FUTURE WATER

Securing our planet's key resource for the generations to come



Saving our planet, lifting people out of poverty, advancing economic growth... these are one and the same fight. We must connect the dots between climate change, water scarcity, energy, food security, energy shortages, global health, and women's empowerment. Solutions to one problem must be solutions for all.

Ban Ki-moon to the 66th UN General Assembly



No water, no life. Human beings are mostly made of water.



An infant's body weight is approximately 75% water.*



The average human adult male is approximately 60% water, by weight, and water accounts for around 55% of the body weight of the average human female.*

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Just how much fresh water is there on Earth?

These water droplets compare the volumes of water on Earth with the volume of Earth itself. Looked at this way, the oceans are just a very thin film on the surface of our planet. We need sustainable water solutions. Urgently. Bottom line, the familiar image of Earth from space is massively misleading. So much blue, yet so little water compared with the volume of our planet. And so very, very little water that we can a), drink, and b), access easily.

71%

of Earth's surface

is covered in water

2.5%

of this water is suitable for human consumption

rivers, groundwater, atmospheric water, people, animals and plants adds up to 1,386,000,000 km³ by volume.



All the water in oceans, ice caps, lakes,





















The droplet is

in diameter





272.8 km

The droplet is

in diameter

Planet Earth: 12,742 km in diameter



<1%

of this fresh water

is accessible to us

The volume of fresh liquid water in the ground, swamps, lakes and rivers amounts to 10,633,450 km³. Of this, 99% is groundwater, and a lot of this is inaccessible to us.

Freshwater lakes and rivers available to humans add up to 93,113 km³ by volume.

'Our' droplet is just



in diameter*

SUSTAINABLE WATER SOLUTIONS

The need to identify, develop and roll out sustainable water solutions is becoming more pressing every day. The combination of a growing human population and climate change are fuelling political and socio-economic tensions. Fresh water, fairly and readily available, is central to sustainable development, healthy ecosystems and, ultimately, human survival.

Amiblu's mission is to speed up the world's transition to sustainable water solutions. How? Through boundless imagination, solid science and great teamwork. From R&D and innovation, to engineering and quality manufacturing, to partnerships and co-creation around pipeline and pipe-related sustainable water management. Everything we need to get the water to the people.

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Amiblu is the world's largest supplier of GRP pipe systems and solutions.

Our GRP pipes are both exceptionally strong and light-weight, resistant against corrosion and abrasion, they feature optimal hydraulics and a remarkably long, maintenance-free lifetime of more than 100 years.

Two powerful brands coming together HOBAS



Amiblu is a 50:50 joint venture whose goal is to develop and deliver fully sustainable water solutions. Amiblu combines Amiantit Europe and its Flowtite Technology, and Hobas Europe, part of WIG Wietersdorfer Holding, and is the specialist in drinking water, irrigation, waste water, hydropower and industry.

The two businesses have distinct expertise that complement each other perfectly. Hobas is a leader in 'centrifugally cast' pipe systems, and Flowtite in 'continuous filament wound' pipe systems. Amiblu's headquarters is in Klagenfurt, Austria, and the company has production facilities in Germany, Austria, Spain, Poland and Romania. It has R&D centres in Norway and Austria, and employs around 1,500 people.

Our licensee partners around the world, plus an extensive network of sales and engineering offices, add a further global dimension. The result is that wherever our customers require a sustainable, high performance solution, Flowtite Technology and Hobas come together to deliver precisely what they require.





We can have sustainable water

Why are we replacing pipes every generation when it's not necessary? Why are we allowing corrosion and leakage to pollute our water and environment when we can stop it? Why are we paying more today for something that lasts half as long when there's no need to? Why are we generating extra emissions by transporting ductile iron and steel when we don't have to? This can't be right.

It can't be right because in every case there's a better, simpler, smarter and more sustainable answer to using concrete, ductile iron and steel to build pipelines for water. And that answer is GRP. GRP pipeline solutions outperform concrete, ductile iron and steel pipes on every dimension. Like plastic, GRP pipes are lighter, easier, more flexible and cheaper to transport and install than concrete, ductile iron and steel. Unlike plastic, GRP are more rigid and can be used to create large-diameter pipes that are strong at low weight.

