

Annual Report 2023



Solar kiosk in Togo for clean drinking water

Featured highlights

- The future of carbon offsets
- One million stoves for Nigeria
- Negative emissions with biochar



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Imprint

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Editorial



Dear readers

In February 2024, the EU climate service Copernicus reported that the Earth’s temperature had already risen by around 1.5°C, the target set by the Paris Agreement. This figure represents the average global temperature over a twelve-month period compared to pre-industrial levels. While future measurements may temporarily fall below this threshold, reaching it is a troubling milestone in the progression of human-induced global warming. Despite this reality, industrialized nations are still failing to sufficiently reduce greenhouse gas emissions to prevent global warming from surpassing 1.5°C.

The climate conference I attended in Dubai in December 2023 underscored this frustration. Delegates from sub-Saharan Africa, one of the regions most severely impacted by climate change, expressed dismay at the lack of action from the Global North. As one delegation leader candidly put it, “They are all hypocrites.”

Given this insufficient governmental response, private carbon offsetting becomes even more vital. Unlike public funding, private initiatives operate independently of constrained state budgets. Yet, recent media reports have criticized several voluntary carbon offset providers, revealing that many climate protection projects—particularly forest conservation efforts—often fail to deliver their promised results.

This criticism is especially unfortunate, as the current global context offers an opportunity to improve the impact of voluntary offsetting. Under the updated rules of the Paris Agreement, offset projects now require collaboration between project developers and host countries, ensuring that projects align with national climate strategies.

In 2023, we signed such an agreement with the Nigerian government for our ongoing efforts in the country. This partnership fosters intensive collaboration that benefits all involved. Alongside the production of stoves that reduce CO₂ emissions, we are also supporting the establishment of hydrogen

production facilities. With these projects, we are already able to offer offset solutions that meet Paris Agreement standards, even though these standards are not yet mandatory. Our stove factory in Kano remains a central hub for this work. By the end of 2024, we aim to increase production to one million efficient stoves annually.

In addition to reducing CO₂ emissions, we are also making strides in permanently storing carbon in the ground. Our new biochar facility in Tanzania captures CO₂ directly from the atmosphere while simultaneously enriching agricultural soils. This dual benefit supports smallholder farmers and promotes climate protection.

Significant progress has also been made in producing climate-friendly fuels. Our e-kerosene plant in Werlte, Lower Saxony, received the 2024 German Sustainability Award. As the first organization in the world to produce synthetic kerosene from green hydrogen, we are proud to contribute to a more sustainable aviation sector.

Finally, with over €30 million in revenue, 2023 marked a record year for atmosfair. However, individual donations have declined. I hope this annual report reinforces your confidence in our work, as your support remains essential to our mission.

Kind regards

Dr. Dietrich Brockhagen
Managing Director atmosfair gGmbH

PS: In June 2024, we mourned the loss of our patron, Prof. Dr. Klaus Töpfer. A dedicated advocate from the very beginning, he consistently urged us to ensure that climate protection delivers tangible benefits to local communities. His wisdom and guidance will be deeply missed, now and in the future.



Sun and Water

Solar energy and water provide climate-friendly electricity. Together with our partners, we construct new facilities in rural areas to supply local populations with energy and clean drinking water. Our irrigation systems for agriculture also run on renewable energy.



Efficient Stoves

In Africa and Asia, atmosfair produces energy-efficient stoves at material cost. These stoves are made from stainless steel and create jobs in local communities. Families using these stoves require 90% less wood for cooking, protecting forests and saving money.



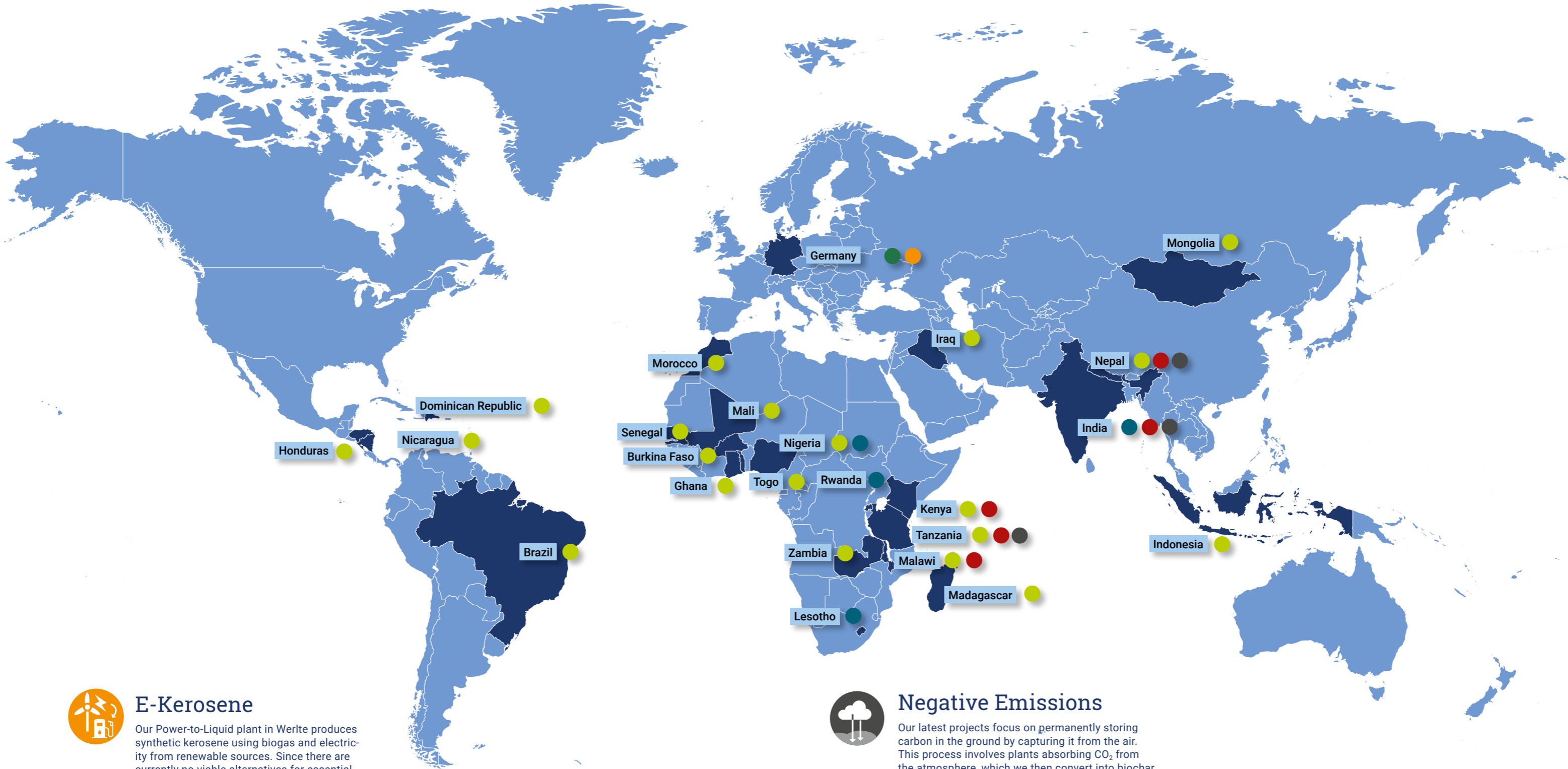
Biogas & Biomass

atmosfair's partners install small biogas systems for farms, transforming cow dung or pig manure into biogas for cooking, lighting, and fertilizer. Additionally, we support electricity generation from agricultural residues in dedicated facilities and repurpose organic waste.



Environmental Education

Climate protection begins at home. That's why atmosfair supports educational projects for students in schools across Germany to foster awareness of active climate protection. However, we do not count these initiatives toward CO₂ offsetting.



E-Kerosene

Our Power-to-Liquid plant in Werlte produces synthetic kerosene using biogas and electricity from renewable sources. Since there are currently no viable alternatives for essential long-haul flights, synthetic kerosene remains the only solution to avoid emissions from fossil kerosene.



Negative Emissions

Our latest projects focus on permanently storing carbon in the ground by capturing it from the air. This process involves plants absorbing CO₂ from the atmosphere, which we then convert into biochar using advanced technologies. The biochar enhances soil quality in agriculture, benefiting both people and the environment.

The Future of Carbon Offsetting

Voluntary carbon offsetting faces criticism for its perceived ineffectiveness, as media reports often highlight its limitations. However, atmosfair argues that climate protection projects can work if implemented correctly. The Paris Agreement offers a framework to enhance the standards of carbon offset projects, providing a glimpse of how the market might evolve in the future.

Picture the Maldives: a turquoise sea and white beaches, attracting 1.5 million visitors annually, most of whom arrive by air. Yet, the CO₂ emissions from these flights contribute to global warming, melting polar ice caps, and rising sea levels. By 2050, 80% of the shallow atolls will become uninhabitable. Despite not being responsible, local populations bear the brunt, while airlines and wealthy travelers are the main contributors. This environmental damage is an "external cost" of air travel.

To address this, travelers should fly less and pay more. Their funding could support green energy projects in the Global South, such as those implemented by atmosfair. Supplying electricity to people who previously had no access would promote North-South justice. A legal obligation to offset carbon emissions would compel airlines and travelers to internalize these external costs, creating a financial incentive to reduce them. Since preventing damage is cheaper than repairing it, airlines might adjust

routes or adopt alternative fuels to lessen their climate impact. If external costs were included in ticket prices, air travel would decrease, potentially creating a significant positive impact on the climate.

CORSIA requires airlines to offset CO₂

Until now, travelers have voluntarily offset their CO₂ emissions. The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) by the International Civil Aviation Organization (ICAO) aims to internalize these costs by requiring airlines to offset a portion of the CO₂ emissions from international flights starting in 2027. However, this only applies to emissions above 2019 levels, which won't be reached until 2023 due to the pandemic. Moreover, CORSIA only accounts for CO₂ emissions, and does not take the full climate impact of flights into account. As a result, airlines still don't pay for the full costs of their environmental damage.

i The climate impact of air travel

Airplanes contribute to the greenhouse effect beyond just CO₂ emissions from burning kerosene. Nitrogen oxides emitted at high altitudes form ozone, a greenhouse gas. Soot particles and water vapor also lead to condensation trails and cirrus clouds, trapping heat and preventing the Earth's surface from cooling. Overall, the climate impact of a flight is three times greater than the effect of CO₂ emissions alone.



Photo: Sebastian Schubbe + Friederike Schulz

In Nepal, atmosfair builds biogas plants to provide cooking gas. But do such climate protection projects significantly contribute to the fight against climate change?

