

Bomhofsplas in Zwolle

Sustainable sand extraction &
solar park, source of best practices

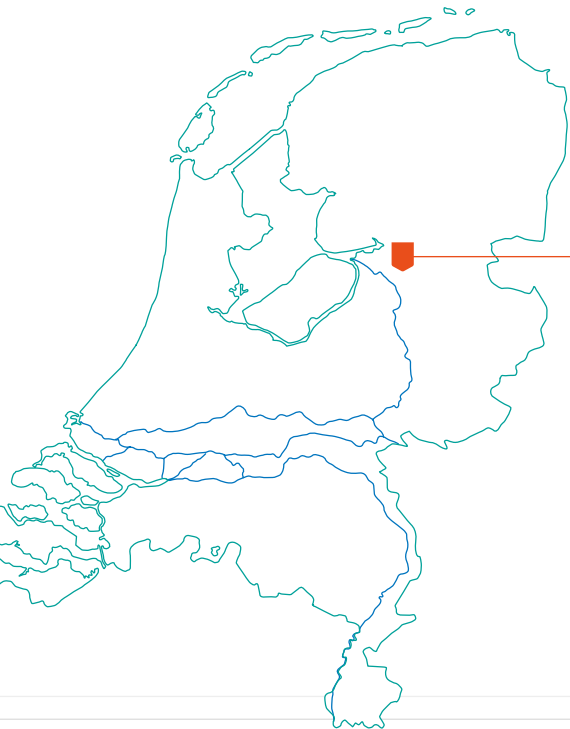
UEPG
SUSTAINABLE
DEVELOPMENT
AWARDS 2022
'ENVIRONMENT'



Dekker

GRONDSTOF VOOR ONTWIKKELING

CONTENTS



Sand Extraction Zwolle and Solar Park
Bomhofspas are located on the
northeast outskirts of the town of Zwolle.

Source of best practices

De Dekker Groep would like to submit the Bomhofsplas in Zwolle for the UEPG Sustainability Awards 2022 in the category “Environment”. The sand extraction quarry Bomhofsplas has become a breeding ground for best practices jointly realised by many parties with respect to innovation, sustainable development and research on a sand extraction quarry.

Sand extraction quarry de Bomhofsplas in Zwolle is a source of sustainably extracted building materials and a major innovative source of renewable solar energy. Thanks to local ownership it provides a source of income and a robust provision of energy for local residents and organisations. The Bomhofplas and the solar park also form a source of new knowledge, inspiration and development due to studies and pilots that take place there.

The Bomhofsplas is an outstanding example of how to realise the energy transition. The collaboration between the many parties involved to realise genuine steps forward and to learn from these provides a source of inspiration, and puts Zwolle on the map as a sustainable city and Overijssel as a sustainable province.



‘The success of the energy transition stands or falls with people identifying with projects. One such example is solar parks like the one here at the Bomhofsplas in Zwolle. This solar park floats on the water of a sand extraction quarry, as a result of which different spatial functions are combined. Furthermore, people can participate in this initiative and benefit from the solar energy generated here.’

Tijs de Bree, deputy for Energy and Environment in the Province of Overijssel



Source of sustainably extracted building materials

Sand Extraction Zwolle (Bomhofsplas) is a source of sand and gravel that are innovatively extracted using green power and with a far more efficient way of extracting sand that uses less energy.

The grading machine on the land runs on green power. The traditional sand dredger on the lake ran on diesel. However, in the course of 2022, it will finally make way for the TopDredge, an innovation by Dekker Groep for a highly sustainable and innovative way of extracting sand. The TopDredge also works entirely on solar energy.

Extracting sand and generating energy: a win-win situation

Dekker Groep is working on the energy transition by electrifying the equipment it uses and making it more energy efficient. The electric machines will already save more than 3 million litres of diesel per year. Dekker Groep's vehicles are also either electric or run on hydrogen. In 2021, we reached our goal of emitting 80% less CO₂ during sand and gravel extraction. Dekker Groep always seeks opportunities to combine the extraction of building materials with other needs in society that require space. Renewable energy, flood safety, new nature/biodiversity, recreation and living environment, and sustainable business.

At the Bomhofsplas, extraction of building material by Dekker Groep combines well with the large-scale generation of sustainable energy in the form of Solar Park Bomhofsplas that Dekker developed with GroenLeven.



CSC Platinum Bomhofsplas

In 2021, Dekker Groep was recognised for Sand Extraction Zwolle when it became the first company in the Netherlands to receive the Platinum certificate from the Concrete Sustainability Council (CSC), with at that time the highest score worldwide.

