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2021 Annual Report

Featured highlights:

New pursuits: e-kerosene

Nigeria and Rwanda: kick-off of local cookstove production



Cover photo: atmosfair production plant for e-kerosene in the Emsland region of Germany

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Publication

Published by
atmosfair gGmbH | Dr Dietrich Brockhagen

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Print run
2.000

Print
Oktoberdruck AG
EMAS-certified, 100% recycled paper, Blue Angel-certified

All figures and photos where no source is indicated come from atmosfair gGmbH.

Cover photo
atmosfair production plant for e-kerosene, in the Emsland region of Germany

Editorial

Dear Readers,

Planes fuelled by kerosene that is not made from biomass, not part of the food vs. fuel debate and produced entirely with renewable energy: a must to tackle the climate impact of long-haul flights. We took this step last year with the completion of our e-kerosene production plant in Werlte in the federal state of Lower Saxony.

But it won't be easy with e-kerosene either: to generate enough e-kerosene for global air transport in 2019, around 10 petawatt hours of electricity would be needed. By way of comparison, all the renewable energy in the world today supplies only a total of about 7 petawatt hours. But, fortunately, these sources of energy are being rapidly expanded; in the last ten years, renewables have nearly doubled worldwide.

Evidence that we are in a race against time to reach the Paris climate targets: we have only about two decades left to decarbonise the global economy, but so far the transformative steps have taken closer to a century. It took more than twenty years for solar power, which was initially ridiculed when the first 100,000 roofs programme was rolled out in 2000, to become the world's most economical and cleanest form of electricity generation.

But it also shows something else: if a non-profit company like atmosfair can be the first in the world to build a facility of this kind and sell the product to customers like Lufthansa, then our civil society is strong. We don't have to wait for the oil multinationals, and many customers are willing to bear the additional costs. For me, the most wonderful thing about the inauguration ceremony in Werlte was that everyone was in attendance: Fridays for Future, the municipality of Werlte, policymakers, the aviation industry, engineers and manufacturers, but also atmosfair customers like you. We showed what is possible when we join forces.

Speaking of joining forces: in 2021, the IPCC



once again emphasised that in the future we will also have to capture CO₂ directly from the air and store it. atmosfair is also active in this area. In India, we produce biochar and apply it to the soil, thereby improving soil yields at the same time. But also technologically, in partnerships where we capture CO₂ directly from the air. We still have a long way to go, but as we all know, everything starts with the first step.

In 2021, we were able to continue to grow with your support. My sincere thanks to you!

Yours sincerely,

Sincerely

Dr. Dietrich Brockhagen,
CEO atmosfair gGmbH

Efficient cookstoves

atmosfair subsidizes energy efficient stoves in Africa and Asia. The small stoves are very popular as users immediately notice how much wood and money they save.

Solar, wind and water

Solar, wind, and water are the three pillars of regenerative energy sources. atmosfair supports partners and technologies which further the development of local economies and the environment.

Biogas & Biomasse

atmosfair partners build small biogas plants which transform cow and pig manure into gas used for cooking and valuable fertilizer. atmosfair also supports electricity production from crop residues and the composting of organic waste.

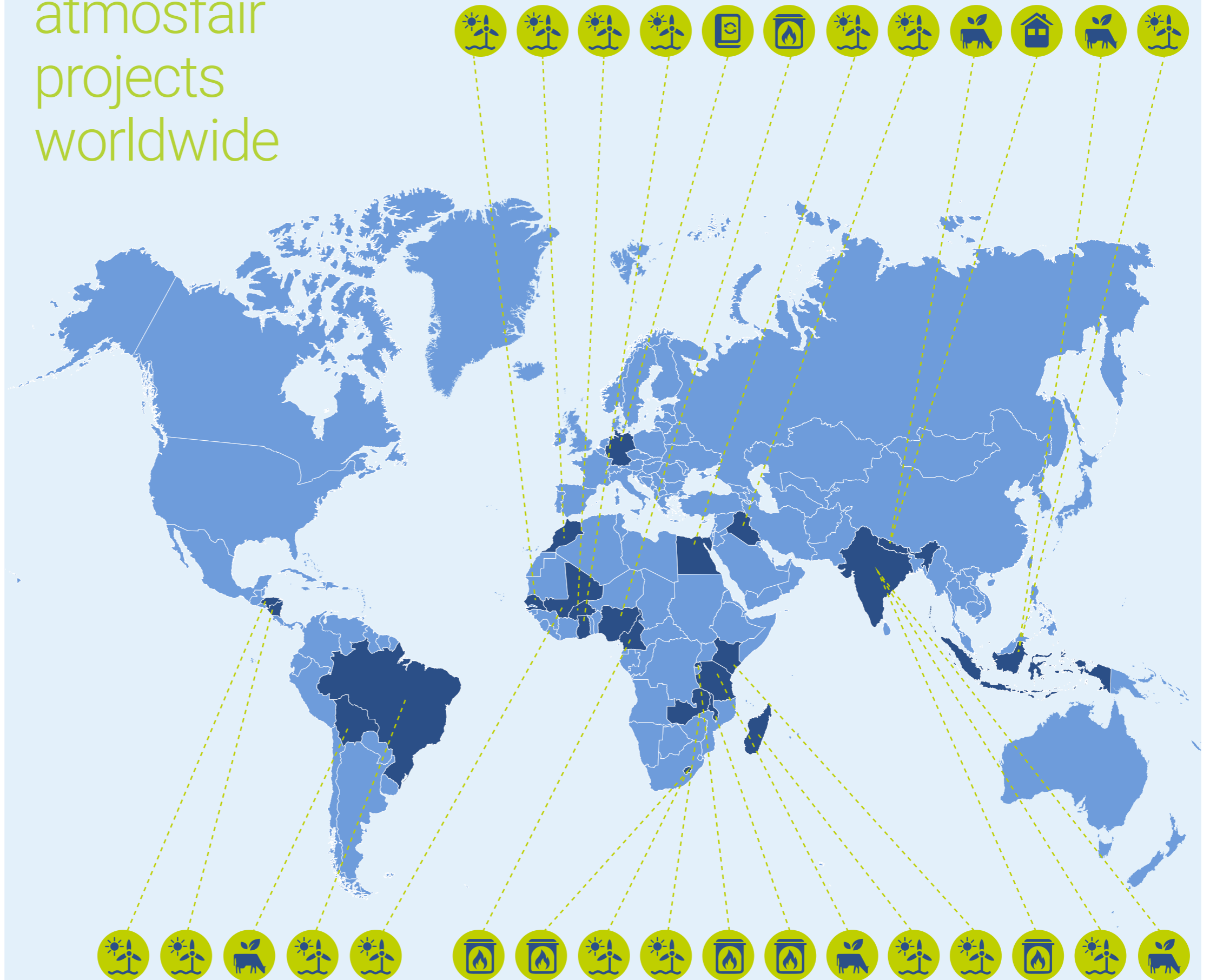
Environmental education

Climate protection starts at your doorstep. This is why atmosfair promotes educational projects in German schools as an investment for the future. We do not claim any resulting carbon reductions.

Renewable Energies Building

After the violent earthquake in Nepal in 2015, atmosfair supported the construction of energy selfsufficient lodges. This helps shift tourism, an important economic sector in the country, towards an environmentally friendly foundation.

atmosfair projects worldwide



New pursuits: e-kerosene

Much needed innovation for a carbon-free future

atmosfair sets standards with production and our new fairfuel label



atmosfair e-kerosene plant in Werlte, October 2021

So far, there have only been three options for climate change mitigation in aviation: flying less, offsetting carbon emissions or using biofuel in planes. However, flying less will hardly take hold globally if economies continue to grow and lifestyles do not change. Carbon offsetting will not achieve the Paris climate targets because aircraft emissions also have to decrease. And biofuel is a dead end because there is not enough land around the world for production without the dilemma of food vs. fuel.

E-kerosene, which is carbon-neutral and synthetically produced from renewable energy sources, is the only real climate alternative if used correctly. atmosfair has set standards in this area: our new plant in Werlte is not only first of its kind in the world, it also closes the carbon cycle and produces carbon-neutral kerosene without losing sight of other environmental goals. In addition, atmosfair has developed environmental criteria with the fairfuel label, which have already made their way into the international debate and EU legislation.

Werlte, 4 October 2021: After intensive planning and two years of construction, the time had finally come. atmosfair celebrated the opening of its e-kerosene plant in Werlte, Emsland, the first in the world. In attendance were its affiliate Solarbelt FairFuel and invited politicians, partners, customers and donors. Angela Merkel and Environment Minister Svenja Schulze gave speeches, and customer Lufthansa and cooperation partner QTA, a travel agency, also praised the plant as a pioneering accomplishment and a necessary step to finally bring air travel in line with the 1.5 degree target set in Paris. Press coverage was enormous and the story dominated prime-time radio and television news

nationwide on this day from Mittagmagazin to heute-Journal and Tagesthemen. The newspapers also reported extensively in detailed articles. Even internationally, the major news outlets covered the event and in the days that followed, atmosfair received messages and enquiries from the USA to Africa and Asia. The plant celebrated the end of construction and the start of operations on this day. Construction had started at the beginning of 2020. E-kerosene production is set to start in the third quarter of 2022, when all the plant components are interconnected. The plant has a production capacity of around one tonne of fuel per day. atmosfair sends the crude kerosene it produces to the Heide refinery



Tagesthemen, Germany's daily television newscast, about the inauguration ceremony in Werlte, screenshot, 4.10.2021



International press coverage

in northern Germany, which then refines it into Jet A1 for delivery to Hamburg Airport. E-kerosene is carbon-neutral when used as fuel because the carbon for its production comes from the atmosphere, in Werlte primarily from a biogas plant. The hydrogen needed for production stems from an electrolyser that atmosfair operates in the plant powered by renewable electricity from wind turbines in the surrounding area.

What is e-kerosene? Does it mean clean air travel?

Already today: carbon-neutral

The 'e' in e-kerosene stands for electricity: one of the main inputs is electricity, which is used to produce hydrogen from water by electrolysis. Kerosene consists of long molecular chains of hydrocarbons. The other main input is therefore carbon, which is extracted from CO₂. Unfortunately there is more than enough CO₂ in our atmosphere. At its own facility in Werlte, atmosfair extracts this CO₂ from a neighbouring biogas plant and directly from the air (direct air capture) During production, e-kerosene is initially carbon-negative as it removes CO₂ from the atmosphere. This CO₂ is only emitted again when it is used in the aircraft engine. This makes e-kerosene carbon-neutral overall.

Only possible in the future: climate neutrality

However, e-kerosene is not (yet) completely climate neutral. This is because e-kerosene still produces contrails and the greenhouse gas ozone at high altitudes, both of which make a significant contribution to global warming. Fortunately, the effects of e-kerosene are only about half as pronounced as with fossil-based kerosene. But even this can be prevented if planes change altitudes and fly around critical layers of the atmosphere. However, this increases fuel consumption and will be a challenge for the aviation industry until in the long term enough e-kerosene will be available to allow for entirely adapted flight altitudes.



Federal Environment Minister Svenja Schulze during the inaugural speech



atmosfair patron and moderator Prof. Mojib Latif



Red ribbon: Environment Minister Svenja Schulze, Lufthansa Cargo CEO Dorothea von Boxberg, atmosfair CEO Dietrich Brockhagen and atmosfair patron Prof. Mojib Latif

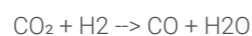
Start in 2019

Several years of preparation, planning and construction led up to the 4th of October. Fundamental to these efforts was the realisation that e-kerosene and other technologies such as carbon direct air capture (filtering CO₂ directly from the atmosphere) can best be done in the Global South. The sun's rays are stronger there, making solar power cheaper, and with fair energy partnerships, the North-South energy transition can also be advanced there with new synergies. This is the reason we founded Solarbelt gGmbH, a non-profit affiliate of atmosfair. It was formed with the aim of developing, constructing and operating new fuel plants for atmosfair in the Global South. Since no plant of this kind has been built to date, we decided to first build a pilot plant in Germany because we wanted to be close to all technology providers. In the search for a suitable location, we quickly found what we were looking for. After a few discussions with EWE Erneuerbare Energien, which operates the biogas plant in Werlte, it was clear that we had found an optimal location with the existing infrastructure. Everything we needed for an e-kerosene plant was in place: a site, biogenic CO₂ from residues of the biogas plant, electricity from nearby wind turbines.

Technologies of tomorrow

Technologically speaking, the plant is already paving the way far into a green future. On the one hand, it is supplied with biogenic CO₂ from the biogas plant, which is separated from the raw biogas by amine scrubbing. Even though this is much more complex than taking CO₂ from a cement or steel plant, for example, the carbon cycle is not closed in this case (see Figure 1). To ensure that we can become independent of the residues from a biogas plant in the long run, we have installed a direct air capture module (DAC). It separates CO₂ from the ambient air and supplies it to the e-kerosene system. With the latest state-of-the-art technology, the DAC module only makes a small contribution to the CO₂ supply. But for the path ahead, it can't be done without DAC, something the IPCC also believes. That is why DAC, as a technology of the future, has been in Werlte from the very outset.