Development of the Global Voluntary Carbon Market

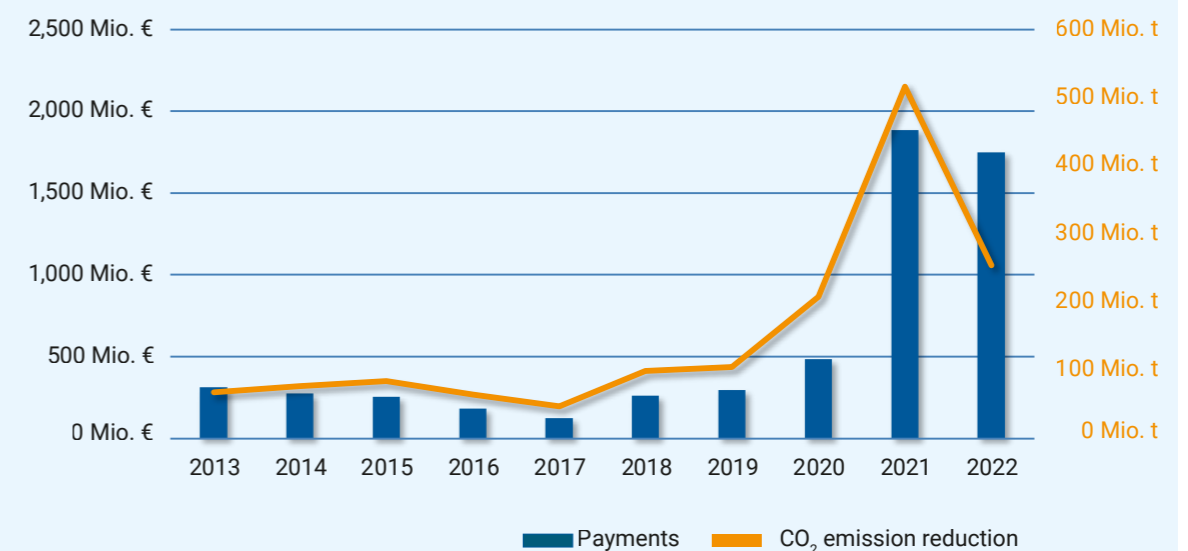


Figure 1: Growth of the global voluntary offset market in millions of euros and CO₂ savings in millions of tons. The surge in 2021 was driven by both higher CO₂ prices and greater demand. Despite the high payment volume in 2022, fewer emissions were offset (Ecosystem Marketplace 2023).

Since 2011, Germany has also levied an air traffic tax on all flights departing from its airports. However, this tax is not earmarked for offsetting external costs.

Neither CORSIA nor the German air traffic tax sufficiently address the issue. Thus, voluntary carbon offsetting remains the most effective tool to cover external costs. This approach is also used in other sectors. As shown in Figure 1, the global carbon offset market is expected to grow from \$500 million to \$2 billion by 2021, driven by higher CO₂ prices and increased demand. While prices continued to rise in 2022, only half of emissions were offset for the same amount of money. Despite this, Barclays Bank predicts the market could grow to \$250 billion by 2030. Voluntary offsets are crucial, according to Malin Ahlberg of Germany's Federal Ministry for Economic Affairs and Climate Action, as they mobilize additional funds for climate protection.

Ineffective Projects, False Advertising

Although the carbon offset market is growing, providers of voluntary carbon offsets have recently faced significant criticism. This criticism is not unwarranted, as illustrated by an example from the carbon offsetting sector. While one offset provider publishes accurate emissions data on their website, a partnering airline only reports one-third of the actual emissions on its site. This suggests that public image may be prioritized over genuine climate action.

Offsetting flight emissions is just one issue. Some providers promote the idea that corporate customers can label their products as "carbon neutral" by supporting voluntary forest protection projects. However, several media investigations have revealed

that most carbon offsets are far less effective than advertised. In fact, up to 90 percent of all global reforestation projects have been classified as ineffective. An undercover investigation by the German newspaper Die Zeit exposed how easily companies can obtain a "carbon neutral" label. In some cases, companies do not even verify the actual carbon emissions that are supposed to be offset.

In response to these shortcomings, Germany and six other EU countries issued the "Joint Statement on Voluntary Carbon Market: The Claims Side," which provides recommendations for ensuring transparency, high-quality certificates, and credible climate claims. The European Union is also taking action: its "Directive on Empowering Consumers for the Green Transition" will, within the next two years, ban misleading claims. Under this directive, companies will no longer be able to claim "carbon neutral" production if emissions are merely offset rather than avoided. While the EU has recognized the issue and proposed a solution, its response has been slow.

Since its founding, atmosfair has actively worked to raise standards in the private offset market. We combine the United Nations' Clean Development Mechanism (CDM) with additional criteria, setting a positive example. Unfortunately, no other provider has adopted our approach. In fact, market standards have declined in a race to the bottom: approximately 95 percent of traded certificates are not CDM projects, meaning they are not validated by UN-accredited auditors. The voluntary offset market has largely failed. Therefore, atmosfair calls for stronger governmental intervention. Significant momentum for this change began at the Paris Climate Conference in 2015.

New rules under the Paris Agreement

Voluntary carbon offsetting inevitably intersects with the rules of the Paris Agreement, even though the agreement primarily targets nations. This is because, whether voluntary or mandatory, offset projects and their CO₂ reductions are automatically included in the UNFCCC CO₂ inventory of the project's host country. A debate has emerged over whether voluntary offsetting can still operate outside of the Paris Agreement's framework. Both supporters and critics are engaged in this discussion.

The core issue is "double counting": Can the offset buyer (e.g., a German company) count a project's CO₂ reductions toward its carbon footprint, while the project host country also counts these reductions

toward its Paris Agreement targets? And would this practice be harmful to the climate?

„Corresponding Adjustments“

To address the potential issue of double counting, the Paris Agreement introduced "Corresponding Adjustments" (CAs). These function as corrective entries in the project country's CO₂ accounting for offset projects, similar to double-entry bookkeeping in corporate finance.

atmosfair has analyzed the issue of double counting and CAs in a separate paper. The analysis shows that CAs are not always technically necessary for offsetting, as double counting does not necessarily occur even without CAs or the Paris rules. This depends on the specific project and country involved. However, CAs provide transparency that helps identify and penalize harmful double counting. Moreover, atmosfair emphasizes that close coordination between the project host country's government and developers like atmosfair from the outset is critical to maximizing the project's benefits for the country. It should also be possible to reach an agreement on CAs. Nevertheless, many project developers avoid CAs due to the high costs involved.

For this reason, atmosfair believes that CAs are increasingly necessary for voluntary offsetting. As a leader in this area, atmosfair has secured five CA agreements with project countries.



Salisu Muhammad Dahiru (Director General of the Nigerian National Council on Climate Change, NCCC) and Dietrich Brockhagen (Managing Director of atmosfair) with the signed CA contract.

i On track for 1.5°C with Science Based Targets

Launched as part of the Paris Agreement, the Science Based Targets Initiative (SBTi) supports private sector companies in contributing to global climate goals. The initiative provides science-based methodologies for companies to calculate how they need to reduce CO₂ emissions across their value chain. Currently, 5,200 companies worldwide are using these methodologies to set climate targets. As shown in Figure 2, an SBTi target requires companies to reduce their CO₂ emissions as much as possible by 2050, in line with the 1.5°C pathway. Any remaining, unavoidable emissions can be offset by supporting projects that remove and store carbon from the atmosphere. This approach aims to help companies achieve net zero emissions by 2050.

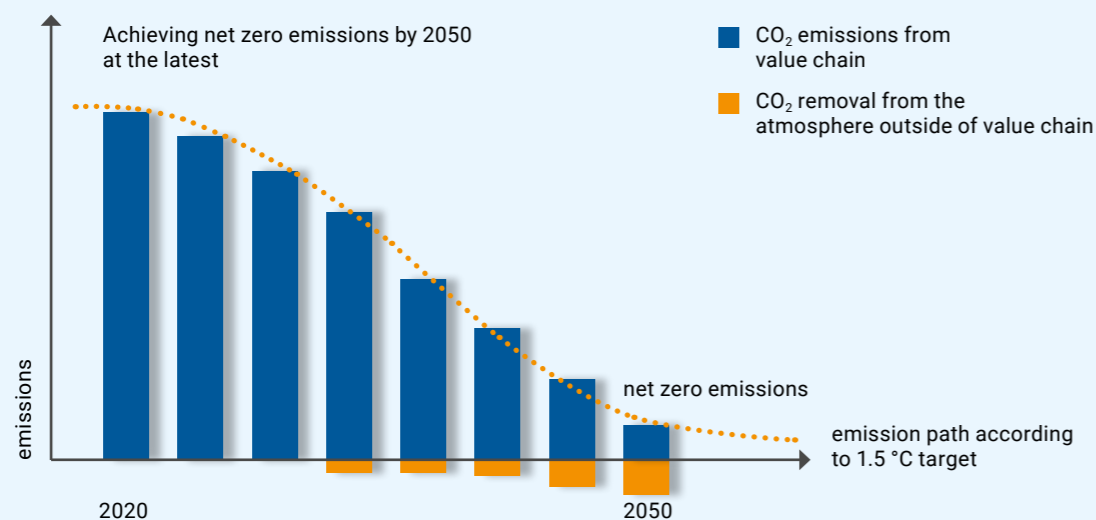


Figure 2: Emission reduction according to SBTi standard

atmosfair and Nigeria sign cooperative agreement

atmosfair's negotiations with the Nigerian government demonstrate how CA agreements can foster high-quality climate protection. In Kano, a city in northern Nigeria, atmosfair built a factory that produces efficient stoves requiring about 90% less firewood, thus significantly reducing CO₂ emissions. To ensure that the CO₂ savings from this project could be passed on to customers in compliance with the Paris Agreement, atmosfair spent over a year negotiating with Nigerian government ministries and organizations.

The Nigerian government was particularly interested in ensuring that the factory created long-term jobs and improved social conditions in Kano, especially for women. Reducing deforestation along the edge of the Sahara was also a key concern. Furthermore, Nigeria sees the project as an opportunity to access new technologies for its energy transition, such as producing hydrogen or synthetic kerosene from waste biomass or solar power.

atmosfair has engaged in extensive discussions with the Nigerian government at the highest levels, planning the projects collaboratively. The Nigerian delegation has visited Berlin several times, where atmosfair introduced them to European technology producers, government representatives, and politicians. In Nigeria, atmosfair and Nigerian officials visited the factory, met with local stakeholders, and tested the stoves.

After more than a year of negotiations, the agreement between the Nigerian government and atmosfair was signed in Abuja. At the signing ceremony, Nigerian Foreign Minister Yusuf Maitama Tuggar emphasized the agreement's significance:

"The Nigerian government wants to build new, climate-friendly energy, but we lack the funds and Nigerian companies do not want to invest. Thanks to atmosfair, we get capital and know-how that our country would otherwise not have."

New hope for voluntary carbon offsets?

atmosfair's CA negotiations illustrate that the mechanisms of the Paris Agreement can enhance the quality of private offset market projects. Countries that enter such agreements stand to benefit significantly. If applied consistently, the Paris Agreement's requirements can elevate voluntary offsetting to a new, more effective level, sending a strong signal to the voluntary carbon offset market.

