# The greenest pipe is the one you don't have to replace

How we approach our green future



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#### EU Taxonomy: Identifiying sustainable business practices

By introducing the European Green Deal, the EU has committed to become carbon neutral by 2050. In order to achieve this goal, the EU Action Plan on Sustainable Finance was created to help finance the transition and allow more funds to flow from investors into sustainable projects and companies. But how do investors and business owners know where to best redirect their capital?

This is where the EU Taxonomy regulation comes in: It's a detailed classification system that defines the environmental sustainability of business activities. The primary goal of the EU Taxonomy is to transform markets by redirecting capital flow towards environmentally sustainable activities. It also combats "greenwashing" attempts by lifting the lid on companies' environmental performance.

Reporting of economic activities with regard to sustainability is mandatory for two key groups: financial market participants offering financial products within the EU and UK as well as large public interest companies (more than 500 employees and a balance sheet over EUR 20 Mio. or net turnover over EUR 40 Mio.). Any other market participant can use the EU Taxonomy voluntarily.

The legislation rewards and promotes environmentally friendly business practices and technologies with focus on:

- Climate change mitigation
- Climate change adaptation
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems

To be classified a sustainable economic activity, a company must contribute to at least one of these six environmental objectives and not violate the remaining ones.



For example: An activity that aims to mitigate the climate but at the same time negatively affects biodiversity cannot be classified as sustainable.

The EU Taxonomy is considered one of the biggest steps in implementing sustainable finance in the EU, as it ensures equal competition, and allows investors to identify sustainable assets more easily.



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The greenest pipe is the one you don't have to replace

#### stream



Recycling is what we do when we're out of options to avoid, repair, or reuse the product.

> –Annie Leonard Environmental Activist

# What makes a product **truly green?**

Longevity of the product and a low carbon footprint are keys to a responsible and sustainable future.

If you listen to and read mainstream media, you know that recycling and reducing the carbon footprint of economic activity thankfully seems to be a top goal of many companies big and small. While we believe that a circular economy is important and applaud all efforts, and advocate for transparent and honest reporting, we also see a second, way more potent angle to make products and companies green: There's no need to recycle what never should have been produced in the first place.

Environmental activist Annie Leonard said it best: "Recycling is what we do when we're out of options to avoid, repair, or reuse the product." In the reduce, repair, reuse, recycle mantra, recycling comes last.

If you want to reduce your environmental impact, make pipes that last for generations. To us that means making products that perform at the highest level for a very long time. Our products are designed to last for generations. So why replace pipelines every 10 years when you can invest in infrastructure that can serve even your children's children's children?

When you produce anything, you have a responsibility to do so with the lowest carbon footprint possible. Cradle-to-gate studies show that 80-90 percent of GRP products' environmental impact is determined at the design stage. That's why we have set up the most comprehensive LCA (life-cycle assessment) platform in the pipe industry. This allows us to carefully evaluate and choose the most environmentally friendly raw materials, designs, and production processes for our products.

Products that last for generations and have a low carbon footprint. Or, as smart people may phrase it: 1+1=11. Find out more on the next 4 pages.

#### GRP pipes are designed for generations. Here's the proof.

A decades-long, low-maintenance service life: It's a promising claim that Amiblu makes about their GRP products. A promise that is not just based on the company's 60 years of age and experience – there's quite a bit of meticulous scientific research involved. Here's why we can confidently stand by our claim.

Let's start with a question: Why most pipes do not reach a mature age? These reasons carry names such as thiobacillus concretivorus and thiobacillus ferrooxidans—tiny bacteria that decompose sewage and form hydrogen sulphide gas (H<sub>2</sub>S). When combined with moist air, the gas forms sulphuric acid (H<sub>2</sub>SO<sub>2</sub>) which is highly corrosive to materials like concrete, steel, and cast iron.