At its core is the electrolyser from Siemens, which uses a proton exchange membrane (PEM) to extract hydrogen from the water at high pressures directly via the membrane. The process engineering stage then converts CO₂ and hydrogen into hydrocarbon chains, which are chemically comparable to fossil crude oil. This is why we talk about the production of synthetic crude oil. To achieve this, the CO₂ must first be reduced to CO (reverse-watergas-shift, RWGS):



The CO is then mixed with hydrogen to form a synthesis gas. From this, a Fischer-Tropsch reactor synthesises long-chain hydrocarbons:

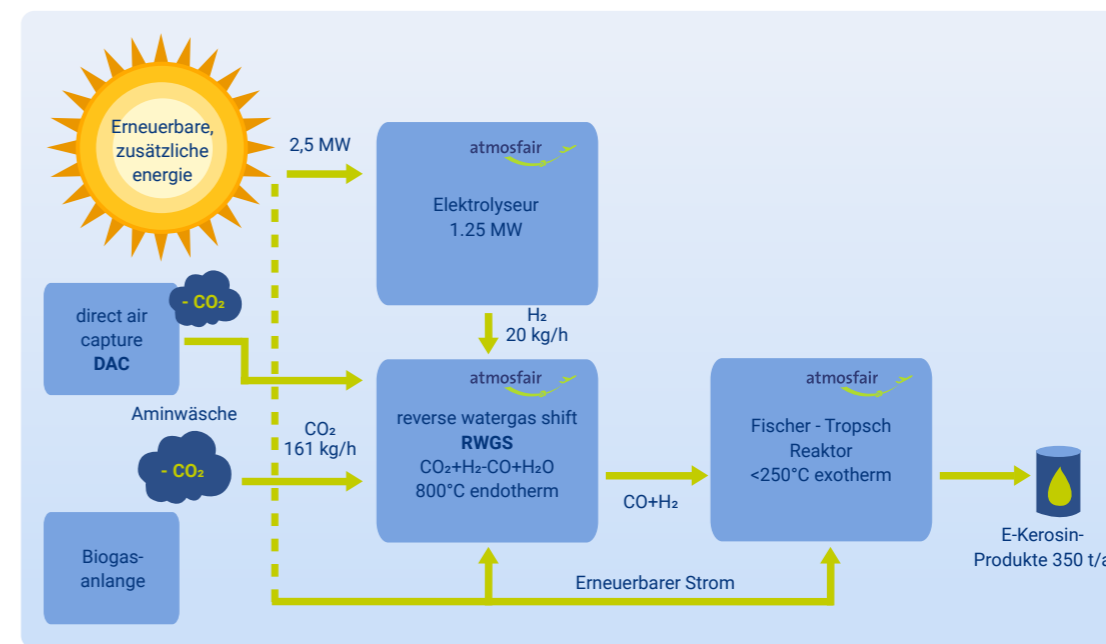


Figure 1: Flowchart of e-kerosene plant (@atmosfair)



Tank system

Finally, we collect the synthetic crude oil in stainless steel tanks and transport it by tanker truck to the Heide refinery. It then refines the crude oil into ready-to-use kerosene.

The plant has a production capacity of around 350 tonnes of kerosene annually. In the process, it converts around 1,300 tonnes of CO₂ and 160 tonnes of H₂. This plant makes Solarbelt fairfuel a global pioneer on a commercial scale.

atmosfair was able to acquire Lufthansa as a customer for the e-kerosene in advance, making it possible for the costs of plant operations to be covered (see section on page 13). However, this partnership was also important to credibly show the public that e-kerosene has a market and is already available today as a real climate solution for air travel.

atmosfair also offers its donors support for e-kerosene by blending synthetic kerosene in addition to offsetting their flight emissions. This means that donors can for the first time avoid emissions from air travel and offset the remaining emissions. This is the first step towards real climate change mitigation for end customers as well.

How does atmosfair fairfuel make its way to my plane?

The quantities of synthetic fuels that will be available in the near future are limited. In addition, processing them into Jet A1 kerosene has to be done in a refinery where our fairfuel has to be mixed with fossil crude oil. This is why atmosfair fairfuel uses an accounting approach, similar to renewable electricity. atmosfair gives the produced quantities of synthetic hydrocarbons to the refinery, which supplies them as a blend to the existing fuel network. atmosfair has this certified by independent experts.

New label for e-kerosene: atmosfair fairfuel

In parallel to the start of the PtL plant operations, atmosfair published the first label for synthetically produced fuels, atmosfair fairfuel. Among other things, it guarantees that the CO₂ sources are environmentally sustainable and that renewable electricity will be further developed. The German Environment Agency and the ifeu Institute in Heidelberg acted as patrons. Synthetic fuels are in short supply and should therefore only benefit those sectors that have no other way to decarbonise by 2050. As a result, the fairfuel label is only permitted for synthetic fuels used in commercial aviation. In addition, there are environmental criteria for the basic raw materials CO₂ and electricity.

Expert of CO₂ criteria

- Exclusion of fossil sources: Not only coal gasification, but also carbon capture from the waste gas of coal-fired power plants and similar sources. Otherwise, the carbon cycle would not be closed; the CO₂ emissions would merely be recycled.
- Characters similar to waste: The CO₂ source should be similar to waste, i.e. that of an involuntarily produced waste material. This excludes CO₂ from cultivated biomass such as rapeseed or maize, but allows e.g. food scraps and biowaste.
- Avoiding lock-in effects: Excludes CO₂ sources that can be replaced by zero-emission sources in order to avoid creating new economic and environmental opportunities for existing sources by including them in the power-to-liquid process. We therefore exclude e.g. CO₂ from industrial processes such as steel or cement production, which can be decarbonised with green hydrogen.
- Development of DAC: The concentration of CO₂ in the atmosphere is already too high. With direct air capture, these huge reserves can be permanently tapped without compromising other environmental goals. As a result, the aim is for DAC to provide the sole source of CO₂ as a raw material for PtL kerosene by 2025.

Excerpt of criteria for electricity

- 100% renewable, solar and wind with a focus on regional power generation (system serviceability).
- Additionality to the energy transition: By expanding or repowering renewable electricity generation, we ensure that the general development of renewable energy is not slowed down.
- No EEG subsidies: This principle applies to the subsidies available in Germany, specifically to the renewable energy levy (EEG levy). If the electricity supply for power-to-liquid relies on EEG subsidies, these funds are not available for the otherwise urgently needed expansion.
- Global South: Operators of e-kerosene plants in developing countries need to create additional renewable energy capacity for rural electrification at socially compatible electricity prices, in addition to generating electricity for the plant. This will benefit the host country and its Paris targets, as well as its population.



Background: future technologies to achieve the 1.5°C degree target

New aircraft designs can lower fuel consumption considerably

By building the plant for the production of e-kerosene, atmosfair was not only the first company in the world to venture into industrial production, but also broke new ground in other ways. Extensive groundwork preceded the decision: what does science say, what do policymakers say, but above all what do our boards, patrons and donors say who offset their flights with us? And who is supposed to buy the expensive

e-kerosene?

The guiding principle remains: "Avoid carbon first, reduce second, offset last." So e-kerosene doesn't mean zero emissions? No, definitely not, instead it means developing necessary technologies without which we cannot achieve the Paris climate targets.

What does science say?

Time is running out.

According to the IPCC, we can only limit global warming to 1.5 degrees if we not only completely decarbonise the global economy, but also achieve negative emissions starting in around 2040 (see Fig. 2).

This also applies to air transport: developing battery or hydrogen aircraft is one of the technical options in this

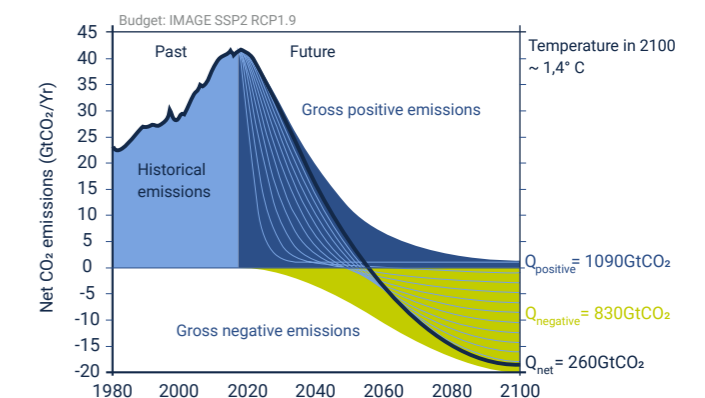


Fig. 2: Historical, positive (brown) and required negative CO₂ emissions to meet the Paris CO₂ budget. Source: IPCC

context. But especially on long-haul routes, where flights cannot be replaced by rail, completely new designs would have to be developed for hydrogen aircraft. However, with service lives of well over 30 years for existing aircraft and the long development times of at least 10 years for new designs, this will certainly not achieve the necessary decarbonisation of air transport by 2045.

Fly less or new fuels

The only solution is to fly less and use alternative fuels in existing aircraft. However, these fuels cannot be biofuels; there is not enough land for them around the world and, most importantly, they would give rise to a conflict between agricultural production for food and for air travel. E-kerosene, produced synthetically with electricity, does not have these limitations. But there are other challenges: to completely power global aviation starting in 2019, we would have to more than double the existing renewable energy sources like wind and solar worldwide. We have enough space and money, but it would entail a tremendous industrial transformation and require international cooperation between the Global North and South. This would not be an easy undertaking in a world where even today many barriers exist in attitudes and between cultures.

Apart from flying less, we have few alternatives. This will be difficult, however, if the emerging countries continue to become stronger economically and people from these countries legitimately want to emulate our lifestyle.

Carbon offsetting vs. e-kerosene

One thing remains clear: carbon offsetting on its own will not make it possible to reach the Paris climate targets. As important as offsetting is for the North-South energy transition with the development of wind and solar power in the Global South, it does not really change anything directly about the CO₂ source. In this case, only the direct carbon emissions are reduced. And this can only be done quickly and cleanly enough with e-kerosene when it comes to air transport. Policymakers have also already made a commitment: the Federal Environment Ministry (BMU) clearly states that e-kerosene is the solution to climate change mitigation in aviation

Environment Minister Svenja Schulze: "Electricity-based fuels are the key to climate neutrality because we will probably still use conventional, turbine-powered aircraft for a long time to come. Aircraft are not purchased on the spur of the moment, and they are in operation for several decades. 30 years is not uncommon. At the same

time, the use of sustainable biomass is already reaching its limits. For noticeably lower CO₂ emissions, we need truly sustainable, renewable fuels."



Welcome message from the German Chancellor to atmosfair at the inauguration of the e-kerosene plant

Angela Merkel: "For long-haul flights, sustainable liquid fuels, power-to-liquid, are one solution. Already today, green kerosene can be blended into fuel for any aircraft to reduce CO₂ emissions."

Why atmosfair?

There are hardly any organisations that have set their sights on the production of e-kerosene. The risk of getting stuck with the initial investment is too great, so it is better to wait and see. But we are running out of time due to global warming. The few companies that are tackling the issue are the big oil multinationals, but their approach must be viewed critically from a climate standpoint. Still, e-kerosene is not automatically "green". atmosfair can also be active where it does not yet pay off or where there are still considerable risks. We are a non-profit organisation and dedicated only to climate change mitigation. That is why our plant has also provided answers to the most important climate questions: Where does the CO₂ come from? Where does the electricity come from? Does the electricity meet additional requirements? What applies to investments in developing countries and fair participation of local communities? With atmosfair fairfuel, we have created a new label designed to answer these questions (see box on page 12).

What do our donors say?

By producing PtL fuels, atmosfair has clearly departed from the business of offsetting and taken a big step forward. Ultimately, it is a product used by the airline industry, although atmosfair actually advocates for less air travel. An analysis of the si-

tuation in air transport based on realistic assumptions provides a clear picture here: e-kerosene is necessary and the only solution for air transport. To ensure that this change of direction was also something our donors wanted, atmosfair asked its top donors ahead of time about e-kerosene.

- We e-mailed 4,800 donors: "Would you like to be interviewed about developments at atmosfair?" 720 said yes; 200 interviews were conducted.

- In-house, trained staff, structured, guided interviews, introduction to the e-kerosene process.

- Main question: should atmosfair enter this field and build its own e-kerosene plant?

It showed that a good 81% of our donors supported the idea or even clearly wanted atmosfair to develop its own plant, even though we are only an NGO. The main reasons were that carbon offsetting can only ever be an interim solution and aircraft must be able to fly with zero emissions in the long run, even if there is still a long way to go. Significantly less than 10% of interviewees said no for various reasons, but mainly because the production of kerosene per se was not seen as appropriate for a climate action organisation like atmosfair.

How does the plant pay off?

atmosfair sells the e-kerosene to DHL and Lufthansa Group at prices designed to cover costs. The total costs are made up of the capital and operating costs. This enables atmosfair to ensure that the plant is operated cost effectively. If plant operation is successful, the donations made in advance flow back to atmosfair. Donations were used to prefinance the costs of the plant. They came from two sources. On the atmosfair website, donors can click on "Donate". Donations through this channel are freely available to atmosfair and can be used wherever funds are currently needed. The second source was profits from atmosfair's business operations, which were channelled into the construction of the plant. atmosfair regularly generates profits through the production and sale of CO₂ reporting software, as well as through offsetting or consulting services for companies. This way, atmosfair can ensure that the construction of the PtL plant in Werlte is not at the expense of carbon offsetting.

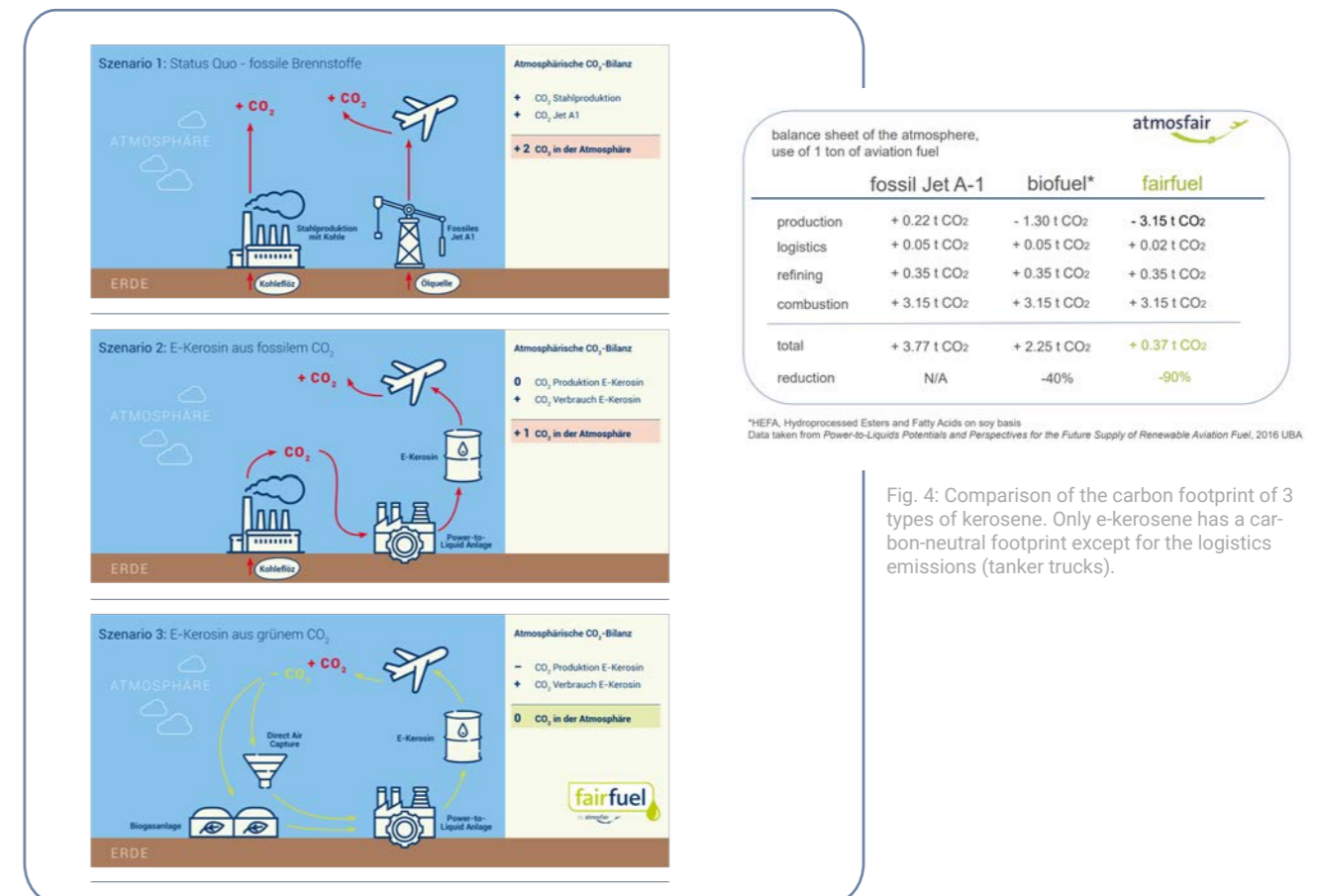


Fig. 3: Scenario 1: Industry and aviation use fossil energy sources. Scenario 2: CO₂ emissions from steel production are used for e-kerosene, but fossil emissions remain. Scenario 3: CO₂ is captured from the air as a residue (via a biogas plant or directly); fossil CO₂ is no longer needed.