National governments and the European Union should play a key role in maintaining carbon offsetting as an effective climate protection tool by developing and promoting standards for high-quality offsetting. atmosfair has already advised the state government of Baden-Württemberg on guidelines for "Greenhouse Gas Offsetting by Companies" and is ready to collaborate with the German government to further improve offsetting practices.

atmosfair's pioneering role

According to the Verbraucherzentrale Nordrhein-Westfalen, atmosfair is pioneering the adoption of Paris Agreement standards for carbon offsetting: "It should be emphasized that atmosfair – as far as we know the only provider in the German-speaking area – works with "Corresponding Adjustments". [...] Due to the broad portfolio and the extensive quality assurance measures, we recommend atmosfair to consumers who want to offset their CO₂ emissions." ☺



Our climate action has a lasting positive impact on the day-to-day life of the people using our green technologies



An employee finishing the Save80 stoves in our factory in Kano, Nigeria; aerial view of the new atmosfair stove factory in Kano

One Million Stoves for Nigeria

Since 2021, atmosfair has been producing efficient Save80 stoves in Nigeria and Rwanda. We aim to increase production capacity to one million stoves annually by 2025. Our factory in Kano, Nigeria, manufactures these stoves for the entire country.

atmosfair is a key and respected partner of the Nigerian government, working together towards a common goal: ending deforestation in the country. The ongoing loss of woodland contributes to unrest and violence. Demand for our stoves is highest in Northern Nigeria, where our production facility creates new jobs in a region struggling with poverty and desertification south of the Sahara.

While the sun blazes outside, the factory remains cool inside. Women and men operate heavy machinery, punching sheet metal and assembling it into

shiny hexagonal stoves. Here in Northern Nigeria, they are working toward a better future. The Save80 stoves have significant benefits: when used with a Wonderbox for slow cooking with residual heat, they require only 10% of the wood previously needed. The stoves emit less CO₂ and toxic smoke, while saving families money.

But how are these stoves produced? And what impact does the factory have on the local community? We spoke with Ojo Olufisavo, the head of production in Kano, to learn more.



Save80 stoves help Nigerian women

The Nigerian Federal Ministry of Women Affairs prioritizes the fight against poverty, improving healthcare, and expanding access to education. Our stove production supports all three goals: Save80 stove users spend less on firewood, inhale fewer toxic fumes, and enjoy healthier lives. In collaboration with a medical team from Hamburg, we demonstrated that pulmonary function improves after switching from traditional cooking methods to Save80 stoves. Additionally, our factory empowers female workers by providing education and promoting financial independence.

Save80 stoves in action

What sets Save80 stoves apart is their remarkably low firewood consumption. The enclosed combustion chamber traps significantly more heat than traditional three-stone fireplaces, allowing the heat to reach the pot more efficiently. Due to the high temperature, the wood combusts almost completely. Just 250 grams of firewood is enough to heat six liters of water, sufficient to prepare a meal for a larger family. Thanks to the high-quality stainless steel used in their construction, the stoves have a lifespan of well over ten years. Stoves sold as early as 2009 have been verified to still be in use today, maintaining nearly the same efficiency.



Hello Ojo, can you tell us more about how you are producing a functional stove?

We import the sheet metal for the stoves from South Africa. We use stainless steel. In our factory, workers are punching individual parts from sheet metal, bend them into shape and assemble them into complete stoves. Every completed stove is shipped with two pots that we are buying from a factory in Lagos. We started with a production capacity of 50,000 stoves per year. In the beginning, we used only mechanical tools, but now the production line is computerized. Since we bought a laser cutter, we could drastically increase the production capacity. Until the end of 2025, we want to produce 84,000 stoves every month and hit the goal of one million stoves.

This is impressive! How many people are involved in producing the stoves?

In Kano, 15 women and 42 men work in two shifts day and night in the stove production. So far, atmosfair has created 66 jobs including administration, sales, cleaning and security. What's more, around 200 jobs have been created at our sales partners. This way, even more people can feed their families. We also deeply care about diversity and gender equality: women receive equal opportunities as men, including in leadership positions. Their income gives them financial independence.

What is it like to work in the factory?

atmosfair supports teamwork and communication. We value mutual respect. We take great care in the wellbeing of our employees and their professional development. They receive recognition and we regularly give feedback. This leads to a good morale and happiness within the team.

What are the biggest challenges and how do you deal with them?

One of the biggest challenges is the rising cost of stainless steel from South Africa. Even though atmosfair subsidises every stove, we still require local partners to hand out micro-credits to our buyers. The stoves pay for themselves within a few months, but their initial purchasing price is too high for many of the rural population. Together with agricultural credit institutions and cooperatives we build sales partnerships to support the rural communities. There is one looming danger, however: the security situation in northern Nigeria is very unsafe, there are many terror attacks and corruption is widespread. The government helps us by promoting our stoves, which is very important in Nigeria. But it remains a challenge.

Why did you choose Kano as the location for the factory?

We chose this location as Kano is the economic centre of northern Nigeria and is very close to the Sahara Desert. Desertification is a constant threat here. And the climate crisis has exacerbated this even further: higher temperatures and lack of rain lead to droughts and dry out the soil. Our biggest problem lies in the population's need for firewood. Once the trees are gone, the soil erodes even more.

This is why the Nigerian government supports projects like the Great Green Wall which aims to plant a tree belt at the border of the Sahara. What does that mean for the region?

The government wants to stop desertification and protect or recover ecosystems with such initiatives. But the manager of the Great Green Wall project was very clear when talking to us: the pressure on the forest due to the need for firewood is too big. Without our efficient stoves there is no chance of protecting the forest.

Thank you very much for the interview and good luck with the production!

i New factory in Keffi

In April 2023, we opened a new factory in Keffi, east of Nigeria's capital, Abuja. Unlike the facility in Kano, this is a Completely Knocked Down (CKD) factory, where parts pre-produced in Kano are assembled. From Keffi, we supply stoves to central Nigeria. Both factories are operated by our Nigerian subsidiary, atmosfair Climate & Sustainability Limited (ACSL), which is a wholly owned subsidiary of atmosfair gGmbH.

Our Standard



Established in 2004 as part of a research project by the German Federal Ministry for the Environment, atmosfair has developed stringent standards for voluntary carbon offsetting. These standards serve as benchmarks for the evolving carbon offsetting market. atmosfair has been recognized in numerous international benchmark studies for its leadership in this field.



Approach



Standards

- Carbon offsetting is a secondary choice; avoiding CO₂ emissions is always preferable
- Climate protection takes priority over maximizing donations
- Raising awareness is a key component, as it leads to long-term CO₂ avoidance
- We collaborate with business travel specialists to optimize travel and promote alternatives like video conferencing

Climate protection projects



Standards

- Permanent CO₂ reduction
- Additionality
- Support for technology transfer between the Global North and South
- Direct assistance to local communities
- Contribution to local environmental protection
- Involvement of project communities in technology selection
- Alignment with development policy goals

CO₂ calculation



Standards

- Comprehensive
- Scientifically rigorous
- Well-documented
- Certified

Organisation and finance



Standards

- Non-profit
- Independent
- Efficient
- Transparent
- Responsible

Implementation



- We do not partner with organizations that fail to meet atmosfair standards, such as proper CO₂ emission calculations, even if it could bring financial benefits
- We do not offer carbon offsets for activities that have simpler, more effective alternatives for reducing CO₂ emissions, such as private car use or power consumption
- We conduct independent calculations to accurately represent climate impact

Implementation



- All projects must meet two key standards: CDM (UN) and the 'Gold Standard' (environmental NGOs), with up to 10% savings through Gold Standard Microscale
- CDM + Gold Standard + X: Compliance with additional atmosfair criteria, such as the carbon quota (minimum share of atmosfair funding in project costs) to ensure additionality, and exclusion of non-beneficial or high-risk projects like forest projects
- CO₂ reduction calculations and monitoring are conducted according to UN standards
- Qualified, UN-approved auditors (e.g., TÜV) are responsible for oversight and held accountable for errors.
- All test reports are published on the UN Climate Secretariat's website
- Project planning and development are managed by atmosfair, in collaboration with experienced partners in developing countries

Implementation



- We account for all climate effects of air travel, including condensation trails and ozone formation, following IPCC guidelines, which significantly increase the calculated climate impact compared to CO₂ alone
- Our emissions calculator is custom-built and certified by the Federal Environmental Protection Agency (Umweltbundesamt)
- All data sources and methodologies are documented and made available on the atmosfair website



Implementation



- Administrative costs are kept low, with over 90% of all donations directed towards climate protection projects in the Global South, including planning, construction, and operation
- Donations are tax-deductible and regulated by the tax office
- We maintain a demanding legal status as a non-profit (gGmbH), with full disclosure in the trade register
- Our advisory board includes high-ranking patrons and environmental experts from the Federal Ministry for Economic Affairs and Climate Protection, non-governmental organizations, and the scientific community



United Nations Framework Convention on Climate Change



Sebastian Schubbe + Frieda Maelle

Project Update:

Biochar in India

Our efficient stoves produce about 30 kilograms of biochar per month as a by-product of cooking

Moulindu Banerjee is thrilled. “We’ve worked hard over the past year, and now we can finally see the results!” The introduction of biochar production using simple gasification stoves has been a success. Farmers are purchasing the new fertilizer and are satisfied with its performance, marking the project as a success story.

However, the journey was not easy. Discussions about using biochar in farming in eastern India began a year ago, but atmosfair’s long-term project partner was initially skeptical. In April 2023, atmosfair and Moulindu launched a pilot project for biochar production and its application in agriculture. They built upon the success of an ongoing atmosfair climate protection initiative, which has already provided more than 160,000 families in the region with wood gasification stoves. These stoves, based on the Top-Lit Updraft (TLUD) principle, convert firewood into wood gas, resulting in cleaner and more efficient combustion. The leftover product is clean charcoal. Families using TLUD stoves produce about 30 kilograms of charcoal per month.

Moulindu purchases this charcoal from families each month. Previously, he sold it as barbecue charcoal to restaurants. With the launch of the pilot project, however, farmers have become his new customers, benefiting from the unique properties of biochar. Its porous surface allows it to hold a large amount of nutrients in a compact space, much like folding and compressing a sheet of A4 paper into a small ball.

The nutrients come from various sources, such as livestock waste. For example, in Kaukepara, biochar is soaked in cow urine. Acting like a sponge, the biochar absorbs the urine and binds the nutrients. atmosfair funded the installation of drainage systems in cowsheds to collect the urine more efficiently.

The resulting mixture of crushed biochar and cow urine is a highly effective fertilizer. During two of the three planting seasons in 2023, farmers applied this enriched biochar to their fields. The results were impressive: the biochar improved plant growth, enhanced the soil’s water retention, and served as a long-term carbon sink. Farmers are pleased with the positive outcomes.

Biochar: a Success Story

Encouraged by the positive feedback and in collaboration with atmosfair, Moulindu expanded the project to include 10,000 additional families already using pyrolysis stoves. In November 2023, atmosfair constructed a facility in Kaukepara to store and process the 300 tons of biochar produced monthly. Since January 2024, this biochar has been centrally

crushed and mixed with compost and limestone. The finished organic fertilizer is packaged and sold to local farmers, with the aim of replacing chemical fertilizers in the region.

