

2015 Algae Year in Review

Another year has gone by and again no change in the Congressional mandate that only supports algae research and not commercial deployment or commercial production of algae biofuels. This has nothing to do with the current price of a barrel of oil. It has to do with two things - the outdated Congressional mandate that requires that the funding only be used for more algae research and technologies and that the grants be paid to universities, and with greed, avarice and self-serving interests on the part of those who have access to government grants.

Have the games being played by the government, university researchers, lobbyists and pay-for-play media helped or hindered algae fuels from ever becoming a reality?

For decades, algae researchers have all used the same mantra: Algae for fuel was too costly, it could not yet be done and they needed more research. They and their lobbyists were successful in convincing the Department of Energy to continue to fund their research projects for decades. Some have made entire careers out of either asking for or awarding grants, and we, the taxpayer, have nothing but rooms and rooms full of unproven fuel technologies to show for their time and effort.

Despite reading numerous embellishments issued in what National Algae Association calls the 'pay-to-play media' press releases, taxpayers, investors and consumers that have read all the algae fuels press releases continue to ask:

Whatever happened to the promised algae fuels?

NAA is convinced that at this point, the failure of cultivating algae for biofuels has nothing to do with the price of fossil fuels. It has nothing to do with lowering the costs. It's all politics!!! It's just one on a never-ending list of good excuses. What about 18 