you money





Prolonging the efficient life of your assets

Ovivo takes a business-orientated view of total operating costs in water and wastewater. Each office can draw upon global best practice and in-depth application knowledge to ensure the efficient and effective running of water solutions within clients' businesses.

Ovivo's commitment to clients is total, with experts dedicated to the provision of high quality operational support, maintenance, and refurbishment.

Ovivo teams worldwide can test and confirm the operating capabilities of systems via regular inspections, either onsite or remotely. They will calibrate water treatment equipment periodically, as specific client service contracts require it.

Your local Ovivo team operates a quality system that conforms to ISO 9001 ensuring that:

- Communicating is as easy as possible.
- Local resources are used wherever possible.
- Costs are kept to a minimum.

Backed by a comprehensive telephone support service and spare part supply agreements, Ovivo's commitment is to develop productive, long-term customer service relationships with every client. Ovivo can monitor treatment systems remotely, including those aboard ships, and it will audit equipment performance aboard vessels. Its teams ensure that the plants are kept in optimum condition, minimizing downtime for your business and enabling you to operate at optimal efficiency.

Applications and Solutions

Industry	Solution	Application
Deployable	Drinking Water Treatment	Clarification
		Filtration
		Desalination
		Distillation
		Re-mineralization
	Process Water Treatment	Pre-Treatment
		De-ionization (Demineralization)
	Wastewater Treatment	Biological Aerobic Treatment
		Membrane Bioreactors
		Flotation

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