

PUREBLUE

RECOVER. REUSE. REGENERATE.

THE MICROPACK⁺⁺ GENERATION

INNOVATION IN DECENTRALIZED
WATER TREATMENT

CENTRALIZED VS. DECENTRALIZED

THE FUTURE OF WASTEWATER
TREATMENT

HEALTHY SOILS

OUR EFFORTS TO MAKE
IMPACT

PASSION FOR WATER

OUR PEOPLE HAVE IT

PURE
BLUE

We want to make impact. Starting today.

You have the very first PureBlue Magazine in your hands. Meet a company specializing in sustainable and innovative water treatment solutions. The mission is our guiding principle: returning water to its natural state. And then? Then healthy soils are created and the environment becomes greener and more resilient. We believe in a future with decentralized water treatment: modular, flexible and close to the source.

In 2022, PureBlue has grown very rapidly, not only within the organization, but also in the technological development of (biological) technology. Smart solutions and an eye for detail made us grow from a product supplier to a solution supplier. With an enthusiastic team full of smart people, PureBlue is now stronger than ever. That calls for a new, more spacious office with more production facilities. We continue to do everything ourselves: from R&D to production, from engineering to service. Everything and everyone under one roof.

Our expertise lies in the biological treatment of wastewater. That is why the MicroPack⁺⁺ Generation is the focus of this magazine. In this installation everything comes together: innovation, technology and experience. With the MicroPack⁺⁺ Generation we can offer a substantial solution in sustainable water management. Our focus is on “recover, reuse & regenerate” our hydric resources purifying wastewater, in a way that it can be reused again (for agriculture, industry, green cities, etc) with the ultimate goal of restoring the soil and contribute positively in the fight against climate change. The starting points for the developments were therefore to achieve as low a CO₂ footprint as low as possible and to be able to have an energy neutral treatment. These are large ambitions, but we're there. We are more than ready to make impact now.

We see great opportunities for decentralized water purification in countries such as Oman, Qatar and Dubai. Our green-city concept is just one of the sustainable examples. A lot is possible and we are eager. The removal of medicine residues is also receiving our special attention. A combination of MBBR, DAF and AOP technology allows us to successfully treat wastewater from i.e. hospitals, among other places, producing water free of medicine residues.

Would you like to know more about the applications and possibilities? Please feel free to contact us. We look forward to meeting you!

Angelo de Mul
CEO



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BUSINESS CASE - CAMPING OLMENVELD

Sustainable Water management: reuse water in the direct surroundings

Jos Westerbeke, owner of Camping Olmenveld, has recently made several sustainable investments to reduce his CO₂ footprint and save costs. One of these projects is the treatment of waste- and rain water with the decentralized water technology of PureBlue in order to make it ready for reuse. This project provides a renewed source of fresh water, suitable for local applications.

The goal? A closed water cycle! Until now, rainwater runs directly into the ditch. The water that camping guests use, for example for washing up, showering and flushing, ends up in the sewer. Thanks to the PureBlue water treatment system, both water streams can now be reused.