Negative Emissions

This biochar project contributes to climate protection in several ways. The TLUD stoves reduce firewood consumption, lower smoke emissions, and improve health by reducing illnesses related to cooking. When mixed with cow urine, biochar serves as an effective fertilizer while also sequestering carbon in the soil, as it is not biodegradable. Moreover, organic fertilizers made from biochar displace conventional fertilizers that are harmful to the environment. The project also creates jobs and provides educational opportunities, enabling local farmers to cultivate their fields more efficiently without relying on conventional fertilizers.

The biochar project in India has been registered with Carbon Standards International under the Artisan C-Sink standard and will be audited and listed in 2024. The first carbon sink certificates are expected by mid-2024.



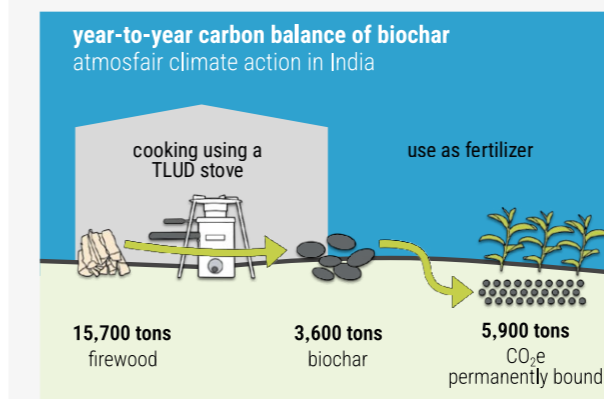
Hustle and bustle in our Kaukepara facility. Biochar is first crushed (blue machine in the background), then mixed with compost using a power mixer (right) and then filled into bags (front left)



The finished organic fertilizer is packed in bags and delivered to farmers in the region



More about the project



Our biochar project in India sequesters 5,900 metric tons of CO₂ equivalents annually. These CO₂ equivalents are calculated based on the carbon content of dried biochar, a conversion factor for CO₂, and the projected amount of carbon that will remain bound over 100 years



See how this stove works

Industrial Production of Biochar in Tanzania

In the open factory hall in Mafinga, Tanzania, the air rattles and creaks with activity. Then – almost unnoticed – black crumbs begin to fall from the large green machine into a box: the long-awaited biochar.

This moment is the result of over a year of hard work, since January 2024, by atmosfair and its project partner, Dark Earth Carbon. After extensive planning, obtaining official permits, signing contracts, consulting with local communities, ordering machinery, constructing the factory, and training staff, the biochar finally begins to emerge. “It’s great to see the first biochar after all this work,” says Arno Rohwedder, one of the founders of Dark Earth Carbon.

Starting in 2024, atmosfair and Tanzanian company Dark Earth Carbon (DEC) aim to produce 2,000 tons of biochar per year in a large-scale pyrolysis plant

in Iringa, the heart of Tanzania’s wood production region. Unlike the small wood gasification stoves used in India, the pyrolysis conditions at this facility can be precisely controlled to ensure high-quality biochar. The plant produces enough biochar annually to power approximately 5,880 TLUD stoves. Additionally, the wood gas generated during the process can be used to produce energy, such as powering a generator. We hope to use the gas for charging electric cargo tricycles soon.

The Mafinga plant is also a source of employment.

DEC currently employs about 60 people, ranging from engineers and fertilizer production experts to plant operators and workers who collect wood waste from local villages.

This wood waste serves as the raw material for biochar. It is a by-product of forest management and small-scale wood processing. Before the project, this waste was either burned or left to decompose in the forest, contributing to the risk of wildfires. The project has changed this practice, putting some of the abundant biomass to use. Local forest authorities support the initiative, as it helps reduce the risk of forest fires.

After harvesting, the wood waste is left in piles in the fields to be burned



Patrizia Pschera



Dark Earth Carbon

Ready-to-use pyrolysis plant in Mafinga

A significant portion of the necessary pruning waste is purchased from small forest owners with less than one hectare of land. By buying this waste, the project encourages proper tree care. In partnership with local organizations, DEC also offers biodiversity courses that emphasize the benefits of biodiverse ecosystems and promote the use of native tree species well-suited for the timber industry.

The collection and transportation of pruning waste from decentralized small forest owners present logistical challenges. DEC staff travel directly to the villages, purchasing and processing the waste using a mobile shredder. These remote areas have limited infrastructure, making it labor-intensive to establish a smooth workflow.

The chipped wood waste is then carbonized in the pyrolysis plant to produce biochar. When used as a soil amendment, biochar improves water retention, counters soil acidification, and its porous structure helps retain nutrients, preventing them from leaching out of the soil.

Currently, work at the Mafinga factory is still in its early stages. Over the next few weeks, the plant will be optimized to ensure stable biochar production. After that, independent certifiers will assess the facility and its production processes. “Our goal is to have the biochar certified as a negative emission for the climate as soon as possible,” says DEC’s Arno. ☺

Local population and stakeholders discuss the biochar project at a meeting



Patrizia Pschera



Sustainable Power Generation in Sun-Rich Countries

A worker installs a power grid in Madagascar



A solar installation in Morocco

atmosfair supports solar energy projects in several countries.

In **Mali**, mini-grids supply approximately 2,600 households with affordable solar power 24/7. This has eliminated the need for diesel generators in villages like Bananso and Séro-Mélo-Diadjoubéra.

In **northern Iraq**, a photovoltaic system powers the Mam Rashaan refugee camp and nearby communities. This system significantly improves daily life for over 10,000 camp residents, allowing them to charge phones, cook, and use air conditioning during the summer.

In **Madagascar**, eight of the 22 planned mini-grids now provide electricity to 50 villages. This reduces dependence on oil imports and strengthens the local solar industry.

In **Nigeria's Toto region**, 1,600 households have received energy from battery-powered solar systems since June 2023. Efforts are underway to double the number of households served.

For many sun-rich nations, solar energy is the most promising source of clean electricity. While conventional photovoltaic systems often achieve commercial success, some solar projects require financial support during initial setup and operation. This is especially true for systems with costly batteries, projects in rural areas with impoverished populations, or those integrated into village or city power grids. In such cases, atmosfair facilitates solar projects that would otherwise be unfeasible.

All our solar projects share a common goal: generating electrical energy from sunlight. Solar cells convert sunlight into direct current (DC), which is either used directly or converted by inverters into alternating current (AC) to feed into local power grids. These systems provide sustainable and reliable electricity in various ways across our solar projects.

Solar power typically replaces conventional fossil fuel plants, such as those powered by diesel or coal, in national grids. It can also pioneer electrification in previously isolated rural areas or communities. These self-sufficient mini-grids offer new oppor-

tunities, such as electric cooking and lighting for homes and workplaces. As a result, people can work or study during the evening and prepare meals in a smoke-free environment.

Readily available, clean solar power opens up new applications, particularly in places without access to an electricity grid. Off-grid solar systems can supply power for groundwater pumps, water treatment plants, efficient agricultural irrigation, and even heating and cooling for buildings. Through these projects, atmosfair not only helps protect the climate but also contributes to building essential and sus-

tainable infrastructure in the project countries. Below are some selected projects from our work.

Building Local Power Grids with Solar Energy: Madagascar, Iraq, Mali, and Nigeria

Many countries in the Global South struggle with inadequate electricity generation and distribution capacity. In many areas, people either lack access to electricity or face frequent power outages. Moreover, existing power plants, most of which run on coal, oil, or diesel, contribute heavily to CO₂ emissions.

The need for decentralized solar power systems is particularly urgent in rural areas, where there is often no connection to national power grids. atmosfair constructs, or supports the construction of, self-sufficient mini-grids in Madagascar, Iraq, Mali, and Nigeria. Electrifying these regions is a crucial step in combating poverty and fostering economic growth. Decentralized solar systems provide either first-time access to electricity or a reliable, clean power supply.

Focus Madagascar

With over 3,000 hours of sunshine annually, Madagascar is one of the sunniest countries on earth. In collaboration with Anka Madagaskar Sarl and autarsys Madagascar, atmosfair has planned a total of 22 solar mini-grids. Currently, eight of these systems, consisting of solar panels, lithium-ion battery storage, and new electricity distribution networks, are already operational.

Decentralized solar power often proves more efficient due to the lack of power losses over long distances. This project provides more than 100,000 people in 50 villages with access to clean electricity. Additionally, atmosfair is partnering with Anka Madagaskar Sarl and Doctors for Madagascar to electrify three health centers in southern Madagascar, far from other planned electrification efforts. This enables emergency medical care at night and ensures the reliable use of examination equipment and refrigerators.



A solar system in Mongolia powers a school with clean energy



Latent heat accumulators in Mongolia store heat for long periods and release it when needed

Efficient air-to-air heatpumps heat this school even at outside temperatures of -40 °C.



Electricity Instead of Firewood, Tanzania

What is common in many countries is still a novelty in others: cooking with electricity. In Tanzania, most people traditionally cook over open wood fires or use simple wood stoves. To address this, atmosfair has been installing photovoltaic systems in schools to power food preparation for students. These systems meet the entire electricity needs of the schools, including the kitchens. Additionally, atmosfair has provided rice cookers, induction stoves, and insulated baskets for slow cooking without electricity. This initiative helps protect the environment and improves the health of the staff, who are no longer exposed to harmful smoke from open fires.

Drinking Water Supply with Solar Energy, Togo, Kenya, and Burkina Faso

Decentralized solar systems are vital in ensuring access to drinking water, especially in remote or arid regions. These systems are self-sufficient, solar-powered solutions that pump groundwater, which is then purified in treatment plants using various technologies depending on water quality. The purified water is distributed via underground pipelines to water kiosks, which serve as 24/7 public taps. People can access clean drinking water using rechargeable NFC credit cards. These systems utilize German technology. In Kenya, reverse osmosis systems from

Berlin-based Boreal Light GmbH ensure clean water, while in Togo, water is treated using a system from Autarcon GmbH, based in Kassel. In Burkina Faso, ultrafiltration technology from Solarspring GmbH is used.

atmosfair has established multiple solar-powered drinking water networks in Togo, providing communities in water-scarce areas with clean and affordable water. In Kenya, atmosfair set up a network of solar-powered water kiosks equipped with reverse osmosis systems that desalinate groundwater. Since 2020, more than 50 such kiosks have been installed.

Efficient Irrigation for Agriculture, Morocco, and Zambia

In arid regions, efficient irrigation is crucial for a successful harvest. Conventional irrigation methods, if available, are often inefficient, wasting both water and energy. Drip irrigation offers an innovative solution, delivering water directly to plant roots and saving up to 90% compared to traditional systems. To power the water distribution through the drip systems, farmers use electric pressure booster pumps.

In Morocco and Zambia, atmosfair has implemented irrigation systems powered by photovoltaic electricity. These systems improve agricultural productivity while conserving water. Additionally, the solar systems replace diesel generators, contributing to reduced CO₂ emissions.



A worker installs air conditioning systems at a school in Mongolia

Generating Heat for Kindergartens in the Coldest Capital in the World, Mongolia

In Ulaanbaatar, Mongolia, atmosfair is piloting two heat generation technologies aimed at transitioning kindergartens from coal-based systems to cleaner solar energy. Two kindergartens are participating in the pilot phase. One is equipped with a water-based heating system that uses heating rods to convert solar-generated electricity into heat. The heat is stored in latent heat accumulators, where wax absorbs and releases heat as it changes phases. This heat is then circulated through insulated water pipes to radiators.