In terms of CO2 emissions, GRP beats concrete, ductile iron and steel every time. GRP pipes have a lower manufacturing, transportation and lifecycle footprint. They last over 100 years. They are corrosion-free. And whereas plastic pipes become uneconomic at large diameters because of the thick pipe walls needed to make them robust, the latest impact resistant GRP pipes offer a sustainable and competitive alternative to concrete, ductile iron and steel.

In a world where the demand for water is increasingly stressing available supplies and resources, our industry needs these benefits. GRP's low flow coefficient, for example,



means hydropower schemes can generate more energy from each cubic metre of water that passes through the turbine. It also reduces pumping costs in potable water and irrigation systems. That same low flow coefficient makes otherwise marginal, low-gradient hydro schemes economic, while the light weight and easy handling of GRP pipes make them ideal for bringing water and power to and from remote areas and communities. Plus, GRP pipes last for decades, which supports long pay-back times. They also do not corrode, foul up or clog, and so require virtually no cleaning and maintenance. And what is true for hydropower is also true for potable water, wastewater, industry and irrigation.

With Amiblu GRP pipeline solutions, we are bringing the benefits of lightweight technologies to large diameter pipeline systems. Amiblu is a joint venture between Amiantit Flowtite and Hobas to provide fully sustainable water solutions. Our solutions cover GRP pipes, tanks, CSOs, inspection chambers and more, all engineered for sustainability across the supply chain. Our services include consultancy, engineering design and installation. With Amiblu, we are solving the 'whys' and so helping the world meet our growing demand for water – sustainably.

Nick Crofts,

CEO Amiblu Group



We can be smarter about how we deliver water

Talk of smart cities and smart technologies immediately conjures up images of the Internet of Things, big data, algorithms and artificial intelligence. Fridges that tell us to buy more butter. Street lighting that brightens and dims as we drive by. But 'smart', in the broadest sense, has a role to play in engineering and deploying sustainable water solutions, too.

All around the world, people want our industry to provide them with secure supplies of clean drinking water. They want reliable water for agricultural, industrial, power generation and other uses. They want us to separate and treat sewage safely. They want us to prevent the pollution of their rivers, lakes and underground fresh water sources. And they want us to do all this with minimal disruption to their daily lives. Smart can help us get there. To us, being smart involves not only data, sensors, connectivity and software, it also involves new product and service concepts and step-change innovation. As Amiblu, we believe in applying 'smart' thinking across the board. It begins with the benefits offered by GRP technology, and spreads from there.

Take cities. Smart cities separate stormwater flows and sewage to prevent the pollution of ground and river water. But this is not always possible. However, rather than simply accepting the risks posed by all-in-one sewage and stormwater systems, we have developed a Combined Sewer Overflow chamber. This custom-made solution outperforms traditional overflow systems by doing a better job at separating solid waste from stormwater before the latter drains into a river or lake. That's smart. Going further, we envision working with installation partners, IT specialists and network operators to transform dumb pipes and inspection holes into connected ones. This way we could monitor flow and water level data to provide early warning of sewage leaks and surge events; measure pressure and flow rates to adjust and optimise hydropower production; and measure pressure and flow to manage water supplies and irrigation systems.

We can also use smart thinking to improve the installation and maintenance of our water networks. GPS-based network registration, for example, can prevent pipelines getting 'lost' in the future, while also documenting the design and other critical criteria. Smart is also behind our 'no dig' jacking solution for new build pipelines, and our 'push through' relining concept that extends the life of ageing sewer systems by decades. Both speed up installation while reducing civil works, traffic hindrance and general inconvenience.

All this is smart. And we have only just begun.

Claus Brun,

CCO International Amiblu Group





"As Amiblu, we believe in applying 'smart' thinking across the board. It begins with the benefits offered by GRP technology, and spreads from there."

Claus Brun

We have enough water...

...if we manage it well

Less than 1% of the water on our planet can be used for human consumption. Yet despite this, there is no global water shortage in overall terms. And where water is short, the situation can be mitigated through the integrated management of our available water resources. For instance, by aligning our water use patterns with the needs of different users, including the environment.