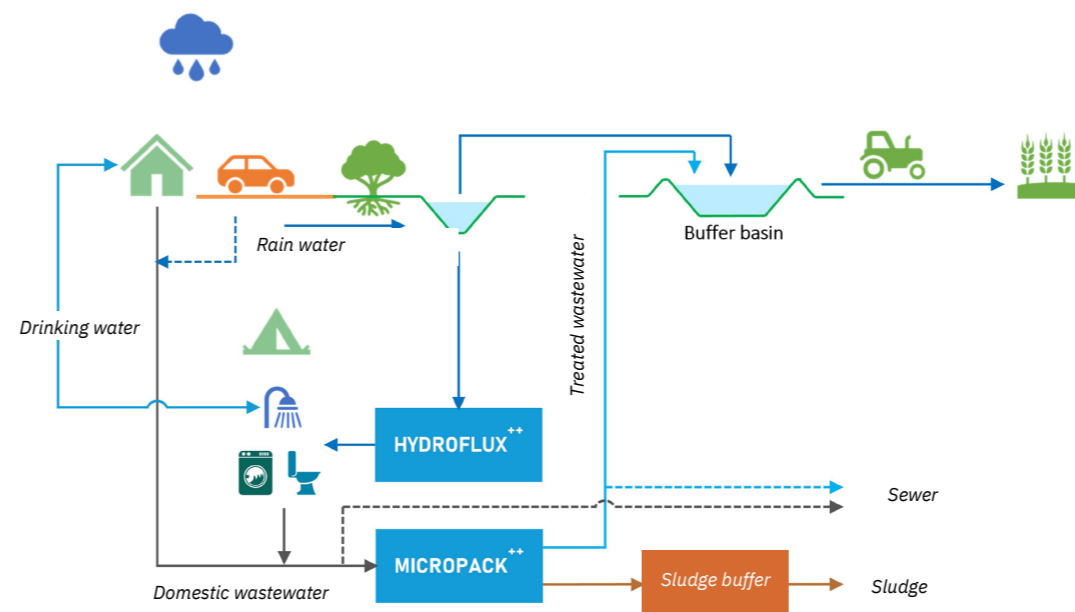
The basin serves as a location to buffer large amounts of water. The water treatment installation enables Westerbeke to use the clean water itself, for example for applications at the campsite. Irrigating of plants and trees is an option, but the water can also be used to flush toilets. In this way, the Olmenveld camp site is able to nearly close the water cycle. But it is not only Westerbeke who benefits from this project..

Clean water goes beyond the campsite

In the immediate proximity there is, in fact, plenty of interest in the renewed water. For example, surrounding farmers have an extra source of fresh water they can use during the productive season. A collaboration has also been found with local sports clubs. They will use the water to irrigate their fields. More applications for this concept can be thought of. Industries can make good use of the water, particularly for cooling processes, when the fresh water supply is scarce during the summer.

“We wanted to know how we could save costs and reduce our carbon footprint of our wastewater streams. The combination of the treatment plant and the water basin seems to be the solution.”

Jos Westerbeke -
Owner Camping Olmenveld



How to finance a pilot project like this?

The pilot at Camping Olmenveld is being developed with support from Hogeschool Zeeland (Expertise Centre for Water Technology). Westerbeke also counts with the help of HISWA-RECRON.

In addition, the project fits in well with the objectives of the EU React programme and for this reason can find financial support here. Westerbeke also makes use of two subsidy programmes, the Environmental Investment Allowance (MIA) and the Arbitrary Depreciation of Environmental Investments (Vamil).



DRIVEN BY INNOVATION

Our R&D team is frontrunner in innovation

PureBlue thrives on innovation. By being at the forefront of new technology, we continue to improve and contribute to a more sustainable world. We do almost everything from our own PureBlue lab, and there are also collaborations with various universities and knowledge institutes. Together we develop the tools for the future. In this article we explain a current development for sustainable degradation of micro-pollutants from wastewater: the PureBlue MicroForce⁺⁺!

Our R&D team is currently developing an innovative approach for the degradation of micro-pollutants in WWTP effluent focusing on a low CO₂ footprint and low cost. Current best available technologies for the removal of micro-pollutants have a large impact on the CO₂ footprint when treating municipal and industrial wastewater.

Removing medicine residues using techniques that are already widely used today, will double the CO₂ footprint. Therefore, PureBlue is developing a technology capable of reducing environmental impact with lower cost, by combining an ozone-based technology with a sustainable biological process: PureBlue's MicroForce⁺⁺ technology. This technology can be used as a stand-alone system or implemented as the first stage of a hybrid process with microbiology.

The further development of the MicroForce⁺⁺ for WWTP effluent is based on years of experience treating industrial wastewater, allowing us to scale our technology to full scale application for wastewater treatment of chemical industries. We are able to treat the water at half the operational cost, compared to competing technologies. The reactors are very compact which also has a very positive impact on the investment costs for this new technology. We were therefore keen to prove this development to the Dutch water boards in the fight against harmful micropollutants.