The second kindergarten uses efficient air-to-air heat pumps for climate control. Nineteen heat pumps are installed to heat the rooms directly. Even at temperatures as low as -40°C, these pumps transfer heat from the outdoor air to the inside of the buildings.

Whether it's air conditioning, irrigation, or solar power, atmosfair's climate action programs are making a sustainable difference in the lives of people in these regions. As Madima, a trader from Madagascar, shared: "I am the owner of this grocery store, where I sell goods for daily use, and my husband is a fisherman. We were among the first customers connected to the solar grid. We always wanted a freezer to store our fish. And today we got it!" ☺

Unifying the Carbon Footprint for Travel

atmosfair Develops IT Solutions for the Travel Industry

The goal of KlimaLink e.V. is straightforward: to determine the carbon dioxide emissions of tourism-related travel using a scientific, evidence-based approach. This allows travelers to make climate-conscious decisions based on accurately measured carbon footprints.

Since April 2023, atmosfair has been developing a technical solution for on-demand travel emissions calculations. Travel agencies can access emissions data for hotels and transportation through a website integrated into the booking process. This enables KlimaLink e.V. member companies to display and compare the climate impact of different travel options.

While there are various methods for calculating travel's climate impact, they often lack comparability and consistency. Differences in approaches lead to significant variation in accuracy. KlimaLink, founded in October 2022 by the sustainable tourism initiative Futouris e.V. and the German travel association DRV, seeks to create an industry-wide framework for consistent CO₂ e emission calculations. The demand for such a reliable method is growing, especially as the new EU Corporate Sustainability Reporting Directive (CSRD) requires businesses to accurately report their travel-related emissions. Since KlimaLink was designed to meet CSRD requirements, it can also be used to generate reports on business travel.

KlimaLink offers a comprehensive solution for the travel industry, providing carbon footprint data for individual segments or entire journeys during

the booking process. It integrates information on outbound and return trips by air, bus, or train, combined with data on different accommodations, rental car categories, and, in the future, leisure activities. Through KlimaLink's innovative approach, travel agents can quickly and effectively inform clients about the most climate-conscious options for their holidays or business trips.

After a six-month implementation phase, the first test version of atmosfair's software solution went live in November 2023. Since then, KlimaLink member companies have been able to integrate atmosfair's API into their booking systems. The full system, with all the services described, is expected to be operational by 2024.

KlimaLink is available in Germany, Austria, and Switzerland, thanks to the excellent collaboration between the German travel association DRV, the Austrian travel association ÖRV, and the Swiss travel association SRV. Additionally, many large tourism companies support the initiative. At a time when companies like Google are reducing the apparent carbon footprint of air travel by excluding non-CO₂ effects such as contrails, atmosfair's emissions calculator is setting a much-needed new standard. 🌱

Climate-Conscious Travel

The Smart Travel Tool by atmosfair

In December 2023, atmosfair introduced its latest application for environmentally conscious travel planning: the Smart Travel Tool. Now available in its first beta version online at atmosfair.de, this innovative door-to-door travel tool simplifies the process of comparing travel options.

The Smart Travel Tool helps travelers find the best connection between two locations by analyzing various modes of transport, including trains, night trains, cars, planes, and long-distance buses. Using up-to-date daily data, it suggests optimal routes for each option and estimates ticket prices, giving users a reliable basis for making informed decisions.

Travelers can optimize their search based on three criteria: carbon footprint, cost, and travel time. Users set their priorities, and the tool finds the most appropriate connections accordingly. Unlike other search engines, the Smart Travel Tool also offers alternatives, such as calculating a journey a day earlier with an overnight hotel stay if no suitable night train is available. This feature not only simplifies travel but also provides a more relaxed start to the next day.

A key factor often overlooked in travel planning is the efficient use of travel time. For instance, while drivers must focus on the road, train passengers can work or plan their vacation. The Smart Travel Tool estimates the unproductive travel time for each mode of transport, allowing users to adjust these times based on personal experience.

New Version for Business Travel

atmosfair is also developing a business version of the Smart Travel Tool, specifically designed for planning and booking business trips. This version will assist companies and employees in making more sustainable travel decisions. Features will include the ability to save preferred airlines, hotel groups, rail cards, and travel policies. Companies will also be able to manage carbon footprints and travel budgets across entire departments. 🌱



The Smart Travel Tool sorts the results individually and according to different priorities. Users can set their own criteria for climate impact, time and money on the central slider. If you would like to try out the Smart TravelTool, you can do so on our website.

We welcome feedback and requests for further development:
info@atmosfair.de



atmosfair's Sustainable Aviation Fuel Receives the German Sustainability Award

In November 2023, atmosfair was honoured with the German Sustainability Award in Düsseldorf. The jury recognized our plant in Werlte, where we became the first organization globally to produce synthetic kerosene from green hydrogen, also known as e-kerosene. They commended atmosfair for its "particularly effective and exemplary contributions to transformation, setting an example, and sending the right signals within the industry and beyond."

Transitioning from a laboratory setup to large-scale production of e-kerosene is a technically demanding challenge, and our plant in Emsland has faced its share of difficulties. After a significant delay and utilizing a simplified process, we successfully produced the first few tonnes of CO₂-neutral synthetic crude oil. However, there is still a long road ahead, and the technology remains in its early stages. Until it's fully developed, reducing air travel remains the most effective measure for climate protection. The jury acknowledged the technical challenges and awarded the prize not only for our achievements but also for overcoming the hurdles in the process. They emphasized the plant's importance in advancing climate protection efforts.

The German Sustainability Award, first presented in 2008, is part of the German Sustainability Day initiative, organized by the German government in collaboration with the German Sustainability Award Foundation.

At atmosfair, along with our sister company Solarbelt gGmbH, which operates the Werlte plant, we are proud of this award and view it as motivation to continue along the path we began in 2020. Together, we remain committed to pioneering climate protection technologies and environmental standards, particularly where these technologies can be applied effectively in developing countries. ☺



The German Sustainability Award honours pioneering contributions to the transformation towards a sustainable future



Tobias Posselt (atmosfair, left) and Jan Hegger (Solarbelt) at the German Sustainability Award ceremony



DZI Spendensiegel: Your Donation at Work

atmosfair continues to hold the DZI Spendensiegel, a certification awarded by the German Central Institute for Social Issues (DZI) for responsible and effective use of donations. This seal is granted to charitable organizations that pass rigorous, independent audits by the DZI. It recognizes efficient and transparent financial practices, sound organizational management, ethical fundraising, and appropriate offsetting.

A thorough review confirmed atmosfair's excellence across all categories. We excel in the effective and economical use of funds, with administrative costs amounting to just 3.8% of total revenue in 2020 and 4.3% in 2021. This means that for every €100 donated, nearly €96 directly supports our climate protection projects. The DZI Spendensiegel is not only an honour for us but also validation of our commitment to maximizing the impact of your donations for climate protection and people in the Global South. ☺



From Donation to Project

Expenditures for Climate Change Mitigation Reach Nearly EUR 32 Million

Since 2005, atmosfair has been funding and operating climate projects globally, using voluntary contributions toward climate change mitigation. The process begins with a signed support agreement between atmosfair and the project operator, which outlines binding annual carbon dioxide reduction targets and specifies how atmosfair will support the project. The period between donation and actual carbon reduction can take up to one and a half years, as this time is needed for project setup and operation. The carbon reductions are then verified by UN-approved assessors.

Timeline for Donation Use in Climate Projects:

Start: atmosfair receives your climate change mitigation contribution.

Months 1 – 2: atmosfair or its partners purchase necessary hardware, such as building materials or photovoltaic panels. Whenever possible, materials are sourced locally to support local economies. However, this is not always feasible; for instance, many African countries must import steel. Despite these challenges, atmosfair strives to locally produce smaller components, such as pots for efficient cookstoves, even if the quality may not match stainless steel alternatives. Projects like building small-scale biogas plants for farms in Nepal and Kenya are a prime example, where nearly 100% of materials, such as clay bricks and floor fill, come from the region.

Months 3 – 4: Materials are delivered to project partners. Importation challenges often arise, such as delays at customs, with shipments stuck in ports for months and incurring significant customs duties. Negotiating with local authorities, particularly with our strict zero-tolerance policy for corruption, is difficult. Internal logistics are also problematic, especially when security situations cause delays.

Months 5 – 6: Production and distribution of climate products (e.g., efficient cookstoves, small biogas plants) or project setup (e.g., installing photovoltaic systems for villages) begin. Depending on the technology, production can range from assembling prefabricated components, as seen with cookstoves in Rwanda, to more complex tasks like pressing and bending steel plates, which will be implemented in local cookstove production in Nigeria and Rwanda. Other projects, like biogas plants in Nepal, require small construction sites for installation over several days. In more complex cases, like photovoltaic systems, detailed planning is needed for assembly.

In household-level projects, sales efforts play a role, as the technologies are sold at reduced prices made possible by climate mitigation contributions. For efficient cookstoves, for instance, teams may travel hundreds of kilometers to present the products in villages and deliver them later. These operations require significant local staffing, often creating hundreds of jobs in large projects.

Months 7 – 19: Carbon emissions are physically reduced during the project's first operating phase. For example, once the new technology is operational, a diesel generator can be switched off, resulting in immediate CO₂ reductions, to the satisfaction of local users.

Months 20 – 22: An external UN-accredited assessor (e.g., TÜV) verifies the reduction in carbon emissions and generates assessment reports, which are repeated annually. The assessor inspects installations, interviews operators, and reviews all relevant data, allowing them to calculate actual carbon emissions reductions for the previous period. These assessors must be re-accredited by the UN every three years and are held liable for any errors. The UN publishes these reports on publicly accessible websites for transparency and accountability.

Expenditure for climate protection projects 2023

Project category	Project	Expenditures 2023*	
Efficient cookstoves	India	1.84 %	46 %
	Nigeria	30.01 %	
	Rwanda	14.45 %	
	Lesotho	0.05 %	
	Malawi: Electric cooking	0.0 %	
Biogas & biomass	Kenya: small scale biogas plants for dairy farmers	0.04 %	36 %
	Nepal: biogas	35.73 %	
	Tanzania: compost	0.08 %	
	Mafia: power generation from coconut tree waste	0.01 %	
	Malawi: bricks	0.13 %	
Sun and water	Kenya: solar water purification	0.02 %	12 %
	Madagascar: rural electrification	0.04 %	
	Mali: rural electrification	0.01 %	
	Senegal: solar power	5.89 %	
	Iraq: solar power	0.11 %	
	Morocco: solar droplet irrigation	0.00 %	
	Dominican Republic: solar power	0.03 %	
	Burkina Faso: solar water purification	1.62 %	
	Togo: solar power	4.15 %	
	Tanzania: solar powered cooktops	0.09 %	
	Nepal Neue Energie (Helambu and Langtang Trek)	0.03 %	
	Nigeria: solar power	0.04 %	
	Negative emissions	India: biochar TLUD	
India: biochar Jalinga		0.01 %	
Tanzania: biochar		0.83 %	
Nepal: biochar		0.04 %	
Germany: DAC		0.80 %	
Environmental education and transformative projects	Germany: Education projects	0.36 %	1 %
	Germany: PTL	0.06 %	
	Transformative projects	0.17 %	
	Kenya Electro Taxis	0.00 %	
Total expenditures 2023: 32.1 Mio. Euro	Total		100%

* Small share = Maintenance + ongoing operation; large share = New projects and expansion

Months 23 – 24: UN bodies cross-check the assessment reports, and the Gold Standard verifies that the project contributes to sustainable development in the host country. This step typically involves multiple rounds of feedback between the assessor and UN bodies.