> Sewer corrosion formula:  $H_2S + O_2 + bacteria$ H<sub>2</sub>SO<sub>4</sub>

This "microbially induced corrosion" can cause significant damage over time. Corrosion is also a major problem in seawater applications, where the contained sodium chloride eats away at e.g. metals and causes them to fall apart. With GRP products, the situation is quite different.

Plastics are inherently more robust than both concrete and metals in acidic environments. To prove this, we literally put our pipes to the acid test: Several pipe samples are exposed to sulphuric acid (H<sub>2</sub>SO<sub>4</sub>) for a considerable time, while being subjected to artificially high tensile strains (see below).



The process of microbially induced corrosion.

Slime and silt contain bacteria which break down organic and inorganic sulphur compounds, thereby producing hydrogen sulphide (H<sub>2</sub>S). When the H<sub>2</sub>S gas comes into contact with the moist surfaces above the water line in the sewer, it can combine with dissolved oxygen (0<sub>2</sub>) to directly form sulfuric acid (H<sub>2</sub>SO<sub>4</sub>). However, most of the H<sub>2</sub>S is decomposed into elemental sulfur S, which is a source of energy for the Thiobacillus bacteria family; they oxidize the elemental sulfur and their metabolic waste is H<sub>2</sub>SO<sub>4</sub>. This sulfuric acid lowers the biofilm pH and corrodes concrete, steel, and cast iron.

Strain corrosion tests according to ASTM D3681 in the Amiblu R&D center in Norway.





Concrete and metal pipes corrode in low-pH sewer environments under the influence of sulphuric acid.

GRP pipes are inherently corrosion-resistant and feature a long, low-maintenance lifetime also in harsh sewer environments.

The idea is to simulate the chemical conditions in aggressive sewage, but under an excessive strain in order to cause failure within a reasonable time frame. To determine the pipes' long-term properties, the measured data is analysed statistically and extrapolated into the unknown to predict a limiting strain for use in pipe design.

In 2008, a pipe sample taken from a pipe in Norway that had been submerged in sea water for more than 33 years was analyzed and showed no signs of corrosion or visible aging. The mechanical properties were also well within the initial design requirements.

Our large database of test results demonstrates the product performance and reveals a service life of several decades with good safety margins. The data shows that, if the strain is below a certain threshold level, the pipes will serve several future generations.

Find numerous case studies of Amiblu pipes in operation for decades here: bit.ly/Stream-pipes4generations

Here's the link to our reference database with over 35,000 projects from all around the globe: amiblu.com/references/



In 2008, after 33 years exposure to treated sewer and seawater, a section of a Flowtite GRP DN 500 pipe was brought ashore for analysis of its condition and mechanical properties. After cleaning parts of it, the pipe looked almost brand-new. The pipe showed no visible signs of ageing and its mechanical properties were basically unchanged.



## stream

#### The carbon footprint of GRP

We don't average values. We don't use online calculators to determine our footprint. We don't massage our numbers till they look like we want them to. Our environment and our kids deserve better than that. That's why we worked tirelessly to set up the most comprehensive and advanced life-cycle assessment (LCA) platform in the pipe industry. The result: transparent numbers our customers can trust down to project level and crystal clear information for us to keep improving.

Cradle-to-gate studies show that 80-90 percent of GRP products' environmental impact is determined at the design stage. A life-cycle assessment (LCA) is a power-ful tool for learning which raw materials or manufacturing stages are the most critical for the environmental performance of the product.

We've set up the most comprehensive LCA (life-cycle assessment) platform in the pipe industry. This allows us to carefully evaluate and choose the most environmentally friendly raw materials, designs, and production processes for our products.

To date, we've compiled LCAs for over 1,200 products, which represent about 80% of our sales. We then condensed the big reports into easy-to-read, EU-standard-ized Environmental Product Declarations (EPD) and can, within hours, provide the data to stakeholders who want to learn more about the environmental impact of a specific product.

