

# Algaeventure Systems

## CUSTOMER

Algaeventure Systems, Inc. is a spinoff of Univenture, Inc., an Ohio-based plastics packaging manufacturer that specializes in eco-friendly packaging solutions. Algaeventure was founded to focus on developing technologies to commercialize algae production and separation into oils and bio-feedstocks. They believe that algae has the ability to feed virtually every aspect of the current petroleum-product industry as well as the evolving bio-diesel industry.

Rapid problem-solving by EWI enabled this ambitious manufacturer to keep moving forward.

## CHALLENGE

Algaeventure aspires to develop systems to provide affordable extraction of oil from algae, one of the most abundant and resilient species on the planet. Current algae to oil technologies use expensive de-watering processes and require a great deal of energy to achieve the end result. Algaeventure's concept of simulating nature's own drying process harnesses the natural process of cohesion, diffusion, and transpiration to dry the algae. Their challenge came in designing lab-scale equipment that utilizes supercritical CO<sub>2</sub> to extract oils from the dried algae flakes. Initial designs for a pressure vessel used in the extraction process could not achieve and maintain the amount of pressure required.

## SOLUTION

Knowing EWI's reputation for welding and design expertise in the oil and gas industry, Algaeventure called EWI. An EWI mechanical engineer understood the design requirement of maintaining high pressure during high temperature differentials in the device. With Algaeventure's original development unit, the thermal gradients caused unequal expansion and contraction that allowed pressure to bleed off. Given EWI's expertise and strong working relationship with Algaeventure, EWI was commissioned to re-design the device to maintain pressure integrity as well as introduce several new features as well. The new design is easy to open and close and has a drain valve for pulling off the oil at the end of the separation cycle. EWI built and delivered a prototype to Algaeventure.

## RESULTS

At the time of this writing, Algaeventure and EWI have completed multiple trials with the new device and successfully and consistently extracted oil from the algae each time. In addition, the clarity of the oil recovered was high, as indicated by its rich golden color. Algaeventure is very pleased to have demonstrated a successful proof-of-concept so quickly. The EWI unit provided improved ease of use, higher pressure quality and improved safety. The project with EWI puts the company one step closer to providing a sustainable alternative to petroleum for fuel and plastics. They plan to keep EWI on hand to advise and consult on the design of subsequent devices, and may engage EWI in other ways as well.



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