Goal, month 24: The UNFCCC Secretariat issues Certified Emission Reductions (CERs) to atmosfair's registry with the German Emissions Trading Author-

ity, part of the German Environment Agency (UBA). While this step no longer affects the project itself, it remains critical for atmosfair's documentation. Registering atmosfair's emission reductions with the UBA offers donors a guarantee, as data is processed and saved by an independent governmental body.

Offsetting obligations and reductions achieved in 2023

Greenhouse gas reductions delivered and verified by UN auditors ⁽¹⁾ [1,000 t CO ₂]		2005 – 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024 ⁽²⁾	Planned total until end of 2024 ⁽²⁾
Efficient cookstoves	Nigeria: efficient cookstoves (CA guaranteed) ³	19	2	18	0	124	86	36	40	28	20	15	9	396
	India: efficient cookstoves	5	18	75	20	20	103	140	149	273	533	674	683	2,693
	Cameroon: efficient cookstoves	12	10	9	10	10	0	0	0	0	0	0	0	51
	Lesotho: efficient cookstoves	3	18	22	25	28	29	29	26	25	25	25	19	273
	Rwanda: efficient cookstoves (CA guaranteed) ³			7	0	98	108	124	161	193	258	334	328	1,611
	Ethiopia World Food Program: efficient cookstoves							25	0	0	0	0	0	25
Biogas & biomass	India: power generation from residual biomass	136	0	65	69	0	56	69	62	54	0	0	0	511
	India: small scale biogas plants for families	45	20	0	0	0	0	0	0	0	0	0	0	65
	Kenya: small scale biogas plants for dairy farmers				3	0	5	7	0	0	0	7	9	31
	Thailand: biogas from sewage		50	0	0	0	0	0	0	0	0	0	0	50
	Nepal: biogas (CA guaranteed) ³				60	299	214	712	485	1,192	902	756	745	5,365
	Indonesia: compost from residential waste	1	1	1	1	1	1	1	0	0	0	0	0	7
	Tanzania: compost											5	3	8
Sun, water, wind	Honduras: small scale hydropower	124	23	0	41	0	0	289	34	0	44	0	0	295
	Nicaragua: wind power	119	45	103	0	0	0	0	0	0	0	0	0	266
	Vietnam: wind power				10	32	0	0	0	0	0	0	0	42
	South Africa: Solar thermal energy for domestic hot water					9	0	0	0	0	0	0	0	9
	Madagascar										3	2	9	14
	Senegal solar PV							50	85	67	120	125	145	592
	Other solar PV (Iraq/Nigeria/Morocco/Tanzania/Mali/Kenya)											1	4	5
Negative emissions	Biochar (India, Tanzania)												7	7
Total		463	186	300	239	621	602	1,220	1,041	1,833	1,907	1,944	1,953	12,308
Reduction obligation through voluntary climate protection contributions		607	90	108	71	86	129	488	336	372	426	426		
Reduction obligation through climate protection projects on behalf of clients		218	95	86	221	389	408	368	362	1,136	1,124	1,614		
Total reduction obligation		825	185	193	291	475	536	855	698	1,508	1,550	2,040		
Accumulated greenhouse gas reduction obligation		825	1,010	1,203	1,494	1,970	2,506	3,362	4,060	5,567	7,118	9,157		
Greenhouse gas reductions, verified by UN auditors, accumulated		464	650	950	1,189	1,809	2,411	3,631	4,671	6,504	8,411	10,354		

¹ In the table, greenhouse gas reductions are listed for the calendar year in which they are verified by external auditors and certified by the applicable standard. Therefore, some greenhouse gas reductions achieved in 2023 are not yet recorded in this year, as they have not been certified yet.

² The greenhouse gas reductions indicated for 2024 are a forecast. The values may change in future annual reports.

³ The national government has committed to corresponding adjustments under Article 6 of the Paris Climate Agreement.

In total, it takes about

- 6 months: Your contribution starts physically reducing CO₂ in a project.
- 1.5 years: The first CO₂ reductions are certified by an independent assessor.
- 2 years: atmosfair receives formal proof of CO₂ reductions from the UN.

The table above shows the carbon emission reductions achieved in the final phase—verified, reviewed, and confirmed by the UN. These reports are available on the United Nations Framework Convention on Climate Change (UNFCCC) website, with links provided

on the atmosfair site. The table also compares these final carbon emissions reductions with atmosfair's reduction obligations to donors, which are accounted for when the climate change contribution is first received.

Though it can take up to two years between receiving donations and obtaining formal UN verification, atmosfair has reduced this gap to zero. By the end of 2023, atmosfair's 9.1 million tons of CO₂ reduction commitments to donors and customers were already offset by 10.3 million tons of formally confirmed CO₂ reductions. This surplus of 1.2 million tons provides a buffer for 2024.

This efficiency stems from atmosfair's conservative estimates of its projects' carbon emissions reductions. Additionally, some projects have been operating longer than initially planned, generating further reductions. In 2023, 1.9 million tons of CO₂ reductions from atmosfair projects were certified by UN auditors.

Although the COVID-19 pandemic and global supply chain delays have slowed project expansion, EUR 32 million was still spent on climate projects (see financial section, pages 32–37). Of this, approximately 36% was allocated to efficient cookstove projects, 12% to biogas and biomass

projects, and 5% to solar projects, including solar agriculture and solar drinking water treatment. Around 1% of 2023's expenditures funded educational and transformative projects, primarily in Germany.

In some ongoing projects, the table may show zero carbon emission reductions. This doesn't mean the project isn't running or reducing emissions. Rather, it indicates that the UNFCCC has not yet published a report for that project in the given calendar year. As verification periods vary and don't always align with calendar years, emissions reductions can fluctuate annually, even for continuous projects.



Sebastian Schubbe + Frieda Maelle

Thanks to the sale of biochar from their TLUD cookstoves, families in our Indian biochar project gain an additional income

Financial Report

Summary

Revenue increased by more than 4 million euros from 2022 to 2023, reaching over 33 million euros. In 2023, atmosfair was able to invest approximately 32 million euros in climate protection projects.

In 2023, atmosfair again received no public funding. The only income from public institutions came through atmosfair's participation in the tender for CO₂ offsetting of business trips by the German Federal Government. No offsetting customer accounted for more than 10 percent of total revenue; thus, the non-profit atmosfair gGmbH remained financially independent.

For over 10 years, donations have been supplemented by income from business operations. The surpluses generated here cover part of the costs in atmosfair's non-profit section. In 2023, over 95 out of 100 euros of donations went into climate protection projects, either directly into technologies such as efficient stoves or solar systems, or to planners and operators of renewable electricity production projects. atmosfair used barely 5 out of 100 euros for its own personnel, who handle project administration and donor support, and for other costs such as IT, accounting, rent, or credit card fees.

Supervision / Organization / Non-Profit Status

The shareholders' meeting of atmosfair gGmbH was expanded in 2021 and now consists of equal shares between the existing shareholder Foundation for Sustainability and Dr. Dietrich Brockhagen. While the foundation solely appoints the members of the company's control bodies, Dr. Dietrich Brockhagen is responsible for the company's business matters. Following the four-eyes principle, he also manages the company's business together with the second managing director Steffen Pohlmann under the supervision of the company's control bodies. The first control body is the independent advisory board for atmosfair standards, consisting in 2023 of representatives from climate-relevant federal ministries (BMWK, BMZ, AA), one professor each from ZHAW and HTW, and a representative from Germanwatch. It met three times in 2023. The advisory board oversees management in matters of environmental integrity and decides on the approval of new climate protection projects, development and control of

atmosfair standards including emission calculations, and the approval of new business cooperations.

As a second control body, the Foundation for Sustainability appointed a supervisory board in 2021, consisting of three members. As an independent body, the supervisory board controls the regularity and economic integrity of the company and exercises the following statutory powers:

- A. Resolution on accounting
- B. Discharge of management
- C. Appointment of auditors
- D. Decision on management compensation

The tax exemption of the non-profit GmbH for 2023 was certified by the tax administration. For climate protection contributions received in 2023, the non-profit GmbH properly issued donation certificates. To make its own work transparent for the public and donors, atmosfair follows the voluntary commitment of the Transparent Civil Society Initiative and publishes the desired information on its website according to the initiative's requirements.

Financially Independent

In 2023, atmosfair was entirely financed through donations for CO₂ offsetting and income from business operations. The latter is also permitted to a non-profit organization to a limited extent. In 2023, neither did the shareholders pay money to atmosfair, nor did atmosfair pay money to the shareholders.

Expenses for Planning Climate Protection Projects

The largest item in expenses is the development and operation of climate protection projects. These include costs for purchasing technologies or building materials (e.g., steel for efficient stoves) on one hand. On the other hand, they include expenses for project development and operation, including inspections by TÜV and other UN-accredited auditors, as well as for project personnel abroad.

In total, atmosfair spent approximately 31 million euros here. In addition to the expenses for CO₂ offset projects, there were personnel costs for project

Balance sheet 2023 / Assets

Assets	2023 EUR	2022 EUR
A Fixed assets	306,419.00	277,068.00
I Intangible assets	8,587.00	3.00
II Tangible assets	26,412.00	5,645.00
III Financial assets	271,420.00	271,420.00
B Current assets	46,123,461.36	24,345,667.76
I Inventories	2.00	2.00
II Receivables		
Trade receivables	11,291,497.42	17,369,078.03
Other assets	6,359,469.79	5,721,374.71
III Cash and cash equivalents, etc.	28,472,492.15	1,255,213.02
C Accruals and deferred income	3,857.79	20,861.13
Balance sheet total	46,433,738.15	24,643,596.89

planning and implementation, which amounted to approximately 1.3 million euros in 2023. In total, since its founding, atmosfair has supported climate protection projects with about 148 million euros.

As a basis for calculating funding commitments for their climate protection projects in a given year, atmosfair normally takes the average of the revenue from the previous two years. This complies with the principle of timely use of funds and gives atmosfair sufficient security for long-term funding commitments to project partners in the Global South. Furthermore, this allows for planning and building new projects, even if revenue should temporarily decline. Moreover, due to the lead time of about one year between project idea and use of funds for hardware such as efficient stoves or solar systems, new projects are not practically feasible otherwise. From 2022 to 2023, atmosfair's revenue increased

by over 4 million euros. According to the above principle, this would have led to a funding volume of about 31 million euros in 2023. atmosfair has fulfilled this. The bank balance increased from 1.2 million euros (2022) to about 28 million euros in 2023. atmosfair created net provisions of about 8.5 million euros in 2023.