Using our LCA scenario generator, we can quickly compare the carbon footprint of various products from all Amiblu plants in a cradle-to-gate scenario. Furthermore, we can educate stakeholders on the impact of raw material selection and steer product choices towards greener and more responsible options.





We can also calculate the environmental cost of every project in monetary value and, thus, put a number on nature's precious contribution.

Our dedicated team of environmental scientists works hand in hand with all departments and hierarchy levels, as we want the reduction of environmental effects to be part of the job of every single employee, especially when there's a global water crisis.

We spent a lot of time dissecting thousands of data points: those of our suppliers of raw materials but also energy providers, those of our raw materials and production processes, those of our logistic partners, and all supporting functions along the value chain. The result is accurate and transparent data down to the project level. No averaging, no use of online calculators, no summarizing.

With the push of a button, we can calculate the environmental impact of every single one of our products and every single one of our projects. Where our competition publishes one report with one average carbon footprint that is supposed to be valid for their entire product portfolio (a practice also known as greenwashing), we compiled and published hundreds of reports and data points so far. And we're just getting started...

This gives our customers the opportunity to make informed decisions, and it helps us to improve and reduce and learn even more. In fact, we're so comfortable with and confident in our data that we decided to strip bare and put everything on our website, free for you to access and browse. Find the raw and honest truth right here: <u>amiblu.com/environmental-product-declarations</u>

Additionally, we started printing the exact carbon footprint of projects on our offers and invoices. Because economic activity means emissions and environmental costs. And if we don't become more aware of them, the next generations will have to pay the price. And for us, ignorance is not an option.

Comparison of different pipe materials with the same diameter, pressure class, and stiffness class. All data is taken from publicly available EPDs and data sheets published by the respective companies.



#### DN 1800, PN 1, SN 10,000



# Climate Change Facts

Read more about these and other facts in <u>thecarbonalmanac.org</u>





## Chubby squirrels and 1°C

What do chubby squirrels have to do with climate change? The temperature on planet Earth has warmed about 1°C in the last decade because we're constantly burning fossils fuels. This may not sound much, but it's enough to cause extreme weather, including hurricanes, floodings, snowstorms, heatwaves, droughts, landslides, and also milder, snow-free winters. Meaning: No struggle for our squirrels to find plenty of nuts, seeds, and insects and grow little winter bellies.

## 10 years to act

Time is running short: According to scientists, we have about ten years to radically cut our carbon emissions before damage to the Earth is irreversible. Even though the solutions are neither easy nor magically fast, we have quite a few on hand: Renewable energy sources such as solar, wind, and water power, as well as the way we eat and travel. 2020 was the hottest year on record. Let's make sure we reverse the trend.



"We're in a giant car heading towards a brick wall & everyone's arguing over where they're going to sit."

–David Suzuki, Canadian scientist and environmental activist



## The four Cs

Coal, combustion, cows, concrete: These four factors are responsible for 70% of all greenhouse gas emissions that accelerate global climate change. Among them is carbon dioxide (CO<sub>2</sub>), the most important greenhouse gas in that it absorbs and radiates heat.

Can we do something about this? Of course! All four factors have modern alternatives in newer technologies. Let's rewrite the rules that industries play by.



#### Somewhere else?

The polar bear is a popular mascot for climate change – but also a misleading one. It suggests that global warming is happening "somewhere else". Truth is: Climate change affects every single inch of our planet. It is happening so fast that many plants and animal species – such as honeybees – are struggling to cope. This is highly alarming, since functioning ecosystems and biodiversity are essential for human life on Earth.



"We are the first generation to feel the effect of climate change and the last generation who can do something about it."

-Barack Obama





#### What is net zero?

To stop global warming, we must get our greenhouse gas emissions down to zero. But: Shutting down all greenhouse gas emitting activities immediately would be impossible. So instead, we can use an approach called net zero. This means that for every molecule of CO<sub>2</sub> we put into the air, we also take one out, making our net emissions zero. To make this possible, we need to use less resources more efficiently, change technologies, and foster natural carbon absorbers like trees.

