

Interest in DOE Algae Biomass Program/BETO technologies diminishes because they have proven to not be scalable outside the lab in demonstration or pilot tests.

After over 10 years of attempts at collaboration between the DOE Algae Biomass Program/BETO, university algae researchers and commercial algae producers over highly advertised pay-to-play taxpayer funded technologies, NAA and its algaepreneurs have no further interest. Why? On information and belief, many of these hyped technologies have not been able to be proven outside the lab in demo and pilot scale projects, and it is known that others won't scale. Unless an algae technology has been proven outside the lab to be scalable and has a low CAPEX, we are not interested in wasting any more time, and the DOE will not pay for someone to do what they should have done years ago. The reason inquiries are not responded to from the DOE and the grant-recipients is painfully apparent – they don't have anything that will scale and they didn't want that to be publicized.

In private Industry, you do not have the benefit of researching anything for 75 years at a cost of \$2.5 billion but the DOE has allowed this to happen and to use US taxpayer funds to foot the bill. If the DOE, university algae researchers, the chosen few to whom grants were awarded without having to certify that the applications contained truthful information and their lobbyists had spent less time promoting their lab-scale technologies and more time working with private industry in commercial production, their technologies might have been available decades ago.

As an example, in 2011 the DOE made a presentation available that showed how many projects were fully funded but not completed. The claims were that less than 10% of the grant projects were completed. While they now require alleged milestones, they are still working at lab scale knowing full well that pilot and demonstration scale of lab size technologies is nearly impossible. This is buffoonery at its finest. The personnel at the DOE were transferred to different departments – salaries still being paid from taxpayer money – rather than being held accountable for their malfeasance.

Opinions from everyone except grant recipients are that the program has been a waste of time and taxpayer money and that there was a decade or more of pay-to-play. Let's look at a federal funding of close to \$100 million to two companies in particular. After a \$50 million award was made, a company approached the USDA, requesting another \$40 million to research the contamination issues they were experiencing from the raceway ponds that the entire industry knew experienced contamination. The USDA declined the company's request because it felt the company should have addressed their contamination issues prior to accepting the \$50 million funding from the DOE, and that the DOE knew that contamination was an inherent problem with raceway ponds. The USDA was not going to help fix a problem that the DOE knew about when it made the \$50 million award. That company is no longer in existence, its assets were either liquidated or buried, and their officers were not held accountable for anything. It was reported that another grant recipient delivered what it claimed to be 100% algae fuel to different government agency after receiving millions of dollars from that agency in addition to what it received from the DOE. Its president and CTO claimed in 2010 that "[it] will produce over 100,000 gallons of fuel and oil in 2010 and substantially more next year". It, too, filed for bankruptcy when the federal money train ran out, and the shareholders were no longer going to pay for salaries and unsubstantiated claims. Now that all that taxpayer money has been spent on algae research, the algae industry has concluded its been all hype with little or no results. It

may have something to do with the fact that algae research grants and lobbying efforts are at an all-time low today. (ie, \$4 million in 2018)

NAA is contacted on a regular basis by algae researchers and companies purporting to be in production who are looking for our information for their next algae research grant. We were even approached by algae research grant recipients and national labs wanting NAA's information so they could put their name on it. A national lab employee demanded NAA's work product, claiming "you have it and we need it and you are obligated and required to provide it to me because I represent the US government." When the algaepreneur asked what guarantee there was that the lab would not take its name off the work product and put the lab's name on it, the response was "that is exactly what I am going to do and I'm the government so there is nothing you can do about it." Nothing other than to not give him what he demanded!

Since then, NAA and its members have been continuously been moving the algae industry forward without them.

NAA started the commercial algae production industry from scratch over 10 years ago while everyone else was busy taking in taxpayer dollars and playing in their labs. We have seen and heard many claims and a lot of equipment and have looked at technologies that the DOE has nothing to do with. We are referred to as the business intelligence for our industry. NAA has tested various algae technologies that were proven outside the lab in a commercial environment at our test sites. The huge learning curve between what takes place in a lab and commercial production is something with which researchers have no experience. We have also noticed a huge difference between algae researcher and private industries projections. Commercial algae producers without any lobbyist, university or government assistance have helped lower the CAPEX by over 50% in some cases.

While various DOE funded companies went out of business, filed bankruptcy or have been liquidated, NAA's commercially-minded algae researchers and producers continue producing tonnage of algae biomass for products in the US and throughout the world having no relationship with the DOE. They continue building new markets, supply channels and relationships every day. Just think, if the algae industry had access to less than 25% of the capital the DOE funded over the years. commercial production would be much further along as an industry today.

The emerging algae industry continues to flourish without the noise from the DOE algae researchers promoting their latest unscalable technologies. Instead of attending expensive algae research conferences in Hawaii and other places, and paying to speak at conferences, we have stayed focused on commercial production and seeking off-take contracts. Due to the huge demand for biobased products and ingredients, commercial algae farms and indoor biomanufacturing facilities have been scaling-up and expanding in the US and throughout the world producing nutraceutical Omega 3 EPA/DHA, cosmetics, food, feed, biofertilizer and bioplastics, a projected \$3.4 billion dollar market. Another growth area for the algae industry is CO2 sequestration and utilization, wastewater remediation and recently commercial algae bloom remediation.

Click [https://www1.eere.energy.gov/bioenergy/pdfs/2011\\_algae\\_review.pdf](https://www1.eere.energy.gov/bioenergy/pdfs/2011_algae_review.pdf) for the complete 2011 Peer Review. Below are some highlights:

- Reviewed 31 projects, about 85% of the Algae Platform portfolio. Most focused on micro-algae, not seaweeds.
- \$87 million of DOE investment and \$28 million of match.
- The NAABB consortium is by far the largest project.
- \$49 million of DOE investment and \$19 million of match.
- Over half of the projects (17) were led by national laboratories, representing \$10 million of DOE investment.
- Most of the projects reviewed were just getting underway:
- 19 started in 2010 and 9 in 2009.
- **Work plans targeted more than work completed.**