Fig. 4: Comparison of the carbon footprint of 3 types of kerosene. Only e-kerosene has a carbon-neutral footprint except for the logistics emissions (tanker trucks).



Nigeria and Rwanda: kick-off of local cookstove production

Finished production facility for cookstove production in Kigali, Rwanda @atmosfair

With the construction of two new factories in Africa, atmosfair also broke new ground in 2021. To effectively tackle the rapidly progressing deforestation, we need large numbers of efficient stoves that people can use to cook cleanly with hardly any wood. The necessary scaling up of stove production requires the formation of local structures that can be economically self-sustaining in the long term. We provide infrastructure, technical expertise, training and financial support. To this end, we have formed subsidiaries, employed local staff, rented land, constructed buildings, developed and tested production lines and trained technicians. The time has finally come and the first Made in Africa cookstoves are leaving the new factories.

For more than 10 years, we have been importing the Save 80 cookstoves from Germany and selling them at subsidised prices. These stoves, together with the Wonderbox, reduce firewood use by more than 90%. The stoves are made of steel and are very popular; even after 10 years of use, annual audits by independent and UN-accredited auditors show that almost all of them are still in use. But some challenges remain: where do we get steel cheaply in Africa? How is distribution going in the large country of Nigeria? How do we make instalment payments possible? Who operates and maintains the machines? At the same time, this step also creates hope: if things go well, we can supply East and West Africa with the best cookstoves from Kano and Kigali, at prices that even rural families can afford.

Two new factories – kick-off of completely local atmosfair stove production

Kigali (Rwanda), March 2022: we and our partners in Rwanda have a reason to celebrate: the first Save80 stove produced entirely locally in Rwanda is complete! Together, we are looking forward to producing

40,000 cookstoves a year from the summer onwards. And considerable progress has also been made in Kano (Nigeria): the container with the machines for cookstove production that we sent from Germany arrived in Kano at the beginning of February 2022. Now we can start building the production line here as well. Production of the Save80 is also scheduled to start in Kano, Nigeria in June 2022. From 2020 to 2021, we developed and tested the machines and production line for cookstove production in our atmosfair test

workshop in the Pankow district of Berlin. In summer 2021, we packed the first set of machines, loaded them into containers and sent them to Rwanda. Coinciding with the arrival of the machines in November 2021, our technical developer Bernhard Ellmann was also on site in Kigali to help with customs clearance, oversee machine setup and discuss all the details of machine operation. A member of the Nigerian team was also present in Kigali so that Bernhard could train both teams at the same time (see box).

The two teams in Nigeria and Rwanda now have 20 people working on commissioning the cookstove production lines, setting up the production processes and starting actual production, so that we are confident of reaching an initial capacity of 40,000 cookstoves per year in each of the two countries in the second half of 2022. After this initial step, we want to gradually scale up production.

Local production of efficient cookstoves – more independence from imports and subsidies

Smoke exposure from cooking indoors has led to nearly 700,000 premature deaths in Africa in 2019 alone, according to a study in the Lancet Planet Health magazine (2021). Especially in rural Africa, the need for efficient and clean cookstoves is high.

There are quite a few providers who are striving to meet demand. To date, atmosfair has exported many of the cookstoves or the stove kits to the countries of use. We



Progress on construction of the new building in Kigali, Rwanda @atmosfair



The production team with the first completely locally produced stove from the new factory in Kigali @atmosfair

now want to change this to ensure that the added value can be shifted as much as possible to the countries where the cookstoves are used.

For our partners in Nigeria and Rwanda, this also means that the costs of the cookstoves can be lowered, as well as dependence on imports. In the medium and long term, it will also help our partners to make their contribution to protecting human health and mitigating climate change without atmosfair subsidies.

Rwanda: kick-off of production

In Rwanda's capital Kigali, our partner company Safer Rwanda (SFR) started construction of a new production facility in the industrial district of Kigali with our support. To this end, SFR formed the company SAFER 1 Ltd, which will also assume responsibility for operation of the new factory. SFR will still handle distribution of the cookstoves as in the past.

The entire construction phase of the new building coincided with the coronavirus pandemic, which caused considerable difficulties, especially in the procurement of building materials. In spite of this, SAFER 1 was able to press ahead with the construction work at a steady pace, so that the construction of the factory building was mostly completed in November 2021.

The timing was good, because the machines were scheduled to be delivered from Germany at the same time and they were assembled on the spot. This also made it possible to successfully train the technicians. And in March 2022, the time had finally come: the first Save80 cookstove manufactured entirely locally left the factory. Starting in summer 2022, we plan to reach the full production capacity with 40,000 cookstoves per year.



Cookstove assembly in our factory in Kano, Nigeria @atmosfair



Our local production team in Kano, Nigeria (from left to right): Okpara Emeka, Salama Fumen, Oyedo Solomon, Jack Anabel and Phillip Cornelius. They have already completed 3,200 Save80 stoves using prefabricated components from Germany. @atmosfair



Our international core team for technical cookstove production (from left to right): Samuel Munana (SAFER 1, Rwanda), Bernhard Ellmann (atmosfair, Germany), Joseph Nsabimana (SAFER 1, Rwanda) and Ojo Olufisayo (ACSL, Nigeria) @atmosfair

Nigeria: the factory and distribution team are waiting in the wings

In parallel to the progress made in Rwanda, the machines for the production of Save80 cookstoves are currently being set up in Nigeria at the new factory location in Kano in the north of the country.

In the first half of 2021, we readied the leased building in Kano for the new stove factory. The local team created a plan for the use of the premises and renovated the building accordingly. A new roof was added, the electricity and water supply was upgraded and the building was plastered, tiled and painted. We completed this work in June 2021. Right afterwards, we were able to set up the first, provisional set of machines for the initial production phase. The plan was to assemble 3,200 prefabricated cookstoves that atmosfair had sent from Germany. We successfully completed this production phase in October 2021.

In January 2022, the machines for the production line of the Save80 stoves also arrived in Kano. The team finished setting up the machines in April 2022, and we launched our own cookstove production in June 2022. We will initially produce about 20,000 to 40,000 cookstoves per year and plan to expand production as much as tenfold in the long term.

The challenge of distribution

The newly recruited distribution team deserves a special mention in Nigeria. It is faced with the challenge of adapting the distribution structures for the locally produced Save80 cookstoves to the significantly increased production figures Nigeria is Africa's most populous country with roughly 200 million inhabitants. Its inhabitants also have above-average incomes by African standards. But getting the stove to the rural regions in the north, where forests are cleared most quickly for cooking, is a problem in terms of distribution and logistics: how do I reach the customers, how do I make instalment payments

possible, how do I bring the oven to the customers?

Until now, we have only sold the stoves directly to users through selected smaller partners. However, this approach has limits. Which is why we want to establish relationships with wholesalers and develop the largest possible network of intermediaries as quickly as possible to enable efficient distribution of the cookstoves throughout the country. Our distribution team is actively contacting prospective key accounts, conveying the high quality, durability and efficiency of the cookstove, and has already taken the first orders.

Ojo Olufisayo, the general manager of our cookstove factory in Kano says:

"Setting up Save80 stove production in Kano, Nigeria, is one of the biggest advances in tackling climate change made in Nigeria in recent years."

Until now, importing prefabricated kits for Save80 stoves has been hampered by many complications, such as currency fluctuations and bureaucratic hurdles in customs clearance. All in all, this has made the supply of goods arduous and led to delays in the value chain.

These difficulties have been largely eliminated now that the Save80 cookstove is made in Nigeria.

People have unrestricted access to clean, efficient, environmentally friendly and locally produced stoves through a stable supply chain. At the same time, there are new job opportunities, especially for Nigerian youth in Kano.

The Nigerian government also sent a clear message through the Federal Environment Ministry by visiting our plant in Kano and assuring us of support from ministries and authorities

Rethinking stove tracking

To capture the CO₂ savings achieved through the use of the Save80 cookstove, we need to record – as in the past – the stoves sold along with the contact details of the users. This is the only way we can prove that the cookstoves are being used and that they reduce CO₂ emissions. To this end, we have launched a pilot study to explore different ways to register our stove users both effectively and reliably. An app (or alternatively by phone) will allow users to register with our Nigerian distribution team themselves once they have received the stove. Making it possible for users to register themselves and the direct contact to our team they have as a result has advantages, not just for atmosfair. It also gives users access to straightforward support if they have questions or are experiencing difficulties. As an incentive to encourage new customer registration, a credit card for a phone is attached to the cookstove on delivery as an added bonus.

Joseph Nsabimana, production manager of our cookstove factory in Rwanda



An interview with production manager Joseph Nsabimana

Joseph Nsabimana is the production manager of the cookstove factory in Rwanda. He joined the team at Safer1, which operates the stove factory, in October 2021. Our colleague Allan Mubiru met him in Kigali and talked to him about the factory and the opportunities that local stove production presents for Rwanda:

What opportunities can the new factory offer for the use of efficient cookstoves in Rwanda?

The new factory in Rwanda gives many people the opportunity to use the efficient cookstoves since they are manufactured in the immediate vicinity. It also creates new jobs that contribute to the country's social economic growth – both for the factory workers and the community that uses these cookstoves, as they save money due to the reduced need for firewood, the durability of the stoves and shorter cooking times. The use of our efficient cookstoves will also improve people's lives by protecting forests, preventing fire hazards and accidents, reducing air pollution and improving people's health.

What is your personal favourite story about the factory?

I am not very good at telling stories, but my story started when I first met Christine and Allan, who told me about the new factory that was about to open. I was interested in the project and decided to get involved. After I came on board, I met Bernhard, who has since guided me through the factory installation process and introduced me to the manufacturing methods for our product. We had several virtual discussions before meeting in Kigali to work together on installation, assembly, machine part manufacture and factory layout. It was a very good experience for me and after he left, I was able to continue working on building the factory to this day thanks to what he taught me. The highlight of my story was the successful test conducted after all the machines were assembled, and the pneumatic piping system and electrical wiring were completed. I was very happy with the whole process. And now we are ready to officially launch production. I would like to thank the entire team, who have always supported me and given me everything I needed to set up the factory.

Drinking water networks in Burkina Faso



Inauguration of the first solar-powered water treatment plant with distribution network in Dedougou @atmosfair



Our cooperation partners Eau Propre d'Afrique with Managing Director Eric Yanna [right] and Alexander Wolf [left] from Solarspring in the assembly hall in Freiburg. @atmosfair



The residents of Dedougou refilling their canisters in the evening at one of the four dispenser stations in the pilot project @atmosfair

On 5 March 2022, atmosfair, together with our Burkinabe partner Eau Propre d'Afrique SARL and Solarspring GmbH, celebrated the inauguration of the first solar-powered water treatment plant with distribution network in the small town of Dedougou, Burkina Faso.

Every day, up to 40,000 litres of water are pumped for the connected districts of Dedougou for about 10,000 people, purified and transported to the distributed dispenser stations. Residents then have opportunity to refill their canisters at different water pumps.

Residents love the new system. Before the system was set up, they had to get contaminated water by hand from shallow, local wells or from the nearby river. The wells are often dry; if they do have water, it is contaminated. The women used to have to boil the water on open fires for which they collected firewood from the surrounding bush.

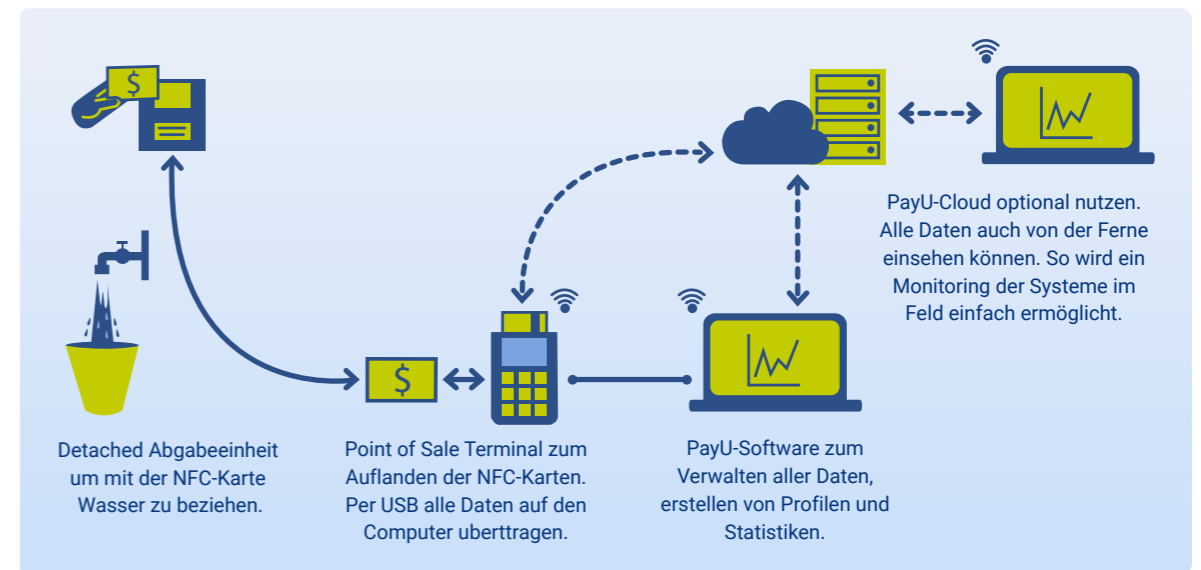
At the inaugural ceremony, the representative of the municipality of Dédougou, Mrs Awa Ouédraogo, was impressed and praised the new facility. "With this water project, Eau Propre d'Afrique is helping to solve one of the most urgent problems. You can see how far people have to walk every day to get to water. And some people even drive through the city all day with 1000-litre ca-

nisters to fetch water and resell it to others. [...] With your systems, the water from the dispenser stations is now even available 24/7. And it can be accessed with prepaid cards and a payment system. It's a great thing and very innovative. [...] We are very proud of this project and feel very honoured that our municipality was chosen for the pilot system. If possible, we would like to have more dispenser stations with a longer water line. The need in our community is great and we are fully behind this project."