#### **Greenhouse effect**

CO<sub>2</sub> does not only have downsides. Together with other greenhouse gases like methane and water vapor, it ensures life on Planet Earth by insulating it like a blanket and keeping the average surface temperature above freezing. It does this by letting sunlight pass through without allowing heat to escape.

This effect, however, turns destructive when there is too much  $CO_2$  in the air the insulation is too strong, and the global temperature rises. The more  $CO_2$  is emitted, the warmer it gets.



#### Our successes in the past and our goals for the future

Sustainability actions have taken center stage in all areas of Amiblu in the last three years. Raw material development and usage, product engineering, logistics, energy consumption, production processes, installation methods, product life circle, social outreach, managerial functions: We looked into every part of our organization, evaluated the status quo, identified potentials, and then stringently followed our set goals. We have a lot to show, and we're not done.

One million euros: that's how much we invest per year solely into R&D for more sustainable products and production methods. A dedicated team of scientists cooperates with thought leaders, academic partners, and license holders to achieve full circularity of GRP.

The resulting initiatives range from recycling options for GRP and reusing materials in Amiblu products, to chemical recycling, and turning shredded GRP into valuable fuel for other industries. We seek green alternatives to conventional resins and challenge our glass fiber suppliers to use renewable energy sources in their production.

We set up the most comprehensive LCA (life-cycle assessment) platform in the pipe industry. This allows us to carefully evaluate and choose the most environmentally friendly raw materials, designs, and production processes for our products. To date, we've compiled LCAs for over 1,200 products. We then condensed the big reports into easy-to-read, EU-standardized Environmental Product Declarations (EPD) and can, within hours, provide the data to stakeholders who want to learn more about the environmental impact of a specific product.

Our goals for the future are crystal clear, and we work with all our ambition and passion towards reaching them. We want to:

- Have LCAs for all Amiblu products by the end of 2022
- Use 100% fossil-free energy sources for the Amiblu production by 2025
- Switch from gasoline to 100% electric company cars by 2025



The five stages of the Amiblu life-cycle assessment

#### Our social commitment

Amiblu is **EU Climate Pact Ambassador**, an EU-wide initiative that invites individuals and organizations to connect and share knowledge about climate change, and to develop solutions to fight it. More info: <u>climate-pact.europa.eu</u>

We are part of the **United Nations Global Compact** and thereby commit ourselves to operate in alignment with universal sustainability principles, take actions that support the society around us, and regularly report on our ongoing efforts. More info: <u>www.unglobalcompact.org</u>

Since 2020, we also sponsor the prestigious **World Energy Globe Award** in the category "water" to identify and fund innovative ideas in water management from around the globe. The Energy Globe Award is today's most renowned environmental prize worldwide. More info: <u>www.energyglobe.info</u>



# What's the deal with Green around the globe? Amiblu Sales Directors have their say.

Amiblu operates in 125 countries worldwide. That's a lot of opinions and approaches and different challenges, depending on where our products are installed. We asked our international Sales Directors to give us a local roundup on "all things green": How important are "green" criteria in their region and how will this change in the future?



#### Mario Frieben

DACH + Asian Territories

"Green" criteria have a very high priority in Germany, Austria, and Switzerland, and are expected to gain even more importance when geopolitical and economic factors calm down. Both authorities and operators are already including sustainability criteria in the tender and planning stage. And it is to be expected that soon stricter legal requirements will be in place that safeguard the environment when building infrastructure. Customers become more aware of environmental factors too leading to interest for GRP from operators who so far have opted for other material solutions such as cast iron, steel, or concrete.

#### Xavier Arasanz

Southern Europe + South America

Environmental awareness has seen a big uptick in both Southern Europe and South America. All countries subscribe to the goals laid out in the EU Taxonomy and by the UN, and the demand for sustainable products will only go up. The Spanish Ministry of Ecological Transition, e.g., is working on a Royal Decree that will require certain companies to publish their carbon footprint.