Nelis de Rouck gives a presentation on MicroForce⁺⁺ at Aquatech.

With our MicroForce⁺⁺ technology, we are therefore participating in the Innovation Program for Micropollutant Removal organized by STOWA (Expertise center of Dutch water boards). STOWA's supervisory committee has previously declared our technology a promising solution in the market. We have therefore received green light after conducting the feasibility study, so that the practical phase of this project can be started, in cooperation with Waterschap Scheldestromen, to run a first MicroForce⁺⁺ pilot unit on site.

IMPACT IN RETURN

Awareness for healthy and living soils

At PureBlue, we want to make an impact: healthy and sufficient water and resilient soils. We see it as our duty to take responsibility for this by sharing our knowledge and creating awareness about water issues. And of course we want to do our bit too: with our own Tiny Forest! In our search for the perfect location we met Leonie Hanemeijer. She has built "Hof ter Stene", a piece of land where the health of the soil is number one.



How did you come up with the idea of Hof ter Stene? 10 years ago I started looking at the soil where our food comes from in a different way. After some research I came across the term permaculture, which is the basis for a healthy and living soil. I started to apply this in my own garden, but I also wanted to share this knowledge with others. And exactly at that moment a piece of land became available, that was perfect to start Hof ter Stene. I wanted to create a place where we could take care of the earth together and share the knowledge about healthy soils. That's how I started to build a community around it.

How is Hof ter Stene organized? We started two years ago, with the help of some young people, and then took the initiative to set up this piece of land. I think the fresh perspective of young people is very important in this. There are now nine of us in total. What is very important for the community is that we do everything together. We solve everything in a sociocratic way.

What are you currently doing at Hof ter Stene? At the moment we are still in the start-up phase, and we are mainly clearing the land. We are doing this together and that creates con-

nection, we are learning about permaculture together. Everyone is immersing themselves in different topics in order to learn from each other and share knowledge. We also organize various activities, such as the neighborhood day. We plant all kinds of things together. This created the need to organize other activities to connect people in nature and provide education, such as a yoga class.