The system in detail

Our project includes a newly drilled deep well, the solar-powered water treatment plant and a branched drinking water network.

The well and the water treatment plant are located on the grounds of the school "L'école primaire du creuset" in the north of Dedougou. The core system consists of a 70m deep borehole, a deep well pump, an ultra-filtration system that removes solids and bacteria from the groundwater, a 10m high water tank and a 6 kWp solar installation that supplies the system with carbon-neutral renewable electricity. Our project includes a newly drilled deep well, the solar-powered water treatment plant and a



The distribution of water at the dispenser stations is monitored and managed remotely © iSAtech water GmbH

branched drinking water network. The well and the water treatment plant are located on the grounds of the school "L'école primaire du creuset" in the north of Dedougou. The core system consists of a 70m deep borehole, a deep well pump, an ultra-filtration system that removes solids and bacteria from the groundwater, a 10m high water tank and a 6 kWp solar installation that supplies the system with carbon-neutral renewable electricity. The dispenser stations can be used around the clock for self-service. Users are authenticated with their pre-paid customer card. The selected quantity of drinking water is then dispensed and deducted from the credit. The installed remote monitoring system ensures the that the drinking water network operates without any problems.

Outlook

"Our goal is to provide access to clean drinking water to as many inhabitants of towns and communities in Burkina Faso as possible," says atmosfair project developer Kevin Möller. From our projects in Indonesia and Kenya (see Annual Report 2019), we know that for the project to

be successful, the plans must be tailored to local needs. In the communities of Burkina Faso, the main approach is to have as many distributed dispenser stations as possible, which keeps the distances for the user short. In 2022, we expect to expand the drinking water network in Dedougou by an additional 2km of pipeline with three more dispenser stations and start new projects in four other municipalities. The project will save approximately 350t of CO₂ in the first year after starting operations. For the coming years, we expect this figure to reach 600t CO₂/year due to increased capacity utilisation and expansion of the water distribution network.



Core system with water tank, technical room for the water treatment plant and water dispenser station @atmosfair



Laying the pipeline network and refilling water at another dispenser station in Dedougou @atmosfair

Partners:

- Operator & owner of the drinking water network: Eau Propre d'Afrique SARL
- System manufacturer: Solarspring GmbH
- Technology:

- solar-powered water treatment system SolarSpring ECO 3000,
- combines ultra-filtration, active carbon filtration and UV disinfection
- can treat 40,000 litres of drinking water per day

Depending on the actual drinking water intake, CO₂ savings of approx. 300-400t per year are expected in the first implementation phase. Entwicklung neuer Standorte mit.

Our standards

Approach	Carbon mitigation project	Carbon emission calculation	Organization & Finances
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Principles

- Offsetting is only ever the second-best solution, avoiding emissions is much more effective
- Climate change mitigation is the priority – not the maximization of revenues
- A key element is building climate awareness – it fosters long-term avoidance of the initial carbon emission
- Optimizing travel with the help of business travel specialists, incl. video conferencing

Action

- No cooperation with actors that do not comply with atmosfair's standards – e.g. in carbon reporting – despite the possibility of financial gains for atmosfair.
- No offsetting of activities for which better and less carbon-intensive solutions are available – e.g. emissions due to car travel or electricity consumption
- Representation of the real climate impact (see carbon calculation), regardless of the industry

Principles

- Permanent reduction of carbon emissions
- Additionality
- Contribute to north-to-south technology transfer
- Direct support to local population
- Contribute to protecting the local environmental
- Consideration for local circumstances when choosing technologies
- Coherence with national development efforts

Action

- All projects must be compliant with two standards: CdM (UN) and Gold Standard (environmental NGOs); up to 10% savings under Gold Standard Microscale
- CdM + Gold Standard + X: X stands for atmosfair's own additional criteria, such as the carbon quota as proof of additionality or the exclusion of unsuitable or high-risk project types (e.g. afforestation projects)
- Calculation and monitoring of carbon emission reductions according to UN standards
- Qualified and UN-certified auditors (e.g. TÜV) who also bear liability
- Documentation of all audit reports on the website of the UN Climate Secretariat
- Projects are planned and developed by atmosfair and implemented alongside experienced partners in developing countries



Principles

- Comprehensive
- Scientifically sound
- Well documented
- Verified

Action

- Incorporation of all climate effects of air travel (e.g. condensation trails, ozone formation, etc.) based on current scientific findings (IPCC), meaning that the calculated climate impact is significantly higher than CO₂ alone
- Self-developed emissions calculator, verified by the German Federal Environment Agency
- Documentation of all data sources and methods used on the atmosfair website

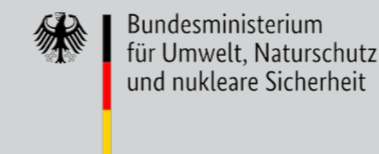


Principles

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

Action

- Low administrative costs: over 90% of donations flow directly into the climate change mitigation projects in the global south, for planning, implementation and operations
- In Germany, donations are tax deductible, under the supervision of German tax authorities
- Legal form gGmbH (non-profit): liability and publication in the commercial register
- Advisory board composed of high-profile patrons and environmental experts, including representatives of the environmental ministry, NGOs and the scientific community



atmosfair was created in 2004 as the outcome of a research project led by the German Ministry for the Environment. The project goal was to develop high standards for voluntary offsetting. The atmosfair standards have since then become a benchmark of the growing voluntary offset market. atmosfair has also reached first place in numerous international comparative studies.



Madagascar: electricity is flowing

The village of Anakao with completed solar installation ©ANKA

After delays due to COVID-19, atmosfair was able to commission three small-scale photovoltaic power grids in southwestern Madagascar in 2021 to provide electricity to eight villages. Two more are still under construction.

ANKA Madagascar ANKA is a women-owned and 50% women-designed Malagasy company specialising in the development and provision of modern, reliable, sustainable and affordable energy solutions for rural communities as well as for private individuals and industrial enterprises. ANKA focuses on rural electrification with hybrid solar PV mini-grids. With financial support from atmosfair, ANKA develops and operates several PV mini-grids in Madagascar.

Rural electrification is underway

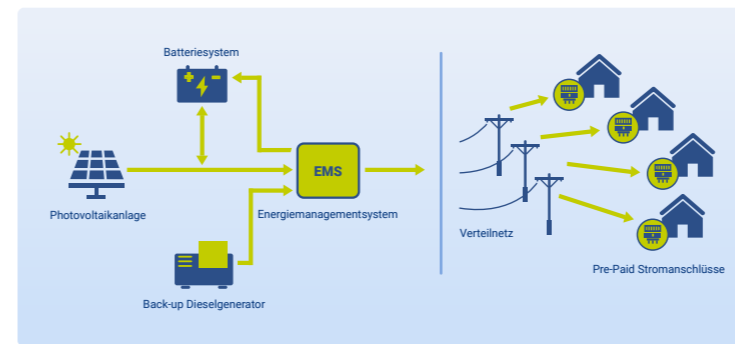
In total, PV mini-grids with a capacity of 1.9 MWp are being installed. The photovoltaic system is supported by a battery system, which means that the mini-grid can also supply



Here we see an ANKA employee installing the distribution grid ©ANKA metal worker Tovonance at work ©ANKA

electricity when there is little sunlight and at night. A small diesel generator provides additional back-up. It can be switched on if solar and battery power are not sufficient. This gives 15,000 households access to reliable, clean energy and an opportunity to set up or expand a business.

Local support for the mini-grids is very high. The funds provided by atmosfair make it possible for the operators to charge an electricity price that is also affordable for lower-income households. Without atmosfair's support, the



Beispiel PV Mini-Grid ©atmosfair

electricity price would be five times higher. In addition, a pre-paid system keeps households from taking on too much debt, as households can only consume the electricity they have paid for in advance.

Madagascar remains one of the poorest countries in the world, with a rural electrification rate of only 7%. It is not likely that the rural regions will be connected to the public grid any time soon. And without access to electricity, economic development in the villages is hardly possible.

A win-win for people and nature

For the first time, it is possible for villagers to refrigerate food and medicine for a longer period of time and to use energy-intensive tools. Rural electrification creates jobs, and villages undergo sustainable growth. In addition to economic development, healthcare in the region and access to education are also improving. Electricity gives schoolchildren a good source of light so that they can study in the evening hours as well.

Without the PV mini-grids, diesel generators would have probably been used in the future to meet increasing energy demand. The use of PV mini-grids prevents CO₂ emissions from diesel generators from being produced in the first place. The total annual CO₂ savings from the seven PV mini-grids is 2,900 tons.

Using solar to combat deforestation

In Madagascar, 120,000 hectares of forest disappear every year. 90% of the original forest has now been cut down. Not much is left of the former green oasis. Madagascans use 80% of the wood they cut for cooking on the open fire. The villagers spend about one third of their household income on wood and charcoal. Access to electricity is changing how cooking habits: instead of using open fires, people now cook with electricity. This will prevent the use of firewood in the future. Whether this is embra-

ced by the local population is being researched by atmosfair together with the project partner ANKA in a pilot study that is being carried out for the PV mini-grids already in operation in the two small towns of Anakao and Mangily. 65 households and three restaurants are able to pay for solar cooking equipment in instalments and buy the electricity they need for electric cooking at a discounted rate. Moreover, while households can cook without harmful smoke emissions, the PV mini-grid operator ANKA benefits because the capacity of the mini-grid is better utilised during the day. The aim of the pilot study is for ANKA and atmosfair to jointly develop a business model to make electric cooking also financially attractive for households. Once developed, this model can then be rolled out across the country, reducing deforestation in Madagascar with the help of the PV mini-grids.



Salama e!

My name is Madima and I am married to RAZANAJATOVO Christian.

I own this grocery shop where I sell everyday goods, and my husband is a fisherman. I was one of the first customers to be connected to ANKA before the national holiday, on 23 June 2021 to be exact.

Madame Madima with her new freezer ©ANKA

We have always wanted a freezer to store our fish. And it has become a reality!!! Earlier this month we were able to buy one. It's like a dream come true.

Thanks to the freezer, I have been able to increase my income by selling drinks, which are now slightly more expensive now because they are cold. This is very popular with our customers. I was also able to expand my services by selling ice lollies. The kids in the village are thrilled.

We are very satisfied with ANKA's service. The local representative is very friendly and personable.

I would like to buy more electrical appliances like a blender and another freezer to further expand my business. Then I could also sell more bottled juices and ice lollies.

I would like to thank all the people who have contributed to this project that has brought light to our village.

Quote from Madam Madima Trader in Anakao, a village in the Atsimo Andrefana region in southwest Madagascar, which only has electricity from one PV mini-grid.

India: carbon storage with biochar on the Jalinga tea estate

Negative emissions for the Paris climate targets

The International Panel on Climate Change (IPCC) says that humans must not only reduce our CO₂ emissions to zero, we also need to remove additional CO₂ from the atmosphere if we still want to meet the Paris climate targets. As a result, atmosfair is now also active in this area and, with scientific support, is testing permanent carbon storage with biochar in the soil in India. On the Jalinga tea estate, we are investigating what happens when biochar is added to fertiliser. The pilot project removes CO₂ from the atmosphere and sequesters it permanently. A carbon sink is created – this also referred to as negative emissions.



Photo 1: Jalinga, a 650 ha tea estate in India is working with atmosfair to decarbonise tea production.

Why biochar?

Plants use solar energy to remove CO₂ from the air and absorb it right into their cell structures. This removes CO₂ from the atmosphere. However, when the plants decompose, they release the carbon back into the atmosphere. Humans can interrupt this cycle by processing the plant biomass into biochar before decay sets in and the CO₂ is released back into the atmosphere. The carbon stored by the plants in the short term remains stored in the form of biochar for centuries even if the biochar is simply applied to the top soil layers

or incorporated into the soil through ploughing. The carbon does not go back into the atmosphere, but unlike other forms of storage, e.g. in crevices in the ground, carbon in the form of biochar does not have to be incorporated deep into the ground, nor does it require a protective layer above it to prevent it escaping into the atmosphere as CO₂.

Biochar: a true all-rounder

Biochar has many other positive effects. In addition to sequestering carbon in the soil, it can also be used as a substrate for nutrients and thus enrich the soil. Especially in tropical soils, it can increase harvest yields. The biochar in the soil absorbs water from the heavy rain during the monsoon season and releases it back to the plants over a period of weeks. This prevents nutrients from being washed out of the soil. Small farmers can produce their own biochar without expensive machinery and thereby improve their financial situation. Biochar thus combines the goal of carbon storage with support for sustainable agriculture.

How is biochar made?