So, while there may not be much water, we do have enough water. We just need to get smart about how we manage the water we have.



Ways we can manage our water better

As populations grow, it's getting harder and harder to ensure sufficient safe water supplies for everyone. And with climate change and the degradation of nature, we cannot simply take more water from lakes, rivers and aquifers. We need to actively manage the full water cycle from a water sustainability perspective. From fresh water abstraction, pre-treatment, distribution, use, collection and post-treatment, to the use of treated wastewater and its eventual return to the environment, ready for the cycle to start over.

Repurpose our wastewater

One way to manage our fresh water better is to be smarter about managing wastewater. Globally, 80% of wastewater goes back into the ecosystem without being treated or reused. The drinking water of some 1.8 billion people puts them at risk of

cholera, dysentery, typhoid and polio. But suppose that instead of flushing raw wastewater into drains and channels, we repurposed it to help us meet the growing demand for water in our increasingly urbanising society? Wouldn't that be a huge step forward? Well, we can.

Wastewater, intelligently managed, can play a major role in meeting the growing water demand in our rapidly expanding cities. It can be used to enhance energy production and industrial development. It can support sustainable agriculture.



Cities

Take cities. Why use drinking water for irrigating public spaces and cleaning streets, when we could be using clean but not potable wastewater instead? Treating wastewater according to intended usage can make recovery more cost effective.



Industry

Then there's industry. Industry accounts for 22% of global water use. But that average hides some dramatic differences. Industry's share of water use is roughly 50% in developed countries, but only 4-12% in developing countries. The latter figure is expected to rise quickly. The more businesses reuse their wastewater internally, or share it with other industries nearby, the better for everyone. Opportunities include using process water for heating or cooling, and rainwater for toilet flushing, irrigation or washing vehicles.



Agriculture

And finally, there's agriculture. The growing use of chemical fertilizers and pesticides makes agriculture an increasing source of potential environmental pollution. Pollution of ground and surface water caused by the release of untreated or inadequately treated agricultural wastewater is a major issue in many developing countries. But, with the appropriate treatment, wastewater can supply both much-needed water and valuable nutrients. This would improve food security and standards of living.

We need a circular water economy

Wastewater is our largest category of untapped waste. A huge opportunity. A circular economy would value wastewater for its potential, rather than discard it or ignore it. As well as providing an 'extra' source of water, safe wastewater management can help protect our ecosystems and supply us with energy, phosphorus, nitrogen and other nutrients and recoverable materials.

Wastewater is the natural starting point for the circular and using water more intelligently. For example, water becomes increasingly polluted as it travels down pipes,

organic waste in ways that sterilize that waste, make it more



WASTEWATER TREATMENT PLANT Sedimentation basin, sewage flowing through large tanks.



Always at the forefront

As Amiblu, we are stimulating the spirit of innovation with the best science and creativity companywide. We are introducing new standards for life cycle assessment and long-term performance. We are training and supporting engineers around the world and leading research and action to improve drinking water and make clever use of wastewater. We are adding smart intelligence to our pipes and developing solutions that will easily exceed our 150-year standard. We are laying claim



HE SPIRIT OF INNOVATION



MÖHRA,GERMANY

Stormwater overflow system with a volume of 145 m³, in a discharge chamber, an outlet and a solid reject retention sy

Managing storm and wastewater in new and smarter ways

Managing urban wastewater and stormwater is a huge challenge that ranges from coping with the consequences of rapid urbanisation and growing populations, to the impact of climate change. As a result large parts of our urban and ex-urban wastewater and stormwater networks are, or soon will be, undersized, underperforming and not up to the job.

The risks of flooding and sewage discharge into urban areas and waterways are seen all too often as major cities suffer inundations, transport gridlock and repair bills that, at best, jeopardise growth and future investment, and, at worst, endanger life.



The ideal answer isn't always ideal

The ideal solution is to keep stormwater and wastewater sewers separate. But in many cases, this means ripping out existing combined storm and wastewater systems and replacing them with two new and independent networks. This is expensive, disruptive and controversial, especially when dealing with historic towns and cities.