Manager Quality, Health & Safety and Environment Henk van Steenberghe received the certificate on behalf of Dekker Groep.



Source of innovation

TopDredge: energy-efficient, autonomous, electric sand dredger

- **Smart:** pump underwater which pushes sand up instead of sucking it up
- **Energy-efficient:** uses about 40% less energy than the diesel dredger
- **Efficient:** can extract sand from greater depths than traditional sand dredgers
- **Quiet:** the heavy pumping equipment underwater makes operations far quieter
- **Electrical:** runs entirely on green power
- **Clean:** prevents 660,000 kg in CO₂ emissions each year
- **Autonomous:** can be operated from the shore via PC or tablet
- **Safe:** personnel do not need to be on board
- **Stabile:** more control over how steep and stable the bank is made



'The highest score on a Platinum certificate worldwide! This demonstrates that the Dutch concrete chain is one the most sustainable in the world. Dekker's autonomous sand dredger is another fine example of that. Innovations like this contribute to achieving the climate objectives.'

Remco Kerkhoven, CSC Nederland.



'An innovation like the TopDredge makes extracting sand far more sustainable and efficient. Dekker Group has shown its true colours by making real work of sustainability through the realisation of such tangible innovative developments.'

Jurjan Lammers, development partner of Dekker Groep for TopDredge



'What's happening here is fantastic. There is room for sand extraction, and at the same time industrial water is being used to generate solar energy instead of filling up meadows with solar panels. This is the direction we should be taking: utilising the sun's energy efficiently.'

Monique Schuttenbeld, Executive councillor for energy transition in Zwolle



'Together with another floating solar park, the Bomhofspas now provides enough sustainable energy for one-fifth of the households in the city. That currently makes Zwolle the capital of floating solar energy. It is fantastic that we can make such a major contribution to the Climate Agreement of the Netherlands.'

Willem Biesheuvel, project leader Bomhofspas, GroenLeven

Source of local, renewable energy

At the Bomhofspas, GroenLeven completed the construction of Solar Park Bomhofspas in mid-2020, which at that time was the largest floating solar power park in Europe and outside of China.

Large-scale and innovative

- More than 72,000 panels on 18 hectares
- Capacity 27.3 MWp
- Annual production: 25,000 MWh, (25 GWh)
- Energy produced is enough supply power to 7000 households
- CO₂ emission: 11,350,000 kilograms less per year compared to conventional power*
- Built by making use of electricity from the panels
- Innovative construction, and each part can be individually and completely disassembled

*Calculated using the standard Green Deal list emission factors www.co2emissiefactoren.nl

Mindful of ecology & biodiversity

- Anchored to the ground, meaning no disruption of fauna and flora in the banks
- 20 breeding grounds for fish on the edges of the park (see page 8)
- Oxygen-rich water due to construction and panels that allow wind and light through



'The sustainable energy generated here is not the only thing that reaches the households in Zwolle. The economic returns also benefit the residents of Overijssel and Zwolle who participate in the cooperative.'

Anouk Blüm, General Director Energiefonds Overijssel

Source of income

Through local ownership, Bomhofsplas Solar Park is a source of income for local residents and organisations. Revenues flow back into the local community in Zwolle. Local ownership means that public support for the initiative is far greater and the regional energy supply more robust.

On 30 June 2020, **Blauwvinger Energie**, a cooperative of residents in Zwolle, purchased the solar park on the Bomhofsplas together with **Energiefonds Overijssel** and a private investor. Energiefonds Overijssel was established by the Province of Overijssel to help accelerate the energy transition by jointly investing in sustainability projects.

Residents of Zwolle can join Blauwvinger Energie and participate in the park by purchasing certificates. In this way, the share of Energiefonds Overijssel will eventually pass entirely into the hands of residents and organisations in the cooperation.

The Province of Overijssel and the municipality of Zwolle are realising a policy to encourage local ownership and the double use of space. The province stated that it is pleased with the development at the Bomhofsplas, which in their eyes, has an exemplary status.



'My wife and I both participate in the Bomhofsplas. We want to take responsibility for the green and local energy supply. The more electricity we can generate and use locally, the more secure and affordable our electricity supply will be. Furthermore, in this way, each euro of profit from this source remains in the local economy of Zwolle.'

Zwolle resident Raphaël van der Velde



'Our goal is to make the energy supply in Zwolle sustainable as quickly as possible while maximising local ownership of the energy sources: jointly sharing the sustainable and financial costs and benefits. We are therefore very pleased that we were given the opportunity to become joint owners of this project.'