Salaries According to TVöD for Employees and Management

After climate protection projects, personnel expenses were the second-largest cost factor. atmosfair employees are paid according to the public service tariff system (TVöD), with classifications ranging from project manager to management at levels 11–15. General administrative costs for telephone, postage, insurance, and office supplies amounted to about 70,000 euros. Rent and office maintenance

totaled approximately 200,000 euros. Additional administrative costs can be found in the income and expenditure statement table.

Administrative Costs of 3.2 Percent

One of atmosfair's standards requires efficient use of donations; therefore, only a small portion of donations may be used for administrative costs. This refers to funds that don't flow into climate protection projects because atmosfair needs them for administration and fundraising. In 2023, a total of nearly 1.1 million euros was spent on this, which, in addition to the above-mentioned items, mainly went to personnel costs and material costs in public relations, IT, accounting, credit card fees, travel expenses, etc. (see table blocks b) and c) under expenditures). This corresponds to an administrative cost ratio of approximately 3.2 percent of revenue.

The administrative costs are so low also because atmosfair continued to avoid paid advertising such as promotion teams in 2023 and instead gained public visibility through content-driven campaigns in the media free of charge. The participating celebrities also contribute to promoting atmosfair without offsetting.

New: DZI Donation Seal

The DZI examines non-profit organizations in Germany regarding their use of donations and appropriate organizational structures. atmosfair has received the DZI donation seal and confirmed a particularly low administrative cost ratio – 3.8 percent in 2020 and 4.4 percent in 2021 – which are top values in Germany. The DZI uses a complex approach for calculation and arrives at lower values for administrative costs than atmosfair itself.

Profits Achieved Increase Funding Volume for Climate Protection Projects

In 2023, atmosfair achieved surpluses of 4 million euros after taxes and before provisions in its business operations with services for companies, which were achieved through the operation of climate protection projects on behalf of customers, sale of CO₂ balancing software, and consulting services (climate service for companies). atmosfair uses the surpluses directly for climate protection projects.

Goal Achievement

Together with the CO₂ reductions certified in 2023, atmosfair has achieved more CO₂ reductions in its climate protection projects from 2005 to 2023, i.e., since atmosfair's founding, than reduction obligations arising from voluntary climate protection contributions and customer orders. This resulted in a surplus of about 1.2 million tons of CO₂ reductions (see table). Thus, atmosfair has overachieved its obligations to all customers and donors and built up a buffer for 2024.

Audit and Discharge of Management

The 2023 annual financial statements were audited in accordance with the articles of association by an auditor appointed by the supervisory board. The auditor confirmed the annual financial statements, raised no objections, and issued an unqualified audit opinion as in previous years. On December 6, 2024, the supervisory board confirmed the proper 2023 financial statements and discharged the management.

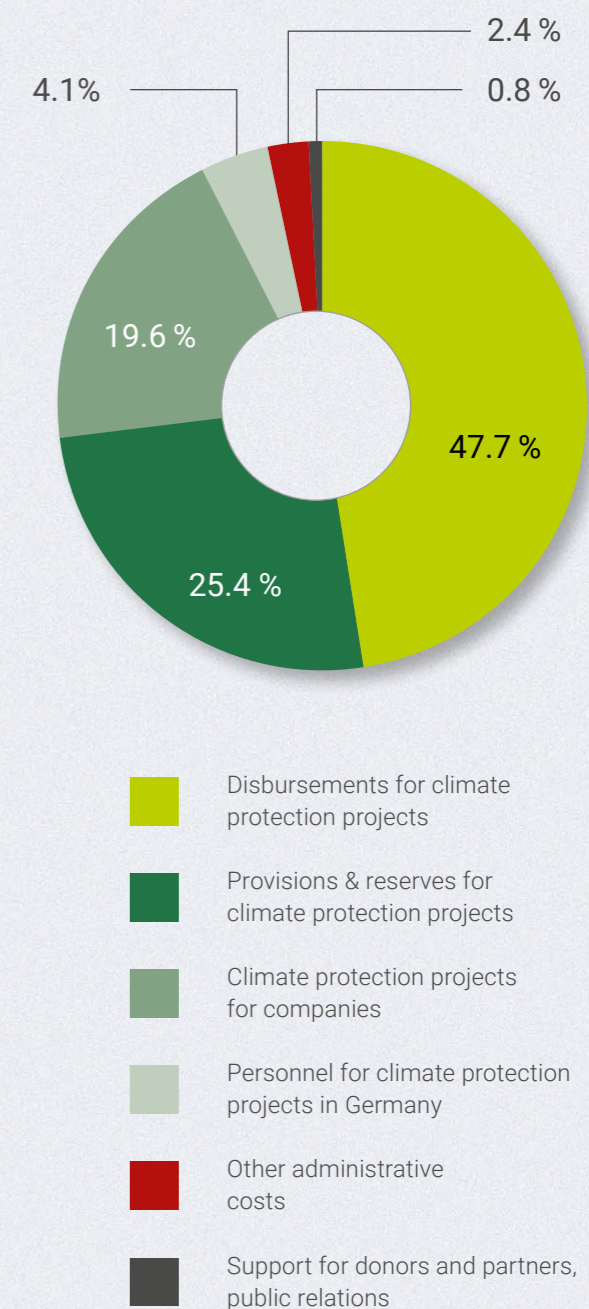
Balance sheet 2023 / Liabilities

	2023 EUR	2022 EUR
A Equity	20,000,537.85	17,522,348.51
I Subscribed capital	25,000.00	25,000.00
II Reserves for statutory projects		
Short-term reserves for climate protection projects	0.00	0.00
Free reserves (including for climate protection projects)	19,975,537.85	17,497,348.51
B Provisions	24,664,269.73	5,892,537.19
Tax provisions	1,557,591.16	405,903.16
Provisions for climate protection projects	23,106,678.57	5,486,634.03
Other provisions	0.00	0.00
C Liabilities	1,768,930.57	1,228,711.19
Trade payables	176,249.40	331,571.30
Other liabilities	1,592,681.17	897,139.89
D Accruals and deferred income	0.00	0.00
Balance sheet total	46,433,738.15	24,643,596.89

Income and Expenditure Statement 2023

	2023	2023	2022
	EUR	%	EUR
Income			
Voluntary climate protection contributions for climate protection projects	23,799,149	71.2	20,497,538
Climate protection projects on behalf of customers, CO ₂ accounting software, consulting, etc. before taxes (economical business operations)	9,602,152	28.7	8,763,621
Other income (interest etc.)	19,009	0.1	10,738
Total	33,420,310	100.0	29,261,197
Expenditures			
A Climate protection projects for CO₂ offsetting, private and corporate customers			
Direct expenses (planning, construction, operation, technology purchasing, testing, personnel in developing countries)	-15,951,723	47.7	-18,336,408
Net creation/release of provisions and reserves	-8,478,189	25.4	1,414,957
Total climate protection projects CO₂ offsetting	-24,429,912	73.1	-19,751,365
Personnel: project planning and support by atmosfair employees in Germany and in the project countries	-1,369,856	4.1	-867,972
B Administrative cost: support for donors and partners, donor recruitment, public relations work			
Personnel cost	-263,667	0.8	-541,796
Editorial office public relations	0	0.0	-10,550
Total	-263,667	0.8	-552,346
C Other administrative expenses			
Office administration (telecommunications, postage, office supplies, insurance, membership fees, depreciation)	-70,243	0.2	-101,664
Rent and maintenance	-200,534	0.6	-311,091
Credit card fees, payment service providers, account fees, exchange rate differences	-91,551	0.3	-141,673
IT (fees, maintenance fees, server rental)	-62,292	0.2	-18,392
Accounting, tax consultancy, annual financial statements, auditor	-348,061	1.0	-155,106
Printing cost for publication	-7,363	0.0	-7,581
Contracts for work and services	-8,480	0.0	-83,217
Travel and representation cost	-8,027	0.0	-10,776
Non-deductible input tax	0	0.0	0
Total	-796,550	2.4	-829,500
D Commercial business operations: sustainability counseling for companies			
Expenditure on climate protection projects on behalf of customers	-4,874,720	14.6	-6,572,200
CO ₂ accounting software	-31,146	0.1	-9,196
Personnel: sustainability counselling for companies	-175,778	0.5	-157,813
Taxes on income from sustainability counselling and climate protection projects on behalf of customers	-1,478,681	4.4	-520,805
Total	-6,560,325	19.6	-7,260,014
E For information purposes: surpluses and utilization			
Surpluses from economic business operations 2023, after taxes, before provisions	3,998,335		1,641,059
Total	-33,420,310	100.0	-29,261,197
Result after reserve release / surplus utilization	0		0

Expenses of atmosfair



References / Selection

Companies

50Hertz
Bayerische Landesbank
BayWa r.e. renewable energy GmbH
Beiersdorf AG
BMW AG/Group
Carlson Wagonlit Travel
Chiesi GmbH
DB Cargo AG
Deloitte
Deutsche Bahn AG
Deutscher Akademischer Austauschdienst (DAAD)
Deutsches Zentrum für Luft- und Raumfahrt e.V.
DHL
DFL Deutsche Fußball Liga GmbH
Deutsche Kreditbank (DKB)
FlixBus
FTI Consulting
GUT Zertifizierungsgesellschaft für Managementsysteme mbH
Hamburg Marketing GmbH
Hermes Germany GmbH
HRG Sports
idealo internet GmbH
InfectoPharm, Arzneimittel und Consilium GmbH
Inter.link
KAYAK
KfW Bankengruppe
Klöckner & Co. SE
Knorr Bremse AG
Landesbank Hessen-Thüringen
Lufthansa AirPlus Servicekarten GmbH
Mercedes-Benz AG

Merck Serono GmbH
meteoblue AG
MTU Aero Engines
Otto Group
Pfinder KG
QVC Deutschland
DB Schenker
Schülke & Mayr GmbH
SDC Bank
SICK AG
Siemens AG
Teva Health GmbH
Toll Collect
Travelpool Europe
UNITO Versand & Dienstleistungen GmbH
VHV Vereinigte Hannoversche Versicherung a.G
Vodafone GmbH
VW Volkswagen AG
WALA Heilmittel GmbH
WEFA Inotec GmbH
wpd AG
W&W Service GmbH

Government, NGOs, Politics, Science & Associations

Acted
Alexander von Humboldt Stiftung
Alfred-Wegener-Institut
Berliner Energieagentur GmbH
Bundesverband Solarwirtschaft e. V.
Deutsche Bundesregierung
Deutsches Youth For Understanding Komitee e.V. (YFU)
DigitalService GmbH des Bundes
École Fédérale de Lausanne