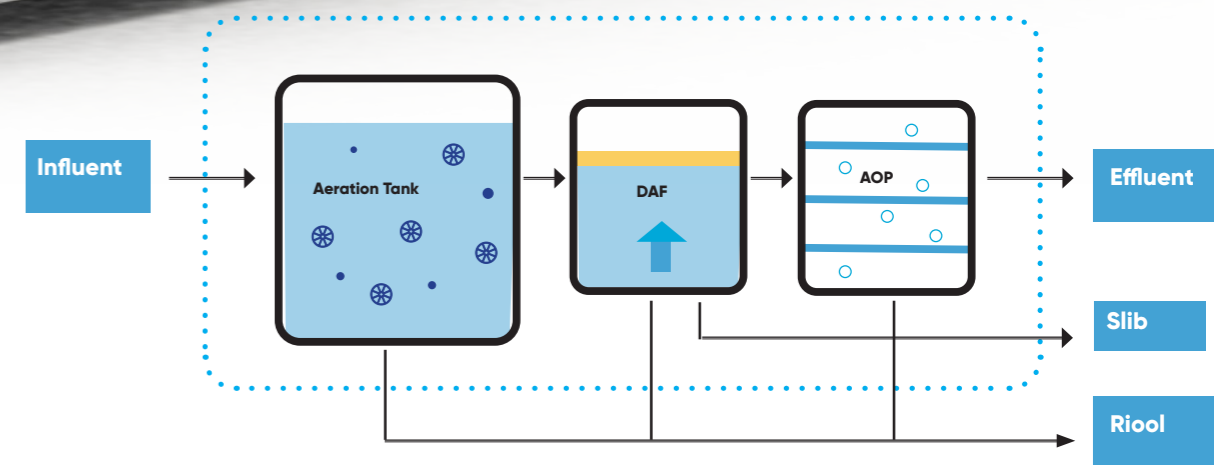
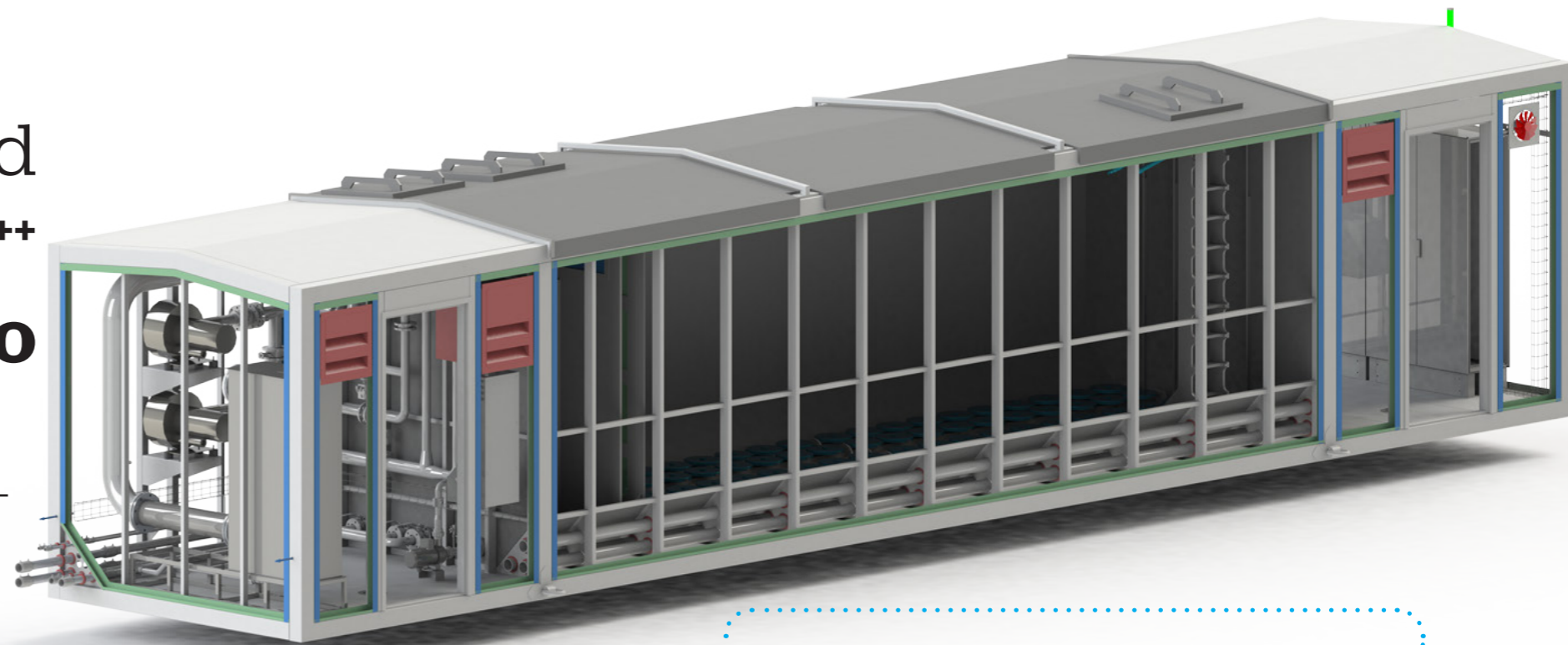
How does PureBlue support you? We were pleasantly surprised that they approached us for a possible collaboration. After visiting the garden, we were very excited and unanimously decided to work together. We think PureBlue is a great company that is a perfect fit for us. We are thrilled with their donation of the trees and shrubs we recently planted together. Together we can create more awareness.



THE NEW GENERATION IS HERE TO STAY

Where innovation and ambition meet: **MicroPack⁺⁺ Generation** is ready to make impact!