But there are other possibilities. As Amiblu, we're working on new and smart solutions to improve the management of storm and wastewater in existing combined sewerage systems. Our Combined Sewer Overflow chamber, for example, is extremely efficient and effective at separating



Only 2% of the 165 billion m³ of wastewater that is collected and treated throughout the world is currently reused.*

suspended solids from wastewater. These solids are then guided to a wastewater treatment plant, leaving the cleaned water to be led into the water course, safely.

A life-extending solution for combined sewers

Each Amiblu CSO chamber is individually designed and optimised based on flow analysis data, conceivable flow rates and available working space. The result is reliable stormwater overflow, a low-maintenance and self-cleaning system, the optimal separation of suspended solids and extra storage. Being modular, every chamber is quick to install, requires little space or excavation work and can withstand high traffic loads with minimum covering. Simple. Smart. Effective.

We need to grow more food using less water







Agriculture is the largest consumer of the world's freshwater resources and looks set to remain so.

The production of biofuels could require as much water as it takes to extract fossil fuels.

Not only is the demand for food growing, but the move from starch-based diets to more meat and dairy-based ones is further driving up water consumption.

Efficiency measures, such as employing precision irrigation systems that adapt according to data from water providers, can help save water and energy throughout the agri-food chain.



A simply better way to irrigate crops

There's a tension at the heart of growing oranges commercially. Orange trees like lots of sunshine and lots of water, but lots of sunshine tends to mean not much water. Compounding the challenge is that in many places, irrigation systems are open channel, so much of the already scarce water evaporates.

It doesn't have to be this way. When 1,800 farmers near Valencia, Spain, replaced their open channel irrigation system with an 11,000 metre GRP pipeline and drip irrigation network, water consumption fell by a third while orange production increased by a third. And the time to first fruit of young orange trees fell by two years. So, less water used, more food produced. That's the kind of sustainable food production we need more of.

less water per hectare

VALENCIA, SPAIN

Project

Communidad de Regantes de la Rea Acequia de Escalona Villanueva de Castellón

- 1,800 farmers
- 800 hectares of land
- 11,000 m of GRP pipe
- 33% less water per hectare
- 30% more fruit per hectare
- 2 years quicker to first fruit





33% | 30%

more fruit per hetcare



We need more sustainable power

Producing oil and gas, growing biofuels and fracking for shale gas are all water intensive. Highly so. This makes them unsustainable in a world of increasingly stretched water resources. Amiblu is committed to leading the way in supporting the transition to fossil-fuel free energy production and less water-intensive renewables, like hydropower. Hydropower, along with wind and geothermal energy, is a key component in every sustainable energy mix.

AND DURANT AND A

LIMA, PERU, is a vibrant city of light. Amiblu penstocks play a vital role in keeping it that way, sustainably, with a green hydropower project, 180 kms in the mountains.



Hydro is central to the renewables mix

As readily accessible locations are used up, hydropower engineers are turning to steeper and harder-to-reach locations to generate the power we need for our cities and industries. Sustainable GRP pipes help because they are easier to transport and install than concrete, ductile iron and steel pipes. And that's not all.

Our lightweight, low-maintenance, long-life pipes are also helping to bring power to remote communities. Amiblu pipes have already played a key role in hydropower schemes in difficultto-access areas of Chile, Sri Lanka, Uganda, Scotland, Norway and Iceland, as well as Alpine and other regions. Innovations like using short pipes to reduce the number of bends and thrust blocks, couplings that eliminate the need for fittings, and the use of long-drawn curves that facilitate the hydraulics, all make a difference.

Small hydropower projects are very pipe intensive but provide interesting financial returns to investors as well as sustainable energy. Between 2015 and 2020 an additional 1500MW* of small hydropower capacity will be installed in Europe alone. This will demand over €350M of pipes every year.



*Strategic Energy Technology Information System, EU

71%

Hydropower is the leading renewable source for electricity generation globally, supplying 71% of all renewable electricity. Reaching 1,064 GW of installed capacity in 2016, it generated 16.4% of the world's electricity from all sources.

The city of the future is smart: smart homes, smart energy, smart buildings, smart technology, smart care, smart mobility and **smart pipe technology.**

Smart cities and our role in infrastructure



Specially shaped, non-circular pipes to reline dated sewer and drainage systems, preventing leaks and improving return rates without digging up our cities.