Biochar is made using a process called pyrolysis. Biomass containing lignin such as wood, coconut shells or rice husks is super-heated to a high temperature. In the process, the biomass is broken down into solid, liquid and gaseous products. The solid component is biochar. Pyrolysis has one great advantage: anyone can make it easily and cleanly and in small quantities. It thus also helps to support small, self-reliant businesses and can be rolled out immediately to just about anywhere in the world. In the most basic scenario, anyone can dig a cone-shaped hole, start a small fire at the lowest spot and then gradually add dry biomass as long as the lower layers are not yet completely burnt into ash. The shape of the hole and the closed flame curtain prevent oxygen from reaching the lower layers. The heat breaks down the biomass. In the end, the entire hole is filled with biochar. This is then buried in the ground, which also prevents the biochar from turning

Strictly speaking, charcoal is a special form of biochar where wood is used as the raw material. A linguistic distinction is made between charcoal and biochar depending on the type of use. Charcoal is burnt and used for barbecuing, for example, while biochar is processed so that it can no longer be burned, for example by mixing it with soil.



Photo 2: The worker fertilises the plant with the exactly calculated amount of compost and biochar.

The atmosfair pilot project in Jalinga

Biochar to improve soil quality

The Jalinga tea estate has been using a special composting method to fertilise tea plants for more than 15 years. atmosfair and the tea estate are now investigating whether this method can be improved on. We are conducting a field trial on carbon-enriched agriculture with biochar. On an experimental area about the size of 900 football fields, we are researching the effects on yield of four different fertiliser mixtures with biochar under different environmental conditions.

Three test methods for climate-friendly increases in yield

The employees produce the charcoal right on site from tea harvest residues without any expensive machines. The biochar is not itself a nutrient, but like activated carbon, its particularly large interior surface enables it to bind nutrients. The biochar traps nutrients as soon as it comes into contact with them. Since the nutrients are bound to the biochar, the plant sends a stronger signal to microorganisms. These convert the nutrients so that the plant can absorb them. The many microorganisms make the soil healthier. To enrich the biochar with nutrients, we carried out and compared three different methods in a field trial in 2021:

Jalinga Tea Estate

- Tea estate in Assam, India
- Tea grown on 650 ha with annual production of about 800 t of finished tea
- Since 2003 100% organic farming using special composting method, since 2021 field trials with biochar
- Goal: Decarbonised tea production. Together with atmosfair, the tea estate is working to fundamentally restructure the energy supply to use renewable energy sources, e.g. fossil coal is replaced in the factory by pellets from harvest residues.

1) In February 2021, the workers mixed biochar with plant residues and composted it for just under a month. The biochar thus absorbed the nutrients during the entire composting process.

into charcoal. In technologically more sophisticated processes, the three reaction products (solid, liquid and gaseous) can be collected and reused or safely stored. This means that almost all the plant's carbon is sequestered in the long term [Link: <https://onlinelibrary.wiley.com/doi/full/10.1111/gcbb.12553>].

Is it really possible to permanently sequester carbon with biochar?

The difference between biochar and soil carbon

In conventional approaches to sustainable agriculture, farmers try to increase the amount of soil carbon through their farming practices, e.g. by ploughing less or using compost. Complicated dynamic processes make storing this carbon in the soil dependent on many factors and is thus extremely unstable. On average, a carbon molecule remains in the soil for 50 years before it is released back into the atmosphere. This is an unreliable way to store carbon, as it is not permanent.

In contrast, the special structure of biochar helps it to resist biological degradation in the soil. For this to be really reliable, the ratio between hydrogen and organic carbon that makes up the biochar must fall below a certain value [Link: https://www.researchgate.net/publication/303101470_Persistence_of_biochar_in_soil]. This can be verified in the laboratory. Once this value is reached, scientists say that a maximum of 0.3% of the biochar degrades annually [Link: https://www.european-biochar.org/media/doc/2/c-de_senken-potential_2-1.pdf] and thus only small amounts of CO₂ are emitted. After 100 years, for example, at least 74% of the carbon is still reliably sequestered in the soil. Other important factors also come into play: The basic cycles of the ecosystem remain intact. The biochar is returned to the soil exactly where the plants grew. Important minerals and trace elements are retained and the soil does not become depleted.



Photo 3: The urine runs through the pipe directly from the cow shed onto the biochar. It absorbs the urine like a sponge.



Photo 4: Before fertilising the fields, workers carefully mix huge amounts of compost with biochar.

2) The workers soaked the biochar in cow urine until it resembled a sponge. Afterwards, they mixed the fully soaked biochar with compost.

3) Right before the mixture was spread on the fields, the workers mixed the biochar with the finished compost.

The workers dug a small hole about 30 cm deep next to each of the 40,000 plants. They then put in the exactly calculated volume of the three mixtures described above and covered it with a little soil. For control purposes, the workers fertilised some plants only with compost.

Then it was time to wait: the first results of the field trials

For many months, we recorded data on yield each time the tea was harvested. The soils in Jalinga are very acidic. Chemical barriers keep the plants from reaching available nutrients. However, biochar raises the pH value and thus makes the nutrients available. As a result, we had expected that the regulating effect of the biochar alone would have a rapid, positive and visible effect on plant growth. However, this effect was not noticeable in the first weeks after application. Instead, we initially recorded slightly lower yields from the plants fertilised with biochar. Probably because the nutrients were so well bound to the biochar that they were not directly accessible to the plants to the usual extent. But this changes over time. Over the entire harvest period, we found that fertilisation including co-composted biochar as well as with the biochar soaked in urine significantly increased plant growth. On average, there was an 18% increase in yield (see diagram).

A real success. We would like to thank Prof. Claudia Kammann [Link: <https://www.hs-geisenheim.de/personen/person/414/>] and Hans-Peter Schmidt [Link: <https://www.researchgate.net/profile/Hans-Peter-Schmidt>], who gave us a lot of support in the field trial and evaluation plan and in the interpretation of the results. We will also continue the field trials in 2022. Together with the

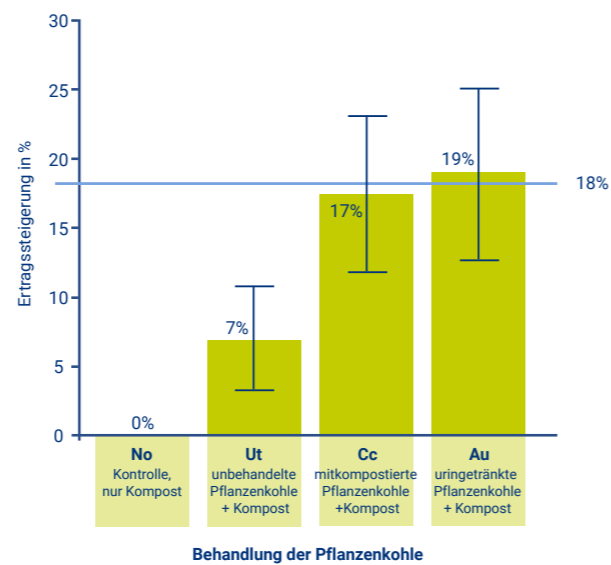


Photo 5: With proper treatment of the biochar, we were able to achieve an 18% increase in yield in the biochar field trial in Jalinga.

workers from the tea estate, the atmosfair team has create a field trial and evaluation plan for 2022. We will take a closer look at the most promising results from 2021 and optimise conditions to ensure less labour-intensive application.

Other projects

In other projects, atmosfair is analysing how biochar can contribute to successful reforestation. The focus is particularly on challenging environments such as a heavily eroded mountain in Nepal. When trees are planted, biochar is added to the hole so that the trees can benefit particularly from the biochar's water retention capacity. People from the region of the town of Bandipur take care of the trees over three years until they are strong enough to survive on their own. We are also planning field trials to see how small-scale agriculture can be practised in forest gardens using biochar. It will be optimised for sustainability, biodiversity, yield maximisation and carbon storage.

Outcomes of the COP26 – more ambition and integrity – offsetting in the future with atmosfair!

Florian Eickhold

At the two-week COP26 climate conference held in Glasgow in October 2021, the Parties were able to agree on the last outstanding rules for implementing the Paris Agreement concluded in 2015. This completed the Paris Agreement's rulebook. Now all the international rules have been defined for market mechanisms (Article 6 of the Paris Agreement), which will be used to implement the agreement that entered into force at the beginning of 2021.

The Paris Agreement replaces the Kyoto Protocol, which previously governed international climate action. However, this change in regime is not merely an update of existing agreements, but a fundamental reform. Under the Kyoto Protocol, only developed industrialised countries had binding emission targets. The Paris Agreement requires all countries to set emissions-reduction pledges to prevent the global

had none. This meant that climate projects in developing countries could be easily credited towards offsetting in industrialised countries without double counting. Under the Paris Agreement, this division has been eliminated. All countries now pursue their own climate plans and want credit for their own achievements in reducing carbon emissions, including from projects in their own countries.

CO₂ reductions from projects are automatically captured in national emission inventories, no regulation is needed. This means that a project's CO₂ reductions initially always "belong" to the project country. If a project operator like atmosfair wants to claim the CO₂ reductions for itself, the project country must relinquish its claim, because otherwise the project emissions would be counted twice: the host country would count the savings towards its reduction



Florian Eickhold (atmosfair) with Dr Jeanne d'Arc Mujawamariya, Rwandan Minister of the Environment



Klaus Milke (centre, Stiftung Zukunftsfähigkeit, atmosfair shareholder) receives the certificate of honour from the Nepalese delegation in Glasgow for atmosfair's services to the Nepalese biogas plant construction programme

average temperature from rising 1.5 degrees. In National Determined Contributions, each country describes how it will curb emissions (for example, through legislation and regulation for emission-intensive sectors). These climate action plans are updated no later than every five years and submitted to the United Nations Climate Change Secretariat with reports on what has been achieved. This is intended to create a dynamic process that allows particularly ambitious states to position themselves as attractive international partners.

Crediting climate projects for carbon offsetting

Under the Kyoto Protocol, until the end of 2020, the world was divided into two groups: industrialised countries with binding carbon reduction targets and developing countries that

targets under the Paris Agreement, and the buyer of the CO₂ reductions would use them for offsetting.

COP26 laid down the rules to prevent this kind of double counting. These rules stipulate that a host country must agree (authorise) to an offset project in advance and then has to adjust its own CO₂ inventory upwards ("corresponding adjustments") if it wants to allow the generated credits to be approved for offsetting. Only one party can thus claim the emission reductions for itself. This also gives rise to new competition for reduction options. Prof. Axel Michaelowa, one of the most renowned experts in market mechanisms, urges governments to be cautious about the new role of developing countries: "Think carefully about which reductions you want to authorise for export. Make use of low-cost options for achieving your national emissions targets and steer international investors towards the high-cost reduc-

It is virtually impossible to know based on the claims how climate-friendly the companies or products really are.

atmosfair does not use the term "climate neutral" in its communication as a matter of principle and encourages its customers to avoid it as well. One positive example of a company that has positively communicated the measures taken to reduce emissions is the Hamburg-based Otto Group with its Hermes mail order business. In cooperation with atmosfair, Hermes has been sending its parcels "CO₂-neutral durch Kompensation" (carbon neutral through offsetting) since 2021. In this case, the label, the advertising and the webpages already make it clear that carbon neutrality can only be achieved by offsetting the unavoidable emissions in logistics. And offsetting is not the focus for Otto/Hermes.



Getting water at a dispenser station in Dedougou and residents filling up canisters in the evening.

as it is currently hardly feasible to completely avoid emissions in logistics.

Otto/Hermes also sets itself apart from other companies when it comes to carbon offsetting and does not only focus on carbon credits to offset its own emissions. In addition, Otto/Hermes and atmosfair are working together to build solar-powered water treatment plants in Burkina Faso, focusing primarily on other sustainability goals of the Otto Group and the benefits for the people in Burkina Faso.

Transparent advertising from Otto: "Carbon-neutral through offsetting"



By 2020, the Otto Group had already lowered its CO₂ emissions by 50% compared to 2006. The Otto Group IT department also switched to a more climate-friendly cloud provider to avoid emissions. Hermes is testing e-vehicles and e-bikes in various cities for the last mile of parcel delivery to actually decrease CO₂ emissions before offsetting with atmosfair only after the last mile. In this case, offsetting is a meaningful addition to the climate strategy,

Neutralisation according to Science Based Targets initiative:

SBTi defines neutralisation as measures that companies take to remove carbon from the atmosphere and permanently store it to counterbalance the impact of emissions that remain unabated (not yet reduced)

What can companies communicate if they truly excel in their climate strategy?

First things first: create transparency. Companies should only communicate what they have really achieved or want to achieve for climate change mitigation. The language should be so simple and clear that even consumers without prior knowledge can easily differentiate between measures the company has undertaken itself

and carbon offsetting.

atmosfair has compiled an overview of the possible climate action ambition levels of companies, from bronze to platinum.

From atmosfair's point of view, bronze companies should only communicate that they calculate and offset their emissions, transparently and without a claim to neutrality. Only those companies that set concrete goals and focus primarily on reduction and avoidance before offsetting could consider setting themselves

apart from other companies with climate-neutral claims (from silver ambition level). And with all the confusing claims: wouldn't a company today even be more likely to stand out from the rest if, instead of printing "climate neutral" labels, it printed, for example, a QR code on its products, allowing interested readers to see and learn about the entire climate strategy – from target setting to reduction to offsetting of unavoidable emissions?

Depending on the ambition level, atmosfair recommends or warns companies against the following claims with high or low risk of consumer complaints:

Measures / Claim / ambition level	Level 1 ★	Level 2 ★	Level 3 ★	Level 4 ★
Climate measures	Carbon offsetting only	First CO ₂ reductions, mainly carbon offsetting	CO ₂ reduction to 1.5 degrees and SBTi net-zero-committed, carbon offsetting only as a supplementary measure	CO ₂ reduction to 1.5 degrees and SBTi net-zero-committed, carbon offsetting and neutralisation
Misleading claim	Climate neutral, 1.5°/paris compliant, carbon neutral	Climate neutral, climate positive	Climate neutral	–
Exaggerated claim	Product with net zero carbon, carbon neutral	Carbon neutral, 1.5°/paris compliant,	climate positive	–
Appropriate claims	We offset our emissions	Carbon neutral through offsetting/net zero carbon	Carbon neutral	climate positive

Appropriate claims for corporate climate strategies

The future of mobility: atmosfair tests alternative drive technologies with FlixBus



The Scania gas-powered bus in operation in Sweden. The bus is powered exclusively by biomethane made from agricultural waste. ©Scania

Even at a distance, the shimmering metallic blue colour of the buses is a clear sign that these are not ordinary FlixBuses. In fact, they represent another milestone on the road to decarbonising the bus fleet of the long-distance bus company, because it is not diesel that gurgles in the tank, but climate-friendly biomethane in the form of CBG (Compressed BioGas) and LBG (Liquified BioGas). Since July 2021, travel along the Brussels-Amsterdam and Stockholm-Oslo routes has been particularly climate-friendly with the world's first international long-distance bus connections powered by biogas. These buses were supplied by the manufacturers Iveco and Scania. The goal is to find out how customers and bus partners respond to the biomethane buses and whether biomethane could be used more widely in the FlixBus fleet as a short- and medium-term low-carbon alternative to diesel.