The MicroPack⁺⁺ Generation is PureBlue's most innovative solution for treating and reusing wastewater. The modular and flexible MicroPack⁺⁺ treats water close to the source and can be placed anywhere. In this way, we can drastically reduce the CO₂ footprint of wastewater treatment and give water a second life. The installations of the MicroPack⁺⁺ Generation are based on biological treatment and the Advanced Oxidation Process can even remove medicine residues and other micropollutants from water. This makes treated wastewater available for reuse and even restoration of soils. Ready to make an impact!



This is how we make a difference



Recover, reuse and regenerate

We convert wastewater into a sustainable water source for reuse.



Modular installations

All MicroPack⁺⁺ solutions are modular, compact and easily scalable. It can be placed everywhere.



Biology driven

Our MBBR system uses biology. Specialized bacteria break down the various compounds present in the wastewater.



CO₂ reduction

We drastically reduce the CO₂ footprint of wastewater treatment drastically by purifying close to the source. We do this with the most innovative solutions.



Removal of medicine residues

Our AOP removes medicine residues and antibiotics from the water. We are leaders in this technology.



Low maintenance

We make control and maintenance as easy as possible thanks to our PureControl⁺⁺ system. Online monitoring and adjustment when needed.



Sustainable energy

Water and energy are intertwined, making it possible to reuse about 60% of energy.



Removal of micro-pollutants

Our MicroForce⁺⁺ also removes harmful micro-pollutants, ensuring very high quality reusable water.



Low costs

Easy installation, compact size and low maintenance keep costs low.

MicroPack⁺⁺ (MBBR)¹

An innovative biological technology that treats water and valorizes the waste into renewed material. In the first step, MBBR, specialized bacteria break down the various compounds present in the wastewater.

Model	MP_S	MP_M	MP_L
L x W x H (m)	11 x 3 x 3	15 x 3 x 3	25 x 3 x 3
MBBR volume (m ³)	25	50	100
Capacity (Inhabitant equivalent)	600	1200	2400

MicroFlux⁺⁺ (DAF)²

Then, very fine bubbles of dissolved air in the MicroFlux⁺⁺ separate the clean water from the biomass and suspended solids. In addition to producing clean water, biomass can be digested into a new source of green energy.

Model	MF_S	MF-M	MF_L
L x W x H (m)	7,5 x 3 x 3	7,5 x 3 x 3	7,5 x 3 x 3
Capacity (m ³ /hr) 500mg/L solids	3	6	12

HydroForce⁺⁺ (AOP)³

An additional treatment step that removes micro-pollutants and medicine residues from the water. This is done by means of advanced oxidation processes (AOP). It is the solution to turn effluent into a renewable source of fresh water. Ready for reuse or to safely return it to nature.

Model	HF_4	HF_14
L x W x H (m)	7,5 x 3 x 3	7,5 x 3 x 3

Want to know more about the ideal configuration for your wastewater?

We are happy to advise you. Please feel free to contact us.

¹ Moving Bed Biofilm Reactor
² Dissolved Air Flotation
³ Advanced Oxidation Process

Water without medicine residues.

We are ready.

Did you know that treated wastewater in most countries still contains medicine residues and other harmful substances? It harms nature and brings our ecosystem out of balance. It is even a threat to our health. Did you also know that we can change this right now? Our technology is ready to make wastewater truly clean and safe for reuse or to return it responsibly to nature and contribute to healthy biodiversity. Without medicine residues.

Sustainability in health care

Our HydroForce⁺⁺ is the final step in the MicroPack⁺⁺ Generation configuration. This highly innovative Advanced Oxidation Process (AOP) unit removes harmful medicine residues and micropollutants from wastewater.

Although water boards and legislation will only take action on medicine residues removal from 2030 onwards, we are already making an impact. Why keep returning polluted water to nature when we can actually make it safe again? We feel the urgency to make the difference now. And fortunately, we are not alone in this.

Our AOP technology will be widely available for central wastewater treatment plants as an add-on installation or within a decentralized configuration.