'No dig' jacking solution and 'push through' relining concept for new-build pipelines.

Smart cities, smart pipe technology

TILBURG, THE NETHERLANDS Specially shaped, non-circular pipes to re drainage systems, preventing leaks and improving

digging up our cities





PFORZHEIM, GERMANY

Jacking of a 365 m long GRP storage sewer with an outer diameter of 1720 mm in 7 m depth, as part of a renewal project of the city's 100-year-old sewer system.



WARSAW, POLAND

Compared to an open trench construction, an amazing 376,734 tons of CO₂ have been saved in the trenchless installation of 7 km of centrifugally cast GRP sewer jacking pipes.



Amiblu brings together the expertise, experience and global footprint of two leaders in GRP sustainable water solutions: Amiantit Flowtite and Hobas. We have decades of experience across hundreds of potable and wastewater, industrial water supply, irrigation and hydropower projects worldwide.

Sustainable water solutions around the world, around the clock

Tons of CO2 saved

In Poland, for example, we cut the disruption, time, cost and carbon footprint of deploying a 3-m diameter, 5.7 km long pipeline extension to Warsaw's Czajka wastewater treatment plant. The combination of high-strength, thin-walled GRP pipes and smart jacking technology led to a 30% reduction in soil extraction versus open trenching, and enabled us to shrink the size and number of construction locations. The use of smaller equipment, plus fast assembly and small curve radii, helped to further reduce construction costs. But the icing on the cake was the reduction in carbon footprint. From manufacturing through to installation and clean-up, using Amiblu pipeline and jacking technologies saved an estimated 376,734 tons of CO2 compared with a trenchless installation, leading it to win the Polish National Energy Globe Award.

From the 'Via Baltica' to Las Vegas

Some projects are huge, some small, some straightforward, assistance, and the known high chemical, corrosion and some complex – in all combinations. Over the years we've abrasion resistance of our products, plus their light weight supplied a stormwater tank for IKEA, in Bayonne, France, a 1000 m³ GRP potable water tank for Pitomača. Croatia (in fittings. And staying with industrial applications, our biaxial just five days), provided vital ring road drainage for the Vilnius, pipes and patented joint technology feature in the world's Lithuania section of the 'Via Baltica', and completed a 500-m jacking run in Las Vegas, Nevada, USA. Besides jacking, this project involved open-cut and slipline sections, all employing Spreading sustainable progress GRP pipes of various lengths, diameters and stiffness classes. Turning to hydropower, we are bringing the benefits of this Our smart Combined Sewer Overflow solutions have helped clean resource to communities in Morocco (where it is also to improve the management of storm and wastewater In providing agricultural irrigation), Chile, Sri Lanka, Uganda, the Czech Republic, Slovakia and Germany, and so prevent Scotland, Norway and other countries. Smart thinking, like disruption to communities and industry. In Bruchsal, Germany, using shorter pipes to reduce bends, plus GRP's natural our pipeline solutions proved ideal for overcoming the space, weight, strength and low flow coefficient advantages over concrete, ductile iron and steel are all central elements in our shallow gradient and digging restrictions involved in replacing an historic, large-diameter interceptor sewer. In Venice, Italy, hydropower story. As they are in every Amiblu project.



our pipeline helped to transform the Fusina sewage plant into a multipurpose facility that purifies sewage and stormwater from several surrounding towns, plus industrial effluents and polluted groundwater. To optimise treatment, the upgraded plant collects sewage separately on a strict rota, with some treated biologically and subsequently used by local industries, negating the need to divert river water. The remaining purified water is led through a 20-km pipeline out to sea.

Out with the coal, in with the new

On the industrial front, our GRP pipes play a crucial role in cooling a combined cycle power plant in Bouchain, France. This replaced a coal-fired plant and uses a gas turbine to generate electricity, with the heat this creates used to generate further power via a steam turbine. The result is 50% more power from the same fuel compared to a simple cycle plant. Plant operator EDF chose us for our on-site production and installation and easy handling, long lifetime, and the option of tailor-made largest desalination plant, Ras Al-Khair, in Saudi Arabia, a reality.