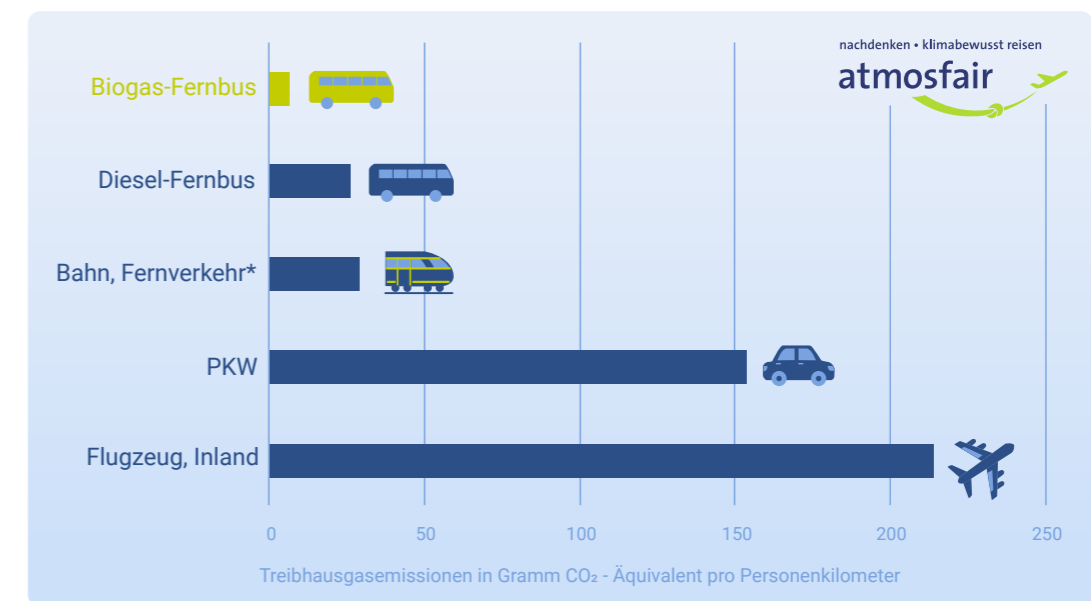
atmosfair ensures climate-friendly travel and pays additional costs

Biomethane can be produced from a wide range of biomass sources. Whether the end product can be considered sustainable or not depends to a large extent on which feedstocks were used in its production. To ensure that only sustainable and climate-friendly biomethane is used in the long-distance buses, atmosfair helped FlixBus to select the right biogas suppliers. The biomethane used

in the pilot project in the BeNeLux region comes from the company OrangeGas and is produced from sewage sludge in a plant in Amsterdam Westpoort. As a waste product of wastewater treatment, sewage sludge is a sustainable feedstock for biogas production from an environmental point of view. Biomethane from the company Gasum is used on the route in Scandinavia. The Finnish state-owned company currently operates 17 biogas plants in Finland and Sweden, where biogas is produced exclusively from waste products such as municipal biowaste, food scraps or agriculture. The geographical choice of Sweden to pilot a biomethane vehicle is no coincidence, as the country is a clear pioneer in the use of biomethane in the transport sector. Moreover, unlike in Germany, energy crops are hardly ever used in biogas production, which is problematic.

Taking into account the entire value chain of fuels, including their production, atmosfair calculated the emission savings of the buses. The result: the biomethane buses are a clear gain for the climate, as they can reduce greenhouse gas emissions by an average of 75% compared to a similar diesel bus.

As the market for gas-powered vehicles is currently still quite small, more expensive vehicle and service contracts are a particular barrier for fleet operators. On the other hand, as far as ope-



Comparison of greenhouse gas emissions of different modes of transport. The biogas long-distance bus can reduce greenhouse gas emissions by about 75% compared to a diesel long-distance bus. The data for long-distance buses is based on calculations by atmosfair, the data for rail, cars and planes comes from the Federal Environment Agency. *The emission factor for rail is based on data on the average electricity mix in Germany. ©atmosfair

rating costs are concerned, gas-powered vehicles can already compete with or even outperform diesel vehicles. To help overcome cost barriers, atmosfair is supporting the pilot project and assuming all additional costs incurred by bus operating companies relative to diesel buses.

atmosfair and FlixBus: partners since 2015

Since 2015, atmosfair and FlixBus have been cooperating to make long-distance bus travel more climate-friendly and to replace diesel engines on the road with new drive technologies. The contributions that passengers can make to climate change mitigation when booking their FlixBus journey therefore not only fund efficient stoves for households in Rwanda, but also transformative mobility projects in the Global North. These include Germany's first electric long-distance bus, which FlixBus and atmosfair jointly put on the road in 2018, electric cargo bicycles for non-profit organisations and electric vehicles combined with their own solar power production for SOS Children's Villages in Eastern Europe.

Next stop: hydrogen

Piloting biomethane buses is another step towards realising the vision of a long-distance bus fleet not powered by fossil fuels. Since there are many challenges associated with powering heavy duty vehicles with electricity, the use of biomethane in this segment in particular is a very good way of reducing emissions already in the short and medium term.

However, FlixBus does not want to commit to a specific drive technology for the future. For some time now, plans have been underway for the world's first hydrogen-powered long-distance bus. In 2021, a great accomplishment on this front was celebrated: a consortium consisting of atmosfair, FlixBus, the technology manufacturers Freudenberg and ZF, and a vehicle manufacturer, was awarded funding from the Federal Ministry of Transport and Digital Infrastructure. In the Hyfleet project, the partners want to jointly develop a long-distance bus for regular service by 2024. A particular focus is the development of the fuel cell system that can meet the requirements of coach transport and, as such, can also be applied to freight transport with heavy-duty trucks.



The Iveco gas-powered bus that is in service in the BeNeLux countries. The bus is operated exclusively with biomethane made from waste materials. ©IvecoBus

From the donation to the project

Expenditures for climate change mitigation increase to over EUR 18 million

Since 2005, atmosfair has been operating and financing climate projects around the world with voluntary contributions to climate change mitigation. The first step is for us to sign a support agreement with the project operator. This agreement stipulates binding reduction targets for carbon dioxide emissions each year and how the project will be supported by atmosfair. Up to one and a half years can elapse between the donation and the actual reduction of carbon emissions. This is time that we need for project setup and operation. Approved UN assessors then verify the reductions in carbon emissions outlined here.

The timeline is as follows:

Timeline for the use of your donations in climate projects

Start: atmosfair receives your contribution to climate change mitigation

Months 1 – 2: atmosfair or the partners buy hardware such as building materials or photovoltaic panels. Whenever possible, we buy materials locally, keeping the value chain as local as possible. But this is not always feasible because many countries in Africa do not, for example, produce steel, they only import it. We still try to have at least smaller components such as pots for efficient cookstoves produced locally, even if the quality is sometimes not as good as with stainless steel. The best way to achieve our ambition is to build small-scale biogas plants for farms such as in Nepal or Kenya, where almost 100 % of the building materials (clay bricks and floor fill) come from the region.

Months 3 – 4: Materials are delivered to the project partners. There are often problems with the customs authorities when we have to import. Sometimes shipments are stuck in port for months and often incur significant customs duties. We try to negotiate with the authorities

with our own local staff and with experts, but this is always a difficult undertaking, especially with our zero tolerance for corruption. Logistics within countries are also often problematic, e.g. when the security situation causes delays.

Months 5 – 6: Production and distribution of climate products (efficient cookstoves, small biogas plants) or project setup (e.g. photovoltaic installation for a village). Depending on the technology, production may mean simply screwing together prefabricated components, as has been the case so far in Rwanda with the efficient cookstoves or it may involve pressing, bending and screwing together steel plates, as will be the case in the future in our local cookstove production in Nigeria and Rwanda or it could mean a small construction site where a biogas plant in Nepal is installed over several days, or a complex assembly process with the necessary detailed planning in the case of a photovoltaic system. In the case of household projects, sales are an additional factor, because we sell the technologies at a price that we can significantly reduce with the contributions to climate change mitigation. Especially for the efficient cookstoves, this often means teams travelling many hundreds of kilometres in delivery vans to give sales presentations in villages and later deliver the cookstoves. atmosfair needs the most local staff on the ground for the activities at this level, which can mean several hundred jobs in large projects.

Months 7 – 19: Carbon emissions are physically reduced during the first operating phase of the project. Here, the technology is in operation for the first time and immediately reduces CO2 physically because, for example, a diesel generator can be switched off for a district. The users are happy.

Months 20 – 22: Reductions in carbon emissions are verified by a UN-accredited external assessor (e.g. TÜV), assessment reports are created. This step is later repeated once a year. The assessor inspects installations and measuring instruments (e.g. electricity meter for a photovoltaic installation), interviews the operators and checks all data collected that is required for the respective UN method for the project type. This allows the assessor to

Expenditures for climate projects in 2021

Project category	Project	Expenditures 2021*	
Efficient cookstoves	India	11%	29%
	Nigeria	9%	
	India: Jalinga: biochar	1%	
	Uganda electric cooking	1%	
	Rwanda	7%	
Biogas & biomass	Kenya: small biogas systems for dairy farmers	3%	41%
	Nepal: Biogas	24%	
	India, Tonk: electricity from mustard harvest residues	5%	
	Tanzania compost	6%	
	Power generation from coconut wood waste on Mafia Island	1%	
	Germany: trial project DAC/PTL	2%	
Wind, water, sun	Honduras: small hydropower plant	0,2%	23%
	Kenya: solar water treatment	0,3%	
	Madagascar: rural electrification	4%	
	Mali: rural electrification	1%	
	Senegal: Solar	3%	
	Ghana: solar kiosk	1%	
	Morocco: solar drip irrigation	2%	
	Brazil: agrophotovoltaics	0,2%	
	Dominican Republic	5%	
	Burkina Faso	2%	
	Mongolia	0,3%	
	Germany: green hydrogen/PTL pilot project	4,4%	
	Educational and transformative projects	Education projects in Germany: Energiesparmeister and DUA	
Transformative projects		2%	
Kenya electro taxis		1,5%	
Energy mix	Nepal new energy (Helambu and Langtang Trek)	1,3%	2%
	Nicaragua climate friendly island	1%	
Total expenditures in 2021: approx. EUR 18.6 million		Total	100%

* Small percentages = maintenance + ongoing operations, large percentages = new projects and expansion

calculate the actual carbon emissions reductions of the previous assessment period. The assessor must be re-accredited by the UN every three years and is liable for any errors. The UN publishes its reports on publicly accessible websites so that anyone who is interested can view them and raise objections if necessary. In the area of project funding by NGOs, this provides a very high degree of transparency and reliability.

Months 23 – 24: Assessment reports are cross-checked by UN bodies and additionally verified by the Gold Standard, which confirms the

project's contribution to sustainable development in the host country in addition to the emission reductions. This is a purely administrative step and in practice usually means multiple feedback loops between the assessor and the UN bodies until all of the committee's questions to the assessor have been clarified.

Goal, month 24: The UNFCCC secretariat issues the Certified Emission Reductions to atmosfair's registry with the German Emissions Trading Authority, which is part of the German Environment Agency (UBA). This final step no longer affects the project itself, but is still important for atmos-

Offset obligations and carbon reductions in 2021

Greenhouse gas reductions, achieved and verified by UN auditors(1) [1,000 t CO ₂]	2005 - 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 ⁽²⁾	Total planned by the end of 2022 ⁽²⁾	
Efficient cookstoves	Nigeria: efficient cookstoves	1,8	17	2,3	18,2	0	124,0	85,5	36,2	39,5	27,6	19,5	371
	India: efficient cookstoves		5,2	17,7	74,7	20	20	103	140	149	273,3	488,7	1292
	Cameroon: efficient cookstoves	3,2	39,0	9,8	9,2	9,8	9,8	0	0	0	0	0	51
	Lesotho: efficient cookstoves		3,3	17,8	21,8	24,8	27,6	28,9	28,7	26,2	0	25	204
	Rwanda: efficient cookstoves				6,5	0	98,1	107,8	124,3	160,6	193,3	250	941
	Ethiopia World Food Programme efficient cookstoves							24,5	0	0	0	0	24
Biogas & biomass	India: electricity produced from crop residues	18,8	117,4	0	65,2	69,2	0	56,1	68,6	61,9	53,9	49	560
	India: biogas systems for households	24,1	21,1	19,5	0	0	0	0	0	0	0	0	65
	Kenya: small biogas systems for dairy farmers					2,8	0	5,4	6,6	0	0	7,3	22
	Thailand: biogas from waste			50	0	0	0	0	0	0	0	0	50
	Nepal: biogas					60	298,9	213,9	711,8	484,8	1192,1	950	3911
	Indonesia: composting of household waste		0,5	1,2	1,3	1,3	1,2	1,2	1	0	0	0	7
Wind, water, sun	Honduras: small hydropower plant	64	60	22,7	0	41	0	0	28,8	34	0	44	295
	Nicaragua: wind power	118,6	0	45	102,7	0	0	0	0	0	0	0	266
	Viet Nam: wind power					10	32	0	0	0	0	0	42
	South Africa: solar thermal power for warm water in households						9,3	0	0	0	0	0	9
	Senegal Solar PV								49,8	84,5	67,4	68,4	270
	Total, GHG reductions, achieved and verified by UN auditor	230	233	186	300	239	621	602	1.220	1.041	1.808	1.902	8.381
Reduction obligations based on voluntary climate contributions received	516,5	90	90	107,6	70,6	85,9	128,6	488,1	336	371,8			
Reduction obligations from carbon projects commissioned by customers	137,1	81,3	95,3	85,5	220,5	389,2	407,5	367,8	362	1.135,9			
Total reduction obligations	653,6	171,3	185,3	193,1	291,1	475,1	536,1	855,9	698	1.507,3			
Accumulated GHG reduction obligations	653,6	824,9	1.010,2	1.203,3	1.494,4	1.969,5	2.505,6	3.361,5	4.059,5	5.567,2			
Greenhouse gas reductions, verified by UN auditors, accumulated	230,5	464	650	949,6	1.188,5	1.809,1	2.410,9	3.630,7	4.671,2	6.478,8			

1 GHG reductions in the table are indicated according to the year in which they are verified by an auditor and certified by a standard. This means that some emission reductions achieved in 2021 might not be included in that year, as they are still in the process of being certified.

