



**LAGI 2022**

The obstacle in the way

Mannheim has a long history of invention and innovation. From the bicycle to the spaghetti ice cream, this city has seen a lot of ideas from the minds of great inventors become reality. Mannheim, once touted for its sunny and warm climate, now faces new problems however: Overheating, climbing temperatures, as well as fewer rains and winds.

The city of Mannheim, particularly its city center, has been heavily affected by this growing concern. The city center often experiences higher temperatures, up to a 4-degree Celsius temperature difference in contrast with its surroundings. Cooling the city is difficult because the dense development in the city center has created a blockade that leads to heat accumulation. Additionally, particulate matter and bad air become trapped, lowering the overall air quality. The heat and environmental problems impair the quality of life in Mannheim leaving the people in the city wanting for a place where they can retreat and recover from the stale city.

ma.duneland is our solution.

An idea is born

We want to create a place for Mannheim’s citizens and the next generations, where they can come together and connect. All social and demographic groups should be addressed, ma.duneland should not only be multicultural but also multifunctional. Tapping into Mannheim’s history of innovation, we want to innovate the greenspace to be a place where it’s possible to combine work, leisure and education. We have also kept in mind Mannheim’s personal goal for the BUGA: Not a monument, not a landmark, but a place that gives back to nature.

We want to work with nature as closely as possible to also give endangered species a habitat again. ma.duneland is a retreat for humans and animals – not a structure of hard lines and edges but rather a seamless, organic transition into the flora of the site and a merging into its environment. The hope is that it feels like it has always been there. Due to the structures’ aerodynamic shape and the low height, we also do not disturb the area’s natural wind flow, and even in the best case accelerate it, whereby Mannheim finally gets the cooling it needs. As part of the »Grünzug-Nord-West«, ma.duneland provides a refreshing wind stream into the city and gives the residents of Mannheim and its visitors a new, inspiring place to stay. Mannheim’s topographical location on a natural dune landscape supports our project. We want to take an idea that nature has already created and develop it further, in the spirit of Mannheim’s innovation-rich history. Additionally, we want to educate people about the inland dune landscape around Mannheim, as well as the local flora and fauna of the area.



ma.duneland can be reached quickly via the cycle path, the gondola cableway, and public transport. ma.duneland’s goal is not to interfere with nature, rather adapt to the natural landscape. We want to preserve the natural lines of nature and avoid jarring structures with harsh lines and edges. An escape from the hustle and bustle of the city, the hope is people and nature can co-exist here harmoniously, finding inspiration for the future. A place to relax and come together, and also a place to get excited about solutions for the future of energy technology.

ma.duneland can be translated to the scale of Schrebergartens. The idea is that several Schrebergartens share a common dune instead of having conventional small cottages. One dune can house around 2-5 of these cottages and the space in front can be effectively used for gardening. The gardens not only benefit from the energy generated from the algae reactors and solar panels, but the communal dune creates a sense of connection between the owners of the individual gardens. Moreover, the roof of the dunes can be used for additional gardening or as a relaxing space offering a nice view.

State of the art — made in Germany

As climate protection and mindfulness towards the plant become increasingly important, if not vital, renewable energies are the path to our future. We cannot no longer rely on fossil fuels, which will eventually be irrevocably depleted. Just as different people come together in ma.duneland, the space also combines a different variety of renewable energy sources. State of the art technology is combined into innovation in its most beautiful form.

Algae reactor’s panels act as large windows and will be installed all throughout the dunes’ facades. We use algae bioreactors panels as windows to convert sunlight and carbon dioxide to thermal energy and biomass that can be converted into renewable biofuel through a hydrothermal process. In addition, the algae bioreactor panels provide adaptive shading and act as a thermal insulator as well as a solar collector. The generated heat can also be stored in the dunes through an underground thermal storage system.

The dunes also harness energy in the form of photovoltaic modules. Instead of the classic dark and opaque panels, the dunes utilize transparent solar panels artfully disguised as the glass on the southern side of the dunes. Although transparent solar panels (efficiency of 1-7%) are not as efficient as conventional PV modules (15-22%), the area of ma.duneland is more than large enough to generate sufficient power. Transparent solar panels are multifunctional and easily installed in buildings that might use glass otherwise. To prevent the interiors from heating up like a greenhouse, there will be an inner layer of heat-insulating glass to keep the temperature comfortable inside. Vertical gardening inside further insulates the dune. Finally, the skatepark offers a unique and novel way to generate energy, through the use of kinetic tiles. The tiles collect the kinetic energy from the skaters and convert it as power for the dunes.



Taking action

When designing ma.duneland, we tried to align our aims to the majority of the 17 Sustainable Development Goals for a sustainable future. ma.duneland uses green, self-generated energy to power itself. Any surplus is fed into Mannheim’s grid, providing clean energy to the surrounding neighborhoods. Our goal is to also give innovative solutions to renewable energy a stage — inspiring new methods of integrating green energy into structures. Making use of local manufacturers and suppliers for the construction of ma.duneland also promotes sustainable production. In doing so, we contribute to reducing Mannheim‘s ecological footprint and support the city on its way to becoming a sustainable smart city. In both ways, ma.duneland hopes to promote urgent action to combat climate change.

Among our aspirations is to improve the quality of life for the people of Mannheim and its nature. ma.duneland is a space meant to be accessible to all citizens, where everyone can meet, relax, and even educate themselves »promoting peaceful and inclusive societies for sustainable development« (SDG 16). To educate people on the technologies used, there are the Renewable Energy Lab Dunes. In workshops you can learn about our technologies, with experiments you can see what is behind ma.duneland’s innovation or you can make small statues made of clay for an additional fun factor. The Renewable Energy Lab offer is designed for visitors of all ages.

As we create a space to help provide fresh, clean air for the people, in ma.duneland’s environment small animals will also find a new habitat. Following the example of the »Tempelhofer Feld project« in Berlin, we create pockets of untouched green spaces and leave nature to its own devices, giving it the chance to regenerate and return to its origins.

The integration of new technologies into the aesthetically pleasing landscape of the impressively beautiful dunes hopefully invokes a new perspective for the people who witness it. A stunning landscape which allows you to immerse yourself in nature with wide green spaces and walkable dunes. Woven into the landscape the sources of energy are used to power the dunes, organically seamless and hidden, yet still very much present. We hope that people from all walks of life come to enjoy the safe and peaceful environment ma.duneland has to offer. Renewable energy doesn’t need to be in its classical forms as we know it, often jarring against the flow of nature, rather renewable energy can be integrated into it. Ultimately, it is our wish that ma.duneland inspires its visitors to be optimistic about a post-carbon future.

The environmental impact

Regarding the building materials for the dunes, we wanted to pay special attention to the sustainability and accessibility of the materials and resources used. For the foundation and the interior walls, instead of concrete - notorious for being environmentally harmful, a mixture of natural stone and clay is used. The stone and clay are recyclable, can filter pollutants and are sourced in Germany. The dunes are also supported by recycled steel structures and insulated with cork, obtained through sustainable means by peeling bark off trees which grow back again. In this way, no trees need to be cut down. ma.duneland also keeps in mind Mannheim’s wish to leave large swatches of land free and minimally

developed to help bring cool, fresh air from the countryside into the city center. The dune-shaped buildings in addition to the lower heights of the structures create a minimally invasive landscape, blending in with the environment as seamlessly as possible and causing minimal disruption to the environment. ma.duneland aims to be a permanent fixture in Mannheim, giving the residents of the Spinelli Quarter, and moreover the residents of Mannheim, a new kind of workspace and place of recreation.

Fact Check