A proven partner you can count on

Your partner in sustainable water solutions

Our mission is to speed up the world's transition to sustainable The biggest GRP pipeline solutions company in the world water solutions. How? Through boundless imagination, solid and inventor of continuous filament, centrifugal casting and science and great teamwork. From R&D and innovation, to various proprietary jointing technologies. We are working on engineering and quality manufacturing, to partnerships and the evolution of the relevant EN and ISO standards so our civil co-creation around pipeline and pipe-related sustainable water engineering customers can deliver sustainable water solutions management. Everything we need to get the water to the with maximum long-term confidence. people. This is who we are:

Made to last

- DN 80 to 4000 mm
- PN 1 to 32 bar
- SN Stiffness from 2500 and up



European production

- The largest concentration of GRP production in the world
- Seven factories making:
- Discontinuous, FW, CC and Non/circular pipes.
- High performance filtration systems, fittings and coupling systems
- Special tanks

Why GRP?

- Corrosion resistant: long life without paint or cathodic protection
- · Smooth bore and anti-fouling: constant hydraulic properties, low pumping costs, excellent abrasion resistance
- Lightweight: low transport costs and no need for expensive handling equipment
- Over 100 years of service life with a proven global track record of success
- . Innovative engineering and solutions-based approach that increases investment returns compared to traditional pipe materials

The leader in GRP

Strength in depth

- Over €250M direct turnover
- Over €750M of licensed technology related sales
- Over 1300 employees in Europe

Locations

- Sales and engineerings offices all over the world
- Production in Austria, Germany, Poland, Romania and Spain
- Licensee partners all over the world
- R&D headquarters in Norway
- Corporate head office and R&D centre in Austria



Customer obsession from concept to operational

Whether you're contemplating a major hydropower project, a complex sewerage improvement scheme, or a straightforward upgrade, you need to know that the people you work with are as committed to your success as you are. As Amiblu, we believe in the long view, the long-term, whether we're talking about our products or the way we think about and work with our customers.

This plays out in various ways. We partner with our customers from concept through to operational, with the aim of making you successful. This means adding value with innovative GRP pipeline products and solutions that score better than the traditional alternatives on every parameter. It means providing outstanding services and really engaging with sustainable-water managers. It means solving your problems and overcoming your challenges to guarantee longterm, sustainable performance.

This is not altruism, it's smart business sense – because successful customers not only come back, they become our company's truest champions.

SANDEFJORD, NORWAY Flowtite Technology Center

Working for sustainable water solutions

Society's ability to manage water is central to sustainable development, healthy ecosystems and, in the end, human survival. And with every passing day, the need to identify, develop and roll out sustainable water solutions is becoming more pressing.

We get it, which is why we spend every working day thinking and more efficiently. Thinking about how to integrate the best About new standards for life cycle assessment and long-term

It's also why we are committed to training and supporting water industry engineers around the world, and leading research and action to improve the quality of drinking water solutions this century that will have a positive and sustainable

We are where you are

Global customers require global solutions.

Wherever Amiblu is specified, we can provide the local advice, engineering, logistics and support needed. We have a network of sales offices and licensees able to offer Flowtite and Hobas technologies anywhere in the world to the same high exacting standards in quality and service. Our R&D headquarters in Norway is the largest such organisation in the world. From Norway we support production teams operating all over the world. Our control networks ensure that wherever pipes are produced the product is never compromised. **Continuous innovation** is at the heart of everything we do. From novel filtration systems to pipes able to transport abrasive slurries. From 4m sewage pipes to drinking water tanks. We innovate across modern networks engaging with the ideas and companies that will shape a smarter more sustainable future.



Amiblu locationsLicensees / partners

We never forget why we do this

Sustainable Water Solutions

Amiblu believes that the world's need for infrastructure can be solved with innovation, research and excellence. At Amiblu we want to contribute to a more sustainable world. We do so by cutting edge technology through better research.









Sustainable water solutions

We promise to speed up the world's transition to sustainable water solutions. How? Through boundless imagination, solid science and great teamwork. From R&D and innovation, to engineering and quality manufacturing, to partnerships and co-creation around sustainable water management.

Everything we need to get the water to the people.



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