Enagement Global
ETH Zürich
European Green Party
Fraunhofer Gesellschaft
German Doctors e.V.
GIZ
Global Innovation Fund
Goethe Institut e.V.
Greenplanet Energy
Greenpeace e.V.
Harvard University
Helmholtz-Zentrum für Umweltforschung GmbH – UFZ
Landesamt für Umwelt Bayern
Landeshauptstadt Düsseldorf
Landeshauptstadt München
Lions Clubs International
Öko-Institut e. V.
Stadt Hamburg
Stiftung Entwicklungs-Zusammenarbeit
The Climate Group
Universität Basel
Universität Bern
Universität Zürich
Université de Genève

Events

ARRtist Summit
Berlin Energy Transition Dialoge Conference 2023 (DENA)
Deutsche Hospitality
Die Ärzte
Die Toten Hosen
Euronics Summer Convention 2023

Fachagentur Nachwachsende Rohstoffe
FKP Scorpio Konzertproduktionen
ITB Berlin
NY Climate Week
Tollwood
Querbeat

Tourism

AER Ticket
Aldi Suisse
Contrastravel
DAV Summit Club GmbH
Dein Marokko
Durchblick Leserreisen
Forum Anders Reisen
Frosch Sportreisen
Hauser Exkursionen
Hofer
Insight Reisen GmbH
Laade Gartenreisen
Lufthansa City Centre Reisebüropartner GmbH
Neue Wege Reisen
Papaya Tours GmbH
QTA Raiffeisen-Tours RT-Reisen GmbH
REISEN MIT SINNEN
RTK Reisebürokooperation
Schauinsland Reisen
Weltweitwandern
World Insight

Team



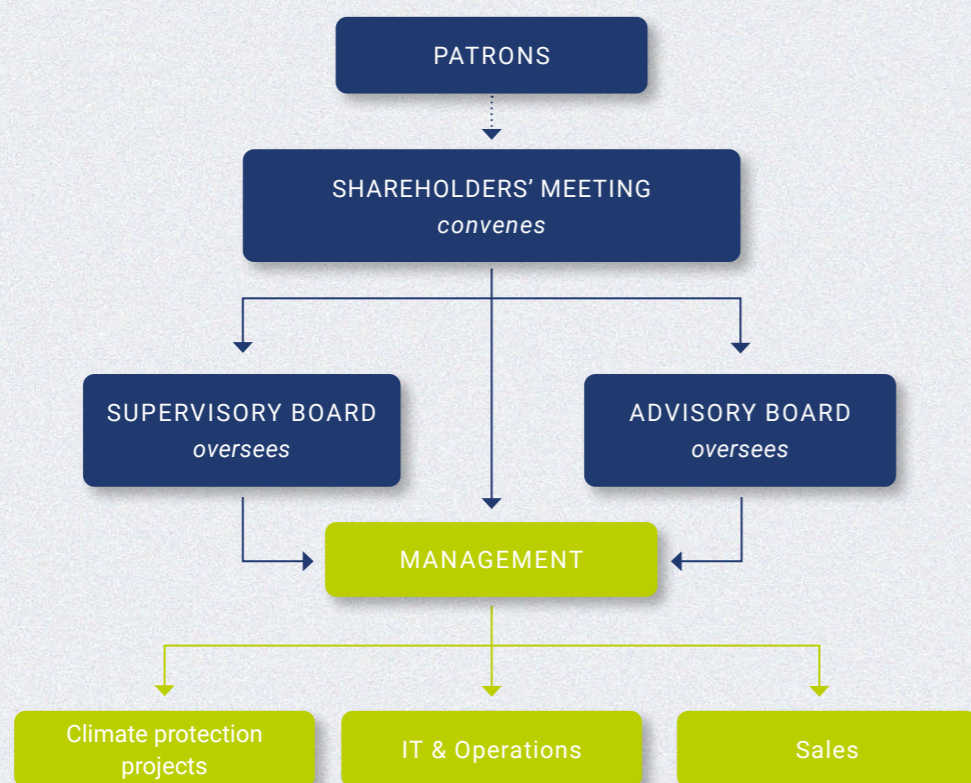
We mourn the loss of our patron, Professor Klaus Töpfer, who passed away on June 8, 2024, in Munich at the age of 85 after a brief but serious illness.

Klaus Töpfer will be remembered by many in Germany and around the world as one of the most influential environmental politicians, shaping the path toward sustainability and climate protection on both national and international levels. For us at atmosfair, he will be remembered as an extraordinary individual. He played a pivotal role in the founding of atmosfair in 2004, alongside Jürgen Trittin.

He consistently urged us to look ahead and keep moving forward, reminding us that a healthy world is only possible through collective action. His guidance has been our compass throughout the years and will continue to inspire us in the future. With Klaus Töpfer's passing, we have lost a tireless advocate and a loyal companion.

Structure and Organization

atmosfair gGmbH was founded in 2004 by its two current shareholders, the Stiftung Zukunftsfähigkeit (Foundation for Sustainability) and Dr. Dietrich Brockhagen, emerging from a research project funded by the Federal Ministry for the Environment (BMU). The research project had previously developed the central standards for CO₂ offsetting, which continue to guide atmosfair to this day. To ensure compliance with these standards, the German government still assigns employees from various ministries to the atmosfair advisory board.



Patrons

The patrons are honorary supporters and ambassadors of atmosfair. They are also members of the advisory board but do not have voting rights.



Prof. Dr. Mojib Latif
Senior Professor at GEOMAR
President of the German Chapter of the CLUB OF ROME
Chairman of the Board of the German Climate Consortium



Prof. Dr. Hartmut Graßl
Physicist, former Director of the Max Planck Institute for Meteorology in Hamburg

Supervisory Board

As an independent body, the Supervisory Board monitors the proper conduct, financial integrity, and soundness of the company. The Supervisory Board approves the annual financial statements of atmosfair gGmbH, appoints auditors, decides on the discharge of the management, and determines their remuneration. The members of the Supervisory Board are appointed and dismissed by the shareholder Foundation for Sustainability.



Dr. Harry Lehmann
Chairman of the Supervisory Board and Director of PtX Lab Lausitz, Future – Environment – Society (ZUG) gGmbH



Yvonne Wende
Deputy Chairwoman and Founder, CEO, and Rector of the Berlin Cosmopolitan School



Dr. Christoph Mecking
Managing Partner of the Institute for Foundation Consulting

Advisory Board

The Advisory Board approves projects and the allocation of funding. It also advises atmosfair on issues of environmental integrity and further develops the atmosfair standards.



Klaus Milke
Chairman without voting rights
Chairman of the Foundation for Sustainability



Prof. Dr. Barbara Praetorius
Professor of Sustainability, Energy, and Environmental Economics, Berlin School of Economics and Law



Christoph Bals
Political Director of Germanwatch
Spokesperson for the Climate Alliance Germany



Prof. Dr. Regina Betz
Professor of Energy and Environmental Economics, Zurich University of Applied Sciences
Head of the Center for Energy and the Environment



Malin Ahlberg
Deputy Head of Department, Federal Ministry for Economic Affairs and Climate Action (BMWK)



Dr. Ursula Fuentes Hutfilter
Head of Climate Foreign Policy, International Climate Protection, UN-FCCC, Federal Foreign Office



Dr. jur. Annette Windmeisser
Head of the Climate Finance Department, Federal Ministry for Economic Cooperation and Development (BMZ)

Tests & Press

Since its founding in 2005, atmosfair has won all twelve comparative studies and tests conducted on carbon offset providers.

We present all these comparisons, based on various criteria, in our brochure, available at: atmosfair.de/testsieger

Our latest test results:

Stiftung Warentest (Finanztest, issue 11/2022)
Carbon Offsets – These Services Protect the Climate and We Tested Them (translated from German)

Stiftung Warentest's Finanztest analyzed four voluntary carbon offset providers. Questionnaires were distributed, and websites were reviewed between June and September 2022. The evaluation focused on the quality of offsetting, transparency, management, monitoring, and the principle of "avoidance before reduction before offsetting." Differences in offsetting quality were particularly noted.

Only atmosfair was able to 'fully convince' the testers. As the test winner, and the only provider to do so, we were awarded an overall score of "very good" (0.5) and achieved the top score for offsetting quality.

You can find the full article as a paid download here: test.de

Test result:
Overall score: 0.5 (very good)
Quality of offsetting: 0.5 (very good)
Transparency: 0.5 (very good)

Quote from the Testers' Report: "Compared to the previous study, the quality of offsetting has deteriorated for three of the four providers. Only atmosfair was fully convincing."

Stiftung Warentest (Finanztest, issue 3/2018)
"Above the Clouds" – Carbon Offset Providers Tested (translated from German)

In March 2018, Stiftung Warentest reviewed organizations offering voluntary carbon offsetting for the magazine Finanztest. The test criteria included "quality of offsetting" and "transparency."

For the "quality of offsetting" criterion, the test primarily examined the standards of climate protection projects that generate CO₂ savings. Finanztest also evaluated the providers' involvement in project development. Under the "transparency" criterion, factors such as whether organizations disclosed their finances, communicated administrative costs, advertising expenditures, and the use of project funds were assessed.

Test result:
Overall Score: 0.6 (very good)
Quality of offsetting: 0.5 (very good)
Transparency: 0.5 (very good)

Quote from the Testers' Report: "Test winner."



Download brochure:



atmosfair.de/testsieger

'There is no one who monitors the system independently'

19.01.2023 / ZEIT online

What's so different about us is that we subject our projects to the UN's verification mechanism for official emissions trading certificates. With liable auditors and supervision by UN bodies. Consumers can also see the project audits and ask questions.



'Flying – and Offsetting'

22.03.2023 / Stiftung Warentest Finanztest

Best in class: atmosfair

'Charge for Emissions - Many Want to Offset, But Only a Few Do'

24.06.2023 / Der Tagesspiegel

According to a Civey survey for Tagesspiegel Background, just over one in four people (28 per cent) can imagine offsetting the emissions of a flight by making a voluntary payment.



'Beyond National Commitments: Rwanda, atmosfair and Gold Standard Launch First Carbon Credit Aligned with Paris Article 6'

15.11.2023 / goldstandard.org

"By offering correspondingly adjusted credits that are authorized from host countries for international transfer, the private sector can help to raise global ambition through using them for voluntary cancellation." – Nicole Wilke, Head of Department, Federal Ministry for Economic Affairs and Climate, (BMWK), Germany



'UN-based Checks on Carbon Credits Face Critical Test'

30.11.2023 / Financial Times

Rwanda extended this guarantee by using a "corresponding adjustment" tool created by the UN. The tool was designed to ensure the estimated cuts in carbon dioxide entering the atmosphere were not double-counted by the company buying the corresponding carbon credits and the country where the project takes place. This enabled Swiss carbon registry platform Gold Standard to certify that more than 54,000 credits for German non-profit Atmosfair, worth \$327,000 at recent market prices, meet the rules of the nascent UN system.





” All the greenhouse gases we are still blowing into the atmosphere will fall back on our feet. One thing that helps: eating more plants, cycling more and holidaying in Mecklenburg instead of the Maldives. And if you fly, then fly fairly – atmosfair ”

Dr. Eckart von Hirschhausen is a physician, science journalist, and founder of the Healthy Earth – Healthy People Foundation.

To him, “planetary health” means prioritizing the protection of our environment and ensuring a future that is sustainable for future generations.