At Amiblu Spain, we have been working for some time to obtain the maximum governmental score for emissions reduction. By the end of 2022, we will initiate reforestation projects with duly accredited companies to achieve emissions neutrality.

#### Jean-Pierre Morin

Western Europe + Africa

In French-speaking markets, we know that our future is at stake. Price is still an important argument, but environmental aspects are gaining weight. We already see a handful of customers consider the carbon footprint of different material options before making a decision and we are hopeful that this will open the door to more "green practice" in the construction industry in the future. We work hard to ensure that public procurement takes sustainability into account and the EU Green Deal is definitely helping. What is needed now are clear directives also at national level.

#### Jarle Hausberg

Northern Europe

As within Amiblu, our clients generally value water and have a high focus on environmental factors. Now we can see an increased focus also from politicians and society in general. In some countries public tenders are weighing environmental factors with up to 30% in the evaluation. In others, costs are even compensated by the government when the more environmental choice is selected by a municipality. With GRP pipes from Amiblu having an expected lifetime of many decades, low maintenance cost (if any) in addition to a very low carbon footprint when delivered and installed, there will be both direct and indirect financial savings as well. **Mariusz Maniara** Eastern Europe

A few years ago, the only factor in the decision on building materials in our region was price. Today, this is still an important decision factor, but the world and general consciousness are rapidly changing. This is why we expect to see more weight for environmental criteria in Eastern Europe. The future is ecology and energy efficiency, and Amiblu's strategy responds to these mindset changes and new market requirements: We apply a very comprehensive life-cycle-assessment process and to evaluate the most environmentally friendly raw materials, designs, and production processes for our products.

**Costin Berbecaru** South-Eastern Europe

The SEE area is accelerating to close the gap with western countries when it comes to sustainability. Everyone is focused on this topic and sees it as our duty to invest in green products because it's an investment for the future. Environmental goals related to climate change, use of resources, and sustainable consumption and production need to have priority. We must work together to implement solutions with reduced impact on the environment, with the greatest lifespan. We can no longer afford to invest poorly, cheaply, and to the detriment of us and future generations.

#### Where can I learn more?

We're glad you ask! Amiblu has a wealth of best-researched, precisely calculated, and continuosly reviewed information at your disposal.

We're confident in our products and happily share all environmental data and sources of smart information with you. And if there's one thing you can't find but need, send us an email at <u>info@amiblu.com</u>.

- How we think about the footprint of our pipes
- Our hub for all things green
- Our environmental product declarations
- The environmental resposibility of GRP
- The economic responsibility of GRP
- The social responsibility of GRP
- Amiblu's Water Manifesto
- Our LinkedIn channel
- Our YouTube channel
- Amiblu Stream magazine dedicated to longevity
- The EU taxonomy regulation explained
- News from the European federation of water services
- Thought-provoking TED talks on climate change
- Edutainment about carbon offsets with John Oliver
- Netflix documentary about the world water crisis

amiblu.com/footprint/ amiblu.com/green/ bit.ly/Amiblu-EPD bit.ly/GRP-Environment bit.ly/GRP-Economy bit.ly/GRP-Social bit.ly/GRP-Social bit.ly/Amiblu-Water-Manifesto bit.ly/Amiblu-Water-Manifesto bit.ly/Amiblu-Water-Manifesto bit.ly/Stream-pipes4generations bit.ly/Stream-pipes4generations bit.ly/EU-Taxonomy eureau.org ted.com/topics/climate+change bit.ly/JO-Carbon-Offset bit.ly/Io-Carbon-Offset

P.S.: Take a look at our offers and invoices! In many countries, you can already see each project's calculated CO<sub>2</sub> emissions listed here. That's what we call transparency in action!

# Let's value water as we should...

...with modern pipe materials and smart solutions designed for the next generations.



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