AlgaePARC: Bringing Innovation to Bonaire

A collaborative effort between private, government and university partners, has been working to develop a microalgae production test facility on Bonaire to create a renewable food source for food and animal feed. Further research could also lead to the use of the microalgae to produce a biofuel which could be used in place of fossil petroleum. The project will soon enter its second phase, with the construction of a small-scale facility to prove the feasibility of the project on the island.

Future Fuel Sources

It is estimated that humans are now consuming energy 105 times faster than what can be supplied using natural petroleum (Netravali and Chabba, 2003). Researchers are looking for alternative energy sources to help bridge this gap. One such alternative fuel source which is gaining a lot of attention recently is biofuel (Chisti, 2007). Biofuels are fuels which are derived from living organisms, for example algae, which can provide a biodegradable and renewable energy source (Song et al., 2008). There are many advantages to using algae as a biofuel including the facts that it can be grown at sea, thus eliminating competition for land use, it naturally filters water, so it can be grown in a variety of water qualities, its production is carbon neutral and it has a very high combustion efficiency (Kumar, 2012). In addition, research is continuing to find new ways to extract oils and proteins out of algae, which could potentially lead to algae being used to create innovative food sources, particularly animal feed (WUR, 2017).

AlgaePARC

A project, known as AlgaePARC, is running on on Bonaire. The idea of the project is to build a microalgae test facility on the island, which will be used to develop the technology for renewable food and fuel production (WUR,2017). The project was initiated by Wageningen University and Research and the government of Bonaire. Further support came in December of 2017, when Netherlands Organization for Scientific Research (NWO) issued a grant for €800,000 to be used to expand this research by funding two PhD students, Rocca Chin-on and Robin Barten (WUR, 2017). In addition, the Ministry of Economic Affairs (now Ministry of Agriculture, Nature and Food Quality (LNV)) and OCTA (the innovative program for overseas areas of the EU) have also funded a feasibility study for this project (Sikkema, 2017). Lastly, the possibility of creating biofuel which could be used for air travel has piqued the interest of TUI, who has also signed on to the project in support (WUR, 2017). This research would be an excellent opportunity to expand Bonaire's local economy past tourism and encourage intellectual investment on the island.

Why Bonaire?

A significant factor in the growth of algae is exposure to sunlight, an issue many labs in the Netherlands have had difficulty overcoming. Researchers believe that if the growth lab could be built somewhere with a larger amount of sunlight, it would be possible to maximize production efficiency (WUR, 2017). Bonaire could provide such a solution, as the island is known for its consistent sunlight and weather year-round. One potential issue could be the island's high temperatures; however, researchers have already recommended two possible solutions. The first involves building a series of platforms near shore to allow seawater to naturally cool the algae tubes/reactors (WUR,2017). The second option would be to carefully select algae which can withstand such high temperatures to allow production via pools on land, such as in the saliñas (Sikkema, 2017).

To compete against other sources of fuel is still a challenge, as the cost of reducing algae to biofuel is still much higher than natural petroleum. A professor of Bioprocess Technology from Wageningen University, René Wijffels has been instrumental in supporting this project. He points out that although creating a biofuel may not be economically feasible now, using algae to create fish and animal feed could greatly benefit Bonaire in the long run (Sikkema, 2017). In the meantime, researchers and manufacturers are still learning how to maximize the efficiencies of reducing algae to make biofuel, and the cost of this reduction process continues to improve. Hopefully, researchers will continue to find new ways to reduce the cost of the process, making algae biofuel a competitive fuel alternative in the near future.

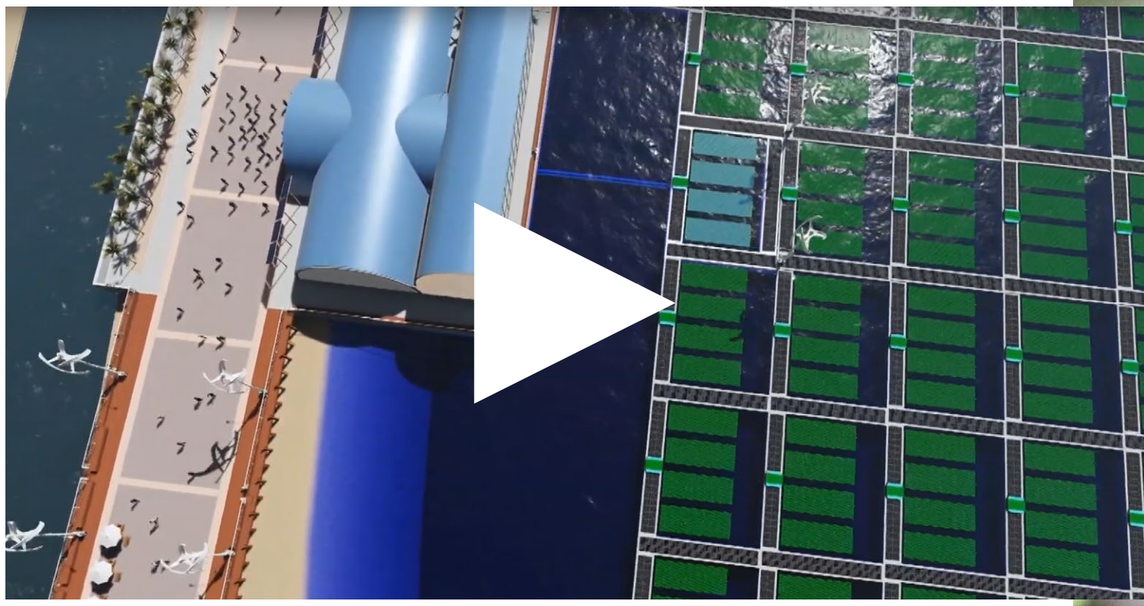
Bonaire: Paradise for Innovation

The production facility will be located at a Water and Energy Company Bonaire (WEB) station in Barcadera (Zwart, 2018). Bonaire offers consistent sunlight and temperatures year-round, an ideal climate for the such a production facility. The proximity to the ocean at the site in Barcadera also offers the potential for floating platforms to be used for cooling, a more environmentally friendly alternative than running a cooling system (Zwart, 2018).

Setting up this facility will be a multi-step process. The first step was to isolate microalgae already present in the salt pans and saliñas of Bonaire. This research was conducted by Wageningen University. The second step, which will begin soon, is to establish the research station at the WEB facility to prove the feasibility of the project. Once this has been successful, Bonaire can work to scale up the production to allow the algae to be grown commercially (Zwart, 2018).

Investing In The Future

Projects such as AlgaePARC, help bring Bonaire to the forefront in innovative environmental research. This project could not only provide an affordable animal feed and fuel source to the island, but will bring about new business and incentivize young, bright talent to stay on the island. As the island continues to face the challenges brought about by climate change, finding innovative ways to cut the island's carbon footprint will be very important. Furthermore, investing in the intellectual future of the island will be instrumental in helping to build a sustainable future for Bonaire.



A conceptual video of what the full scale facility would look like (WUR, 2019)

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