2 The GHG reductions indicated for the year 2022 are a forecast and therefore subject to possible changes in future annual reports.

fair's documentation (see below). Registering atmosfair's emission reductions with the UBA is a guarantee for donors, as the data is processed and saved by an official governmental body that acts as an independent third party.

In total, it takes about

- 6 months for your money to physically start reducing CO₂ in a project
- 1.5 years until the first CO₂ reductions are certified by an independent assessor
- 2 years until atmosfair receives formal proof of carbon emission reductions from the UN

The table above shows the carbon emission reductions atmosfair has achieved in the final phase – in other words, emissions that have been reduced, verified, reviewed and confirmed

by the UN. You can view these carbon emissions reductions in the assessment reports published on the website of the United Nations Framework Convention on Climate Change (UNFCCC), independently from atmosfair. Links to these UNFCCC pages are available on our atmosfair website. At the end of the table, these carbon emissions reductions are compared with atmosfair's reduction obligations to donors. As described above, we have shown the carbon emissions reductions in the final phase, but the reduction obligations are shown in the first phase when your contribution to climate change mitigation is received

Although atmosfair actually needs as long as two years between when the donation is received and the formal UN verification of the relevant carbon emissions reductions, the table shows that atmosfair has been able to reduce this time span to zero in the meantime. The approx. 5.6 million tonnes of reduction obligations that atmosfair entered into with its donors and customers by

the end of 2021 were thus already offset by 6.5 million tonnes of formally verified carbon emissions reductions by the end of 2021. This means that atmosfair not only fulfilled all its obligations in 2021, it also created a cushion of a good 900,000 tonnes of carbon emissions reductions for 2022.

The reason is that atmosfair conservatively calculates and plans the expected annual reductions in carbon emissions of its own projects. In addition, some atmosfair projects have already been running longer than conservatively planned and thus generate additional reductions for atmosfair every year. In 2021, 1.8 million tonnes of carbon emissions reductions in atmosfair projects were certified by UN assessors. Due to the COVID-19 pandemic and delays in global supply chains, expansion has been delayed in some projects. Nevertheless, we spent about 18.6 million euros on climate projects (see financial section, pages 38-43). Of these funds, about 29% went to

efficient cookstove projects, around 41% to biogas and biomass projects and 23.4% to solar projects, including solar agriculture (agrophotovoltaics) and solar drinking water treatment. Approximately 4% of expenditures in 2021 were used to fund educational and transformative projects, mainly in Germany.

In some of the ongoing projects, the table indicates zero carbon emission reductions. This only means that while the project is running successfully and carbon emissions are being physically reduced, the UNFCCC has not published a report on the project during this calendar year. Since the verification periods of projects can begin and end independent of calendar years and do not always run exactly 12 months, emissions reductions listed here can fluctuate year by year, even for projects running on an ongoing basis.

Finances and oversight

Summary

At just under 21 million euros, income increased by almost 6 million euros from 2020 to 2021.

Following the decline in income in 2020 due to the coronavirus pandemic, atmosfair returned to almost pre-crisis levels in 2021 and was able to invest approximately 18.6 million euros in climate projects.

atmosfair did not receive any public funding in 2021. The only income atmosfair received from public institutions came from participating in tenders for carbon offsetting of the business trips of the German and Swiss federal governments. No offsetting customer contributed more than 10% to total income; this means that atmosfair, a non-profit, limited liability company (gGmbH), maintained its financial independence. For more than 10 years, income from business operations has supplemented donations. This helps to cover some of the costs incurred by our non-profit activities. In total for 2021, for every 100 euros donated, about 95 euros were invested in the direct purchase of climate technologies – e.g. efficient cookstoves or solar energy systems for households – or paid to the planners and developers of projects for green electricity generation; atmosfair used just 5 euros of each 100 euros donated for staff to support donors as well as for other costs including IT, accounting, public relations work, rent and credit card fees.

Oversight / Organisation / Non-profit status

The shareholders' meeting of atmosfair gGmbH was expanded in October 2021 and now consists of equal shares of the existing shareholder Foundation for Sustainability (Stiftung Zukunftsfähigkeit) and Dr Dietrich Brockhagen. While Stiftung Zukunftsfähigkeit alone appoints the members of the company's supervisory bodies, Dr Dietrich Brockhagen is responsible for all business matters. He also manages the company's operations together with the second managing director Steffen Pohlmann subject to the oversight of the company's supervisory bodies based on the two-person rule.

The first supervisory body is the independent Advisory Board for atmosfair Standards, 2021 consisting of two representatives of the Federal Environment Ministry and two representatives of environmental NGOs. It met three times in 2021. The Advisory Board monitors the executive management in questions related to environmental integrity and decides whether to approve new climate projects, further develops and monitors atmosfair standards, including emissions calculation and approves new company partnerships.

As a second supervisory body, the Stiftung Zukunftsfähigkeit appointed a Supervisory Board consisting of three members in 2021. The Supervisory Board is an independent body that monitors the propriety and economic integrity of the company and exercises the following powers as stipulated in the Articles of Association:

a) resolution on the rendering of

- accounts.
- b) discharge of the company management
- c) appointment of the auditors
- d) decides on the remuneration of the company management

The fiscal authority certified the non-profit, limited liability company's tax exemption for 2021. The non-profit GmbH duly issued donation receipts for the contributions to climate change mitigation received in 2021. To make its own work transparent for the public and for donors, atmosfair complies with the voluntary commitment of the Initiative Transparent Civil Society and publishes information on the requested data on its website in accordance with the initiative's guidelines.

Financially independent

In 2021, atmosfair's activities were fully financed through voluntary donations for carbon offsetting as well as income generated by its business operations, which is permitted for non-profits to a limited extent. The shareholders did not pay any money to atmosfair in 2021 nor did atmosfair pay any money to the shareholders.

Expenditures, planning climate projects

The largest share of expenditures was incurred for the development and management of climate projects. These included the purchase of technologies and construction material (e.g. efficient cookstoves), setting up and running projects, including verification by UN-accredited auditors and the salaries of the local project teams.

In total, atmosfair spent a good 18.6 million euros here (see table on page 43). Expenditures other than those for carbon offsetting projects included personnel costs for project planning and implementation, which amounted to about 800,000 euros in 2021. In total, since its formation, atmosfair has supported climate projects with around 90 million euros.

When calculating the funding commitments for climate projects in a given year, atmosfair usually takes the average of the income of the last two years. This satisfies the requirement to use funds in a timely manner and gives atmosfair sufficient security for

2020 balance sheet

Assets	2021 EUR	2020 EUR
A Fixed assets	282.023,00	272.041,00
I Intangible asset	3,00	3,00
II Tangible assets	10.600,00	22.038,00
III Financial assets	271.420,00	250.000,00
B Current assets	9.832.062,75	9.230.188,82
I Inventory	2,00	2,00
II Receivables		
Trade accounts receivables	1.803.462,93	380.681,45
Other assets	72.610,08	230.316,03
III Cash on hand, bank balances, etc.	7.955.989,74	8.619.189,34
C Prepaid expenses and deferred charges	2.009,62	7.608,00
Balance sheet total	10.116.097,37	9.509.837,82

long-term funding commitments to project partners in the Global South and the planning and development of new projects, even if income declines in the meantime. Moreover, the lead time of about one year between the project idea and the use of funds for hardware such as efficient cookstoves or solar power systems means that new projects cannot be implemented any other way in practice.

From 2020 to 2021, atmosfair's income increased by 6 million euros. Based on the above principle, this would have resulted in a funding volume of about 18 million euros in 2021. This has been fulfilled by atmosfair, which has created reserves for climate projects amounting to almost 900,000 euros. At the same time, in 2021, the bank balance decreased from 8.6 million euros (2020) to about 7.9 million euros. atmosfair reversed net provisions of about 650,000 euros in 2021. The new provisions will mainly be used for the construction of cookstove factories in Africa and the rural electrification of villages with photovoltaics.

Salaries under the German public-service salary scheme (TVöD) for employees and management

Salary scheme (TVöD) for employees and management

After project-related expenditures, personnel costs are atmosfair's second highest cost factor. The salaries of atmosfair employees are based on the German public-service salary scheme (TVöD), with pay grades ranging from project manager to management at levels 11-15. The total general administrative costs for telephone, postage, insurance, and office supplies amounted to around 60,000 euros while rent and maintenance accounted for a total of approx. 87,000 euros. Other administrative costs can be found in the income statement.

Administrative costs of 5%

One of the atmosfair standards requires contributions to be used efficiently; this means that only a

small percentage of contributions may be used for atmosfair's own costs, i.e. those funds that are not used for climate projects, but rather by atmosfair for its own administrative and fundraising work. In 2021, a total of just under EUR 1.1 million was spent on these activities, which, in addition to the above-mentioned items, was mainly accounted for by personnel costs as well as material costs for public relations as well as IT, accounting, credit card fees, travel expenses, etc. (see table page 42/43, blocks b) and c) under expenses). This corresponds to administrative costs of approximately 5% of income. The administrative costs are also so low because atmosfair continued to forgo all forms of paid advertisement such as promotion teams in 2021 and instead used campaigns with relevant content to gain visibility in the media at no cost. The celebrities involved also help to publicise atmosfair free of charge.

Relocation and rent

atmosfair looked hard for new office space in 2020 and 2021 because the lease for the old office in Berlin Kreuzberg was terminated due to construction.

In April 2022, atmosfair moved to a new office in Berlin Neukölln and is therefore well positioned for the future. The new office has enough space for atmosfair's growing team, and the rent of 14 euros/m² falls in a range that is hard to find in Berlin and absolutely reasonable for the non-profit. In addition to location and size, price was an important factor in the selection of the new premises.

Profits generated increase the funding volume for climate projects

In 2021, atmosfair earned surpluses in its business operations with services for companies totalling 760,00 euros after taxes. This income was generated through the climate projects operated on the behalf of customers, sales of carbon accounting software and consulting services (climate service for companies). atmosfair uses the surpluses directly for climate projects.

Reaching our goals

Including the emissions reductions certified in 2021, atmosfair has achieved more CO₂ reductions in its climate projects between 2005 and 2020, i.e. since the atmosfair was formed, than the reduction obligations resulting from voluntary contributions to climate change mitigation and customer contracts - a surplus of around 600,000 tonnes of carbon emissions (see also table on pages 36/37). This means that atmosfair has largely fulfilled and even surpassed its obligations to its donors and customers.

Review and discharge of company management

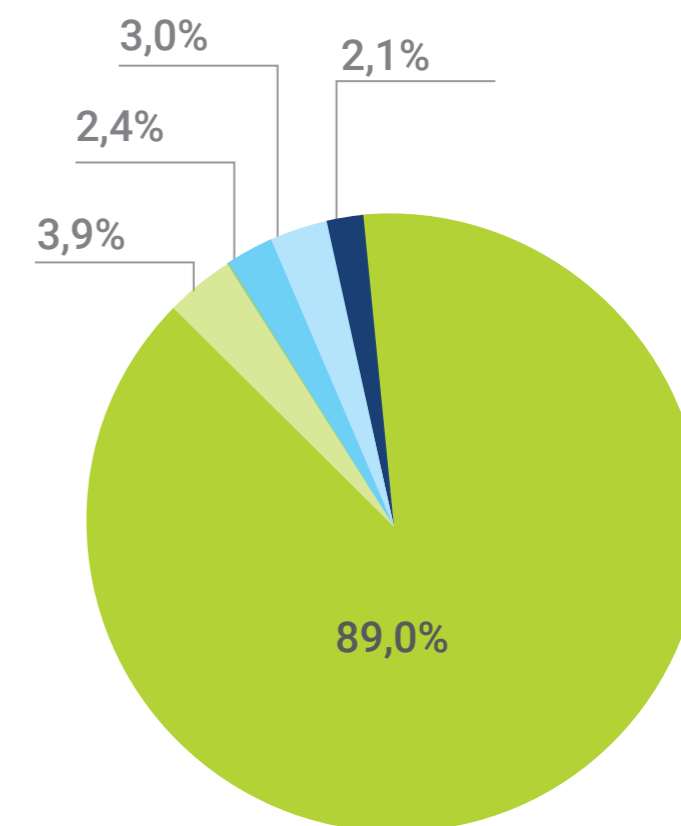
In accordance with the Articles of Association, the 2021 financial statements were audited by an auditor appointed by the Supervisory Board. The auditor confirmed the annual financial statements, raised no objections and, as in previous years, issued an unqualified audit opinion. The Supervisory Board determined that the annual report had been properly completed on 12 May 2022 and discharged the company management.