Kees de Vries, Chair of Blauwvinger Energie



Source of knowledge and inspiration

The lake and the solar park are a source of knowledge, explorations and inspiration.

Water quality floating solar park

Until recently, there were no measurement data and long-term experiences regarding the effects of floating solar parks on aquatic ecology. In 2021, the first field data became available from the Bomhofsplas. Together with co-authors, Floris Boogaard, Professor in Climate Adaptation at Hanze University of Applied Sciences and a consultant at Deltares, measured the water quality and monitored the aquatic life with underwater drone cameras, scanners and sensors for a period of one year.

The researchers found that the oxygen in the water under the canopy remained at a sufficiently elevated level, just as in the surrounding water. That is because the wind can still easily reach the water surface below the panels. The same is true for the sunlight, as shown by the underwater images. Furthermore, the underwater images revealed that biomass was growing on the construction after just four months. These research results are the first of their kind in the world and were published in the international scientific journal Sustainability. This partly led to the start of two large national studies into the effects of floating solar panels on water.

Research & development Dekker Groep

The Bomhofsplas inspired Dekker Groep to generate and use as much green and locally-owned energy as possible in the future. Therefore in 2021, the family behind the Dekker Groep became a participant in Solinoor, Dekker's own new partner in renewable energy. Solinoor focuses entirely on the

development of renewable energy as well as floating solar parks. Dekker Groep will apply these developments at several locations where the group extracts raw materials.

For her graduation project, Anne Beune, master's student in Transnational Ecosystem-based Water Management from Radboud University, is modelling the effect of floating solar panels on aquatic life in the Willemsspoolder, where Dekker Groep is developing a solar park with Solinoor.

Sand extraction and solar energy

Consultancy firm Repowered investigated the possibilities for sand extraction using energy taken directly from the solar panels instead of the power grid. They also assessed the possibilities to store locally generated solar energy for this. This would remove the need to burden the already congested public grid. This research led to some interesting lessons. The user profile of an extraction installation, such as Sand Extraction Zwolle, fits very well with the generation profile of a large solar park, such as Zonnepark Bomhofsplas. This holds

as long as the major maintenance of the installation is shifted from the summer to the winter so that the break in operations takes place when there is less sun.

The second lesson is that involving large energy consumers in the development process as early as possible increases the chances of direct connections being made.

Under existing legislation, retrospectively laying a direct connection between the solar park and the sand extraction would be very difficult.

Furthermore, a large storage battery is expensive, and earning back the investment would be difficult as it would be used relatively little due to the favourable match between supply and demand.

Biohut: breeding ground for sun on water?

The French company Ecocean placed 20 biohuts at the edge of the solar park that were commissioned by GroenLeven.

A biohut is a "double-walled" steel cage with wood and shell material that certain types of algae and shellfish can grow



on. By providing food and shelter for young fish, these structures form an ecological breeding ground and protect the small fish from larger predatory fish that cannot pass through the holes. After the first year, there was a considerable amount of growth on the construction as well as life inside. The development of aquatic life in the biohuts will be monitored for a period of three years.