Fortunately, more and more organizations are feeling the same responsibility as we do. Healthcare organizations are taking steps forward towards a sustainable future. The GreenDeal that they have created with each other is a roadmap to work towards a greener and CO₂-neutral business. They also want to take care of the wastewater they produce. This water contains a higher concentration of medicine residues because of patients who are treated there.



Our MicroPack⁺⁺ Generation is the perfect solution for treating wastewater from healthcare organizations. We can treat directly at the source. The HydroForce⁺⁺ component of the configuration removes medicine residues. The result: medicine-free water that can be used for greening the environment, supplying water to surrounding agriculture, or it can be safely returned to nature.

In addition to safe water, the HydroForce⁺⁺ also contributes to a lower carbon footprint. The installation drastically reduces CO₂ emissions during treatment. In that respect this solution also contributes to the objectives of the GreenDeal.

“Healthy water is the first and most important medicine.”

	MicroPack ⁺⁺ (MBBR)	MicroFlux ⁺⁺ (DAF)	HydroForce ⁺⁺ (AOP)
Type of unit	MP_M	MF_L	HF_I14A
Dimensions (LxWxH in m)	11 x 3 x 3	7.5 x 3 x 3	7.5 x 3 x 3
Max Weight (tons)	70	20	15
Power (kW)	25	17.5	11
Indication energy consumption (kW)	10	8	7

Indicative composition of a MicroPack⁺⁺ Generation for an average hospital. Our consultants always make a proposal that fits your situation.

From centralized to decentralized treatment.

The best idea.



Decentralized water treatment in the Middle East
 Different challenges than the Netherlands, but the same solutions: Reusing water to make cities greener and cooler, to create healthy soils to grow food, lower CO₂ levels, prosperous and healthy environments. With decentralized treatment we can accelerate the world's transition to a sustainable watercycle.



At PureBlue we are working hard to create a greener world, and for us this starts with clean and safe water. Our 'Green City' concept is based on a circular water chain in urban areas. We focus on renewable sources of fresh water and encourage CO₂ sequestration in the soil and microclimate control through the use of plants and trees.

distances and the conventional treatment process uses a lot of energy and releases a lot of CO₂. By treating wastewater centrally, 610,000 tons of CO₂ are released annually. That is equal to the emissions of 185,000 cars in The Netherlands! If you wanted to compensate for that, you would have to plant a total of 25 million trees.

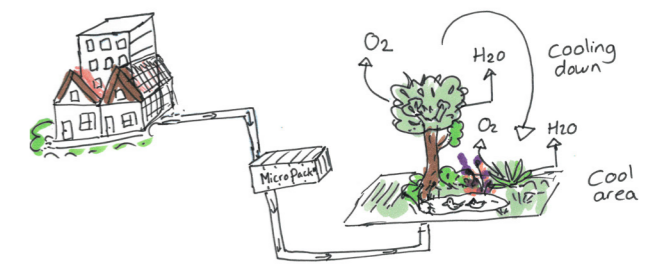
In The Netherlands, the current situation is based on centralized wastewater treatment. This means that all sewer pipes, in a city for example, go to one large sewer, which then takes the wastewater to the central water treatment plant, after which it is discharged into larger water bodies. Pumping over long

On top of that, due to the growing population, many centralized treatment plants are running at their maximum capacity. This leads to dire situations when new neighborhoods are built. PureBlue believes that decentralized treatment offers a solution to these challenges.

What if wastewater didn't all go through one single pipe to the wastewater treatment plant, but each neighborhood had its own compact treatment plant connecting the residents to each other via water? This would shorten the wastewater chain, emit significantly less CO₂ and make residents more aware of their water use and natural environment.

Water is the beginning of connection between people, their food production and their environment. Reclaimed water can be used safely and responsibly for numerous applications. Think of irrigation of urban greenery, irrigation in agriculture or as process and cooling water in industry.

Return water to nature in the state it was received. By closing watercycles and putting more effort into reuse, for example in agriculture, industry or in the city, we prevent shortages of fresh water. This is more important than ever, because water scarcity threatens the quality of life in urban areas worldwide.