Liabilities	2021 EUR	2020 EUR
A Equity	4.624.049,88	3.761.637,99
I Subscribed capital	25.000,00	25.000,00
II Reserves for projects provided for by the Articles of Association		
Short-term reserves for climate projects	0,00	520.803,21
Available reserves (also for climate projects)	4.599.049,88	3.215.834,78
B Provisions	4.830.589,57	5.432.192,80
Tax provisions	0,00	58.807,00
Provisions for climate projects	4.830.589,57	5.350.000,00
Other provisions	0,00	23.385,80
C Liabilities	661.457,92	300.625,09
Trade accounts payable	293.301,88	273.335,55
Other liabilities	368.156,04	27.289,54
D Deferred income	0,00	15.381,94
Balance sheet total	10.116.097,37	9.509.837,82

2021 income statement

	2021	2021	2020
	EUR	%	EUR
Income			
Voluntary climate contributions for climate projects	16.257.277	77,9	12.566.304
Climate projects on behalf of customers, CO2 accounting software, consulting, etc., before taxes (business activities)	4.610.888	22,1	562.468
Other income (interest, etc.)	2.500	0,0	262.075
Total	20.870.665	100,0	14.981.377
Expenses			
A Climate projects for carbon offsetting, private and corporate customers			
Direct expenditures (planning, setup, operation, technology purchases, audits, staff in developing countries)	-15.009.385	71,9	-14.343.089
Release of reserves	650.000	-3,1	1.500.000
Total climate projects with carbon offsetting			
Staff: project planning and support from atmosfair employees in Germany and in the project countries	- 862.412	4,1	1.870.259
B Administrative costs: support for donors and partners, fundraising, PR work			
Personnel costs	-521.939	2,5	-520.048
PR editorial team	-113.461	0,5	-58.021
Total	-635.400	3,0	-578.069
C Übrige Verwaltungskosten			
Office administration (telecommunications, postage, office supplies, insurance, membership fees, depreciation)	-59.028	0,3	-370.429
Rent and maintenance	-87.967	0,4	-75.082
Credit card fees, payment services, account fees, exchange rate differences	-83.615	0,3	-83.739
IT (fees, maintenance costs, server rental fees)	-19.898	0,1	-64.951
Accounting, tax advisory services, financial statements, financial auditors	-93.579	0,3	-64.940
Printing costs for publications	-9.498	0,1	-7.587
Contracts for work and services	-60.346	0,3	-107.821
Travel expenses	-2.616	0,1	-11.226
Non-deductible taxes	-25.216	0,1	-64.130
Total	-441.763	2,1	-849.907
D Business activities: climate service for companies			
Expenditures for climate projects on behalf of customers	-3.357.318	16,1	-1.523.520
CO2 accounting software	-9.949	0,1	-32.476
Staff: climate service for companies	-149.126	0,9	-148.585
Taxes on income from climate service and climate projects for corporate customers	-235.122	1,4	-58.774
Total	-394.196	2,4	-239.834
E For informational purposes: use of surpluses			
Surpluses from 2021 business activities, after tax	759.778	4,4	133.173
Total	-20.870.665	100,00	-14.981.377
Results after release of reserves for climate projects and use of surpluses	0		0

Expenditures of atmosfair gGmbH 2021 (%)



- sbursments to climate projects
- Staff for climate projects in Germany
- Climate service for companies
- Support for donors and partners, PR work
- Other administrative expenses

Corporate partners

50Hertz
 Ableton AG
 AbVie Deutschland GmbH und Co. KG
 Aldi Nord
 Aldi Süd
 Amex GBT
 Bayerische Landesbank
 BayWa r.e. renewable energy GmbH
 Berlin Hyp AG
 BMW AG/Group
 BÜFA GmbH & Co. KG
 Carlson Wagonlit Travel
 Carl Zeiss AG
 Chiesi GmbH
 Consileon Business Consultancy
 Daimler Benz AG
 DB Cargo AG
 Deutsche Bahn AG
 DEVK Versicherungen
 DHL Dolby Germany GmbH
 Fichtner GmbH & Co. KG
 FlixBus
 FTI Consulting
 Hermes Germany GmbH
 HRG Sports
 idealo internet GmbH
 Infectopharm
 IONITY GmbH
 JustWatch GmbH
 KAYAK
 KfW Bankengruppe
 Klöckner & Co. SE
 Lufthansa AirPlus Servicekarten GmbH
 Miele Ce. KG
 Otto Group
 Pfänder KG
 Schenker AB
 SICK AG
 Siemens AG
 TravelPerk
 Vector Informatik GmbH
 Vodafone GmbH
 VW Volkswagen AG
 WALA Heilmittel GmbH
 wpd AG

NGOs, political and academic institutions, trade associations

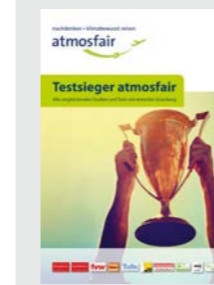
24 Gute Taten e.V.
 Alexander von Humboldt Stiftung
 Alfred Wegener Institut
 Berliner Energieagentur GmbH
 Bundesverband Solarwirtschaft e. V.
 Deutsche Bundesregierung
 École Fédérale de Lausanne
 Engagement Global
 ETH Zürich
 European Green Party
 Fraunhofer Gesellschaft
 German Doctors e.V.
 Greenpeace e.V.
 Harvard University
 Helmholtz-Zentrum für Umweltforschung GmbH
 Hochschule für Technik und Wirtschaft Berlin
 Landeshauptstadt Düsseldorf
 Landeshauptstadt München
 Lions Clubs International
 Ministerium für Landwirtschaft, Klimaschutz und Umwelt des Landes Brandenburg
 Öko-Institut e. V.
 Schweizer Umwelt Bundesamt
 Skateistan
 Stadt Hamburg
 Stiftung Entwicklungs-Zusammenarbeit
 Universität Basel
 Universität Bern
 Université de Genève
 Universität Zürich

Events

Besondere Orte
 Deutsche Hospitality
 Die Toten Hosen
 Fachagentur Nachwachsende Rohstoffe
 FKP Scorpio Konzertproduktionen GmbH
 International Transport Forum
 ITB
 Leipzig Tourismus Marketing GmbH
 Tollwood
 Umweltforum Berlin

Tourism

Aldi Suisse
 Contrastravel
 DAV Summit Club GmbH
 Durchblick Leserreisen
 Forum Anders Reisen
 Frosch Sportreisen
 Hauser Exkursionen
 Hofer
 Laade Gartenreisen
 Neue Wege Reisen
 RTK Reisebürokooperation
 World Insight



atmosfair has been named winner in ten international comparative studies. All comparative studies for offset providers conducted since atmosfair's foundation in 2005 are available for download on our website (www.atmosfair.de/en).

We have selected two examples:



Stiftung Warentest
 (Finanztest, issue 3/2018)

“Above the clouds” – carbon offset providers compared

The consumer rights agency Stiftung Warentest tested a number of organizations that offer voluntary carbon offsetting. Evaluation criteria included ‘quality of offset’ and ‘transparency’.

The criterion ‘quality of offset’ mainly evaluates the standards of the climate change mitigation projects generating the carbon emission reductions, while also taking into consideration involvement in the project’s development process.

‘Transparency’, another important factor, examined the accessibility of the organization’s financial data including the access to administrative and marketing-related expenditures, as well as the distribution of project funds to individual projects.

You can find the complete article here (only available in German, download fee 1 Euro): <https://www.test.de/CO2-Kompensation-Diese-Anbieter-tun-am-meisten-fuer-denKlimaschutz-5282502-0/>

Overall rating:
 Total score: **0,6 (very good)**
 Offset quality: **very good**
 Transparency: **very good**
 Quotation: **„Testsieger“**



Eberswalde University for Sustainable Development – Germany (2010)

Greenhouse gas offsetting providers in Germany

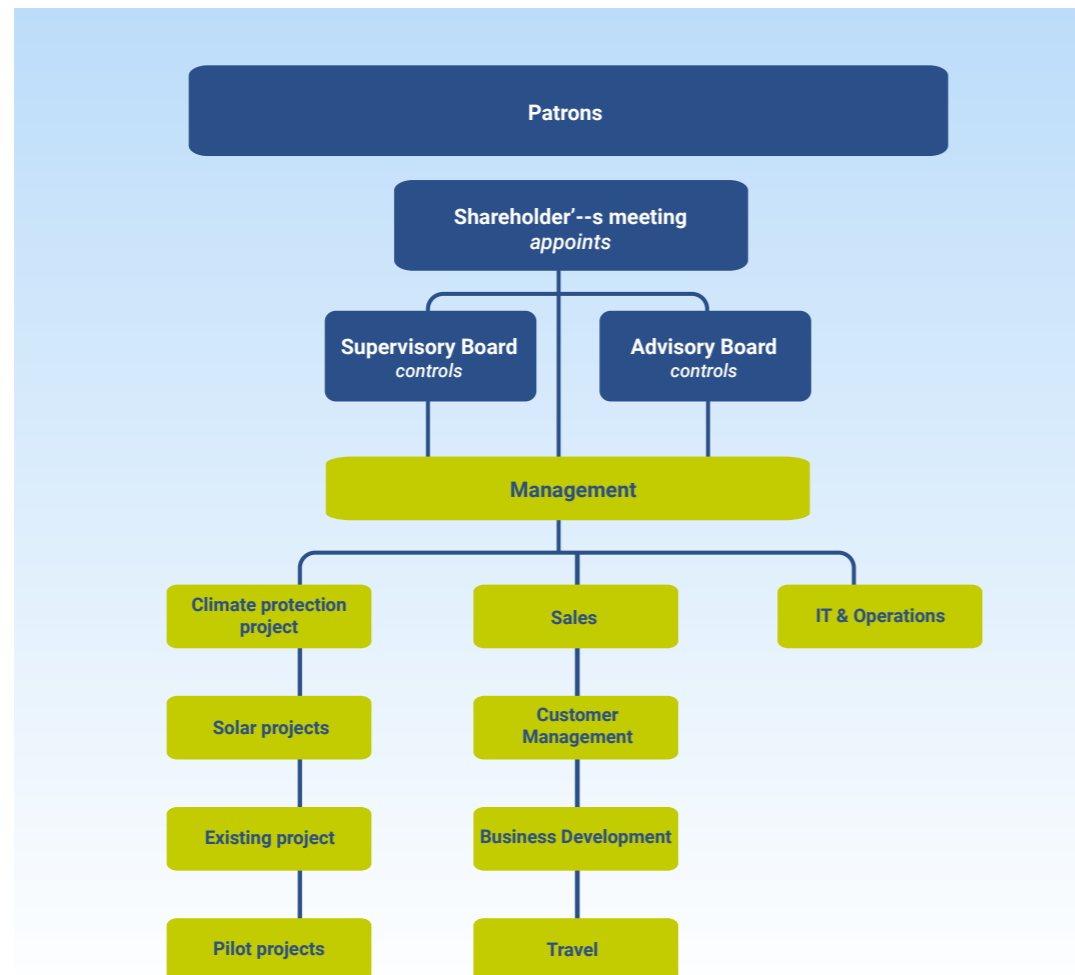
„... And the winner is – the multiple award winner atmosfair.“

In 2010, the Federation of German Consumer Organisations (vzbv) commissioned a study from the Eberswalde University for Sustainable Development to compare more than 20 different organisations offering carbon offsets. The study analyzed the overall quality of the offsetting projects, the accuracy of the calculation, and donor relations. atmosfair was the only provider to be awarded the rating ‘very good’.

Overall rating:
 Truthful calculations: **very good**
 Offset quality: **very good**
 Donor relations: **very good**
 Total score: **very good**

The team

Press show



Patrons	Shareholder's meeting	Supervisory Board	Advisory Board	Management
Professor Dr. Klaus Töpfer	Stiftung Zukunftsfähigkeit / Klaus Milke	Dr. Harry Lehmann	Norbert Gorißen	Dr. Dietrich Brockhagen
Professor Dr. Mojib Latif	Dr. Dietrich Brockhagen	Yvonne Wende	Christoph Bals	Steffen Pohlmann
Professor Dr. Hartmut Graßl		Dr. Christoph Mecking	Dr. Silke Karcher	Tobias Posselt (Prokurist)
			Klaus Milke	

DER TAGESSPIEGEL

10.01.2021
 "Der beste Flug ist der, der nicht stattfindet."



abc NEWS

04.10.2021
 "New plant in Germany aims to cut flying's carbon footprint"

"The era of burning coal, oil and natural gas is drawing to a close," Germany's environment minister, Svenja Schulze, said at a ribbon-cutting ceremony for the new plant. "At the same time, no one should have to sacrifice the dream of flying. This is why we need alternatives to conventional, climate-harming kerosene." The facility in Werlte, near Germany's northwestern border with the Netherlands, will use water and electricity from four nearby wind farms to produce hydrogen. In a century-old process, the hydrogen is combined with carbon dioxide to make crude oil, which can then be refined into jet fuel. Burning that synthetic kerosene releases only as much CO₂ into the atmosphere as was previously removed to produce the fuel, making it "carbon neutral." [...] Atmosfair, a German non-profit group behind the project, says its purpose is to show that the process is technologically feasible and – once it is scaled up and with sufficient demand – economically viable.

Frankfurter Allgemeine

04.10.2021
 "Klimaneutrales Kerosin für die Lufthansa kommt aus dem Emsland"

Aus Strom und CO₂ kann man klimaneutralen Flugzeugtreibstoff herstellen. Das Verfahren wird noch nicht großtechnisch eingesetzt – doch in der Nähe von Oldenburg geht man schon mal einen Schritt voran. Mit klimaneutralem Kerosin soll der Luftverkehr umweltfreundlich werden – doch Anlagen, die den Treibstoff CO₂-neutral herstellen, gibt es bislang viel zu wenige. Im niedersächsischen Werlte geht man nun einen Schritt hin zu der Zukunftstechnologie: Dort ist am Montag eine Anlage zur Herstellung des klimafreundlichen Flugzeugtreibstoffs eröffnet worden.

LA PRESSE

04.10.2021
 "L'Allemagne va produire du kérosène d'aviation carboneutre"

Cette installation, située dans la ville de Werlte (nord), sera « la première usine au monde à produire du kérosène neutre en carbone à l'échelle industrielle » [...]. Il s'agit d'utiliser de l'hydrogène, produit par électrolyse, et de capter du CO₂ dans l'atmosphère. En recombinant les deux, on obtient un carburant de synthèse imitant le kérosène d'aviation. [...] Pour que l'Allemagne devienne neutre en carbone, l'aérien doit également apporter sa contribution, a ainsi affirmé la ministre allemande de l'Environnement, Svenja Schulze, présente pour l'inauguration. »

ARD tagesschau

04.10.2021
 „Eröffnung im Emsland: Erste Anlage für klimaneutrales Kerosin“



Dies ist nur ein kleiner Auszug aus einer Vielzahl von nationalen und internationalen Pressestimmen – der vollständige Pressespiegel 2021 ist auf der atmosfair Webseite als Download erhältlich.

<https://www.atmosfair.de/wp-content/uploads/pressespiegel-2021.pdf>

A close-up portrait of a woman with dark hair and blue eyes, wearing an orange top. She is looking slightly to the right of the camera with a gentle smile. The background is a warm, out-of-focus wooden interior.

Judith Döker

is a photographer, author and actress. During the last few years she travelled for her photo project "Three Questions: Happiness - Political Statements from Around the World" to numerous crisis areas to give a voice to people who otherwise do not have one. She spoke with former Colombian child soldiers, Iranian feminists, domestic workers in India and Pakistan and many others. Her project was shown at the Palau de la Música Catalana in Barcelona and the LVR-LandesMuseum Bonn, among others.

"I am a traveller. Delving into other worlds to connect with people - that's what I love to do. It has made it possible for me to learn an infinite amount. But unfortunately, I can't completely avoid flying in the process. That is why I am very grateful for the opportunity that atmosfair offers me: to offset my flights and support sustainable climate projects around the world."

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atmosfair