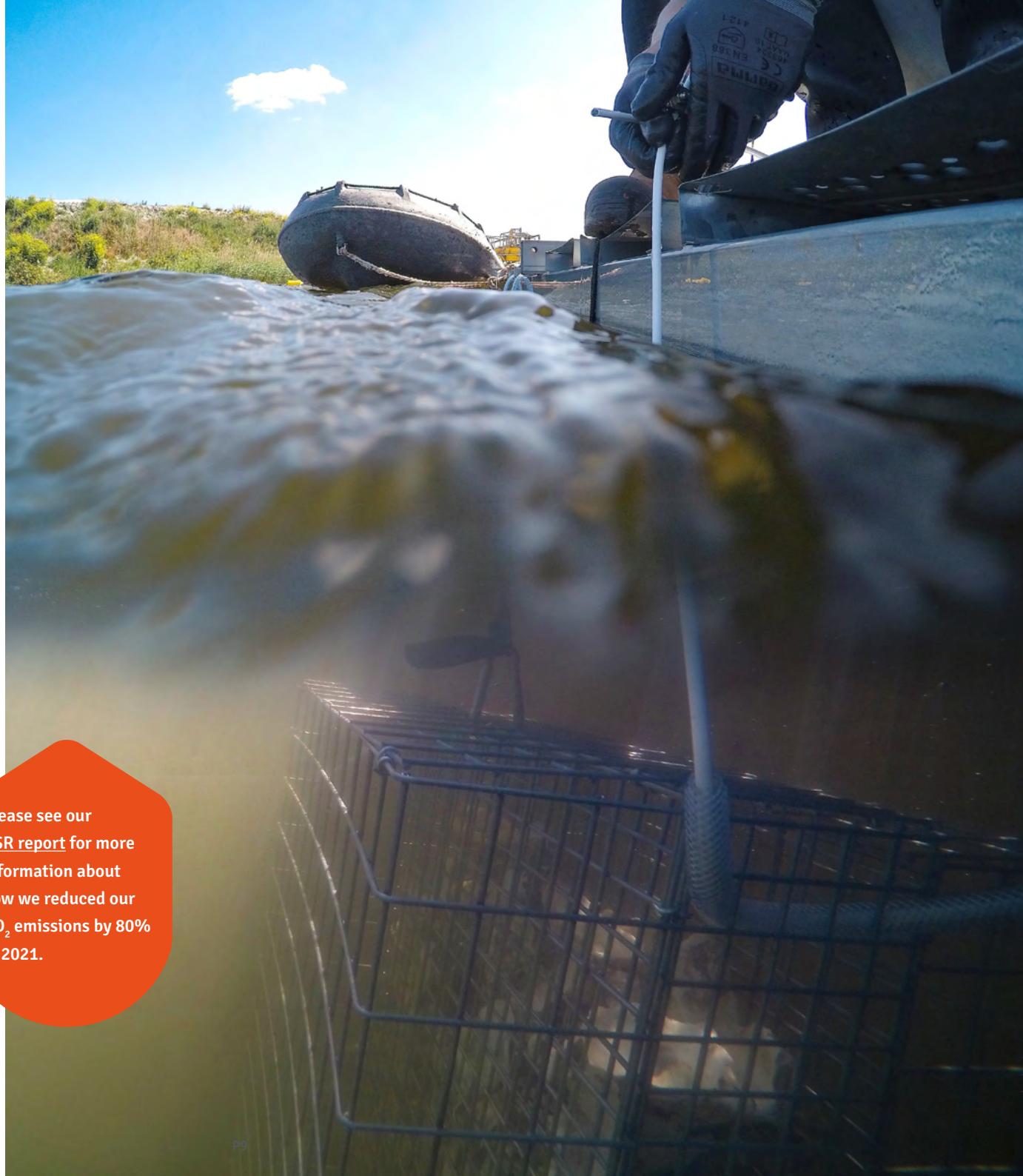
Climate campaigner Urgenda cites Bomhofplas as an example

Urgenda is internationally known for initiating the climate case against the Dutch state. With the judgement of the Dutch High Court in that case, it was the first time in world history that a state was legally forced to reduce the emission of greenhouse gases and to do this based on the European Convention on Human Rights. Urgenda listed the Bomhofspas as an inspiring example for the regional energy transition.

Research into thermal energy from deep lakes

For their graduation project in 2020, students Nienke Braas and Carmen Hazeu from the degree programme Land and Water Management (VHL University of Applied Sciences) investigated the possibilities for extracting heat and cold from deep lakes: obtaining cold from the bottom of the lake or heat from the top and bringing this to a heat exchanger on the land to release the energy. This is happening at a few places, but the technology is still in its infancy. Braas and Hazeu described the boundary conditions such as energy potential, maximum distance to demand, extraction and storage techniques, funding and the effects on nature, water quality and hydrology. They also elaborated these points for the Bomhofspas and the Willemspolder. The Bomhofspas, with its solar panels and everything else, definitely offers perspectives.

Please see our [CSR report](#) for more information about how we reduced our CO₂ emissions by 80% in 2021.



Source of sustainable development

In conclusion

Dekker is a family company where the fourth generation is now at the helm. Our operations are aimed at passing on a healthy and valuable company to the next generations.

We want to be a source of fantastic developments for the future by taking people and nature into account within and outside our company and by offering as much added societal value as possible in the areas where we extract minerals.

This means that we invest in sustainable innovations such as our extraction machines, but also that we offer space to other actors so that we can jointly try out and realise sustainable innovations at our locations.

One of the biggest challenges that the Netherlands currently faces as a densely populated country is finding enough space for green energy. The Bomhofsplas provides that space and, as you could read, far more still.



In our opinion, the Bomhofsplas, our sand extraction lake, with everything that is taking place there, has become a textbook example of our projects as a source for even more development. Together with all the active parties on and around the Bomhofsplas, we have extracted, and we will continue to extract, a wealth of knowledge in a wide range of areas.

Richard van den Berg, Director landscape development, Dekker Groep