PureBluers choose to work with a mission.

The heart of our company: our team. A group of passionate professionals who work with a mission: to make the world a little better with our solutions. One person contributes to innovation, the other to technology, everyone within the organization contributes with their strengths. Here we get to know a number of these enthusiastic people.



Nimmy George
R&D Developer

I like PureBlue as a company because it develops a lot of technologies. I can put my passion into that. You can learn new things all the time and you are really involved in the 'company perspective'.

Together with my family, I moved to Zeeland (province in the south west of the Netherlands) for my work. I'm very happy with the new

connections I've made so far. Everyone is very committed and helpful. That's nice for new co-workers.

My ambitions? PureBlue offers plenty of opportunities to expand my knowledge. I want to become more versatile in knowledge of the different water treatment technologies and who knows, maybe one day do a project in my home country; India!

The work at PureBlue is always very diverse, because you get a lot of responsibility and there are many different tasks to be executed. PureBlue is a great company to explore your own potential.

There are a number of projects I am proud of. Especially the development of the MicroFlux⁺⁺ has been a nice and challenging development project with good results, which also contributes to the new MicroPack⁺⁺ Generation. I was also

responsible for a large part of the development of the InnoPack Mini⁺⁺ (our solution for maritime applications). This is a water treatment system for ships, the size of a refrigerator, and suitable for all wastewater up to ten people.

I would still like to be involved in some great projects within PureBlue. Examples are the development of the HydrOzone⁺⁺ and the MicroForce⁺⁺. These installations are under development to remove medicine residues from the effluent of water treatment plants in order to facilitate water reuse.



Sam de Blied
Engineer



Julia Mariman
Intern HRM

Although I have only just started as an intern, I really enjoy working at PureBlue. I work in a fun and young team where I quickly felt at ease. There are still many opportunities to grow in this company, and I really like that.

I am in the final year of my Human Resource Management studies at the Avans University of Applied Sciences (NL) in Breda. I would

love it if I could do a good research in the near future, with a lot of valuable recommendations in relation to the company's HR policies.

It is important to me that my work remains challenging. That fits in with the character of PureBlue. The company is currently growing a lot and I see many interesting opportunities that I would like to work on.

BEST EMPLOYER IN THE WATER AND ENVIRONMENTAL SECTOR!

PureBlue was selected as the best Dutch employer in the water sector. What an honour! We got the award from branchorganisation Envaqua and it was handed over at the Aqua Nederland fair. The jury found Pure Blue to be the most inspiring, progressive and ambitious employer.

Lisa, Angelo, Ivory and Nikki (left to right) receiving the award.



I experience working at PureBlue as a lot of fun. It is a young team with many nice colleagues. It's great to see that we are working on such new technologies together.

At PureBlue everyone is approachable. You can say anything to anyone and you can go to anyone. This is definitely something that suits me. I really like this transparency in the company!

The project I am most proud of is the project we presented to the waterboard in Ritthem (NL). We were able to put all our technologies into one container, and I am very proud of that.

My goal is to become an even better service engineer in the end. Of course, there is still a lot to learn and I would really like to expand my knowledge. The position of commissioning engineer seems like a very nice position to me.



Wouter Doms
Service engineer

INVESTING IN TALENT & FUTURE

Youth has the future.

Dutch Wavemakers, ClimateSchool, Energy Battle

Dutch Wavemakers

Dutch Wavemakers is an organization with a clear mission: bringing young people with a passion for water and energy together in an ever growing national and international community.

These young people are trained as Dutch Wavemaker ambassadors and are brought together during physical events and on an online platform. In everything they do, the organization makes the unique connection between the content of the global water and energy challenge and the atmosphere and energy of (inter)national top sports, especially water sports.

We are proud partner of Dutch Wavemakers. The mission is also actively supported within PureBlue. 10 of our team members have followed the training to become Wavemakers and are now ambassadors.

Because of the growing international character of Dutchwavemakers, the organization will continue as Wavemakers United from March 23th 2022.

More information:

www.dutchwavemakers.nl /
www.wavemakersunited.com

PureBlue Climate School

Last year we organized the first PureBlue Climate School at our location in Kapellebrug (NL). A really fun afternoon where we involved 50 children and their parents to a full program of interactive water experiences (thanks to DutchWavemakers), games, a quiz and a meet & greet with Olympic sailor Marit Bouwmeester, who told about her connection and the importance of water. Everything was centered around water and soil. The Climate School is one of our contributions to make youth aware of climate change in a playful way. What a success this afternoon was ... There will definitely be a sequel.



Up: children learn with a water table about the importance of green in urban areas.
Left: volunteers from Team PureBlue
Below: Marit Bouwmeester hands out the medals and awards.

Energy Battle

We are also happy to support initiatives of educational institutes to get youth actively involved in thinking about sustainability challenges of the future. One of these initiatives is the Energy Battle organized by ZB library of Zeeland. This year they are organizing the Energy Battle for the seventh time.

Eight secondary schools are participating this year in this competition around energy, sustainability and circular economy. The teachers work with the students in teams on an assignment from companies. The finals will take place soon.

Various companies act as clients for the school projects. Together with the organizers, they give a guest lecture, offer an excursion and are part of the jury during the preliminary round at the school. The best student team pitches their idea in front of a professional jury and a youth jury in the provincial final.

We are one of the companies committed to serving as a client. In this way PureBlue wants to make young people aware of the various possibilities that exist to contribute to climate action, but also to make them aware of the possible choices to specialize yourself towards the sustainability sector.

duurzaamheidsuitdagingen van de toekomst.

AMBITIONS - PARTNERS & PROJECTS ABROAD

The MicroPack⁺⁺ generation brings water to places where it is most needed.

The MicroPack⁺⁺ Generation, because of its modular Green City applications, which creates renewed water fit for reuse in greenery, food, agriculture and soil regeneration. This concept stands out in regions where there is a great need for water. There is a lot of interest from the Gulf region, but also from countries around the Mediterranean Sea, where drought is becoming an increasing problem and the demand for sufficient and safe water is growing. Sustainability is the leading factor. Always.

Trade missions to discover and find partners. In the past few months we have been on the road a lot. As soon as the Corona pandemic measures allowed, we visited many regions and made valuable new contacts.

There are a lot of connections with our concepts and innovations when it comes to the issues at hand. For example, we can make a valuable contribution to the reuse of water, which is becoming increasingly scarce in these areas. We can bring water to places where it is most needed, for greening cities

(and cooling through green air conditioning concepts), making water available for food production in areas where it is not currently possible due to drought. Water can be safely returned to nature and contribute to soil recovery there. We do this with the smallest possible ecological footprint while contributing to the global CO₂ targets.

Because the MicroPack⁺⁺ Generation is modular and compact, it can be placed everywhere. This is also an enormous benefit in countries in the Gulf region. The applications are endless. We see great interest from developers, hotel chains, government, universities and companies. Not only the product plays a role in this, but also the social innovation around our concept is seen as an opportunity.

During trade missions in Dubai, Saudi Arabia and Oman, concrete steps were taken and valuable contacts were made. CEO Angelo de Mul was the keynote speaker at the Abu Dhabi Sustainability Wee, visited the World Expo in Dubai, and went out with embassies to meet new partners and listen to the need for circular water solutions in the countries concerned.

We will also be present in these regions in the coming period. We aim to get in contact with parties seeing a possible connection with our concept.



Partners & projects wanted
 We believe in the power of collaboration. Together we can make more impact much faster. As a solution provider with a broad concept, we see many opportunities and especially much added value in collaborations with other parties.

 PureBlue is always open to meeting companies who would like to carry out a pilot project with us, or who can provide an addition to our concept. Together we work toward a common goal: a greener planter!

 We are currently actively seeking for parties who want to team up with us in the MENA region.



Recover.

Reuse.

Regenerate.

Water.



How can we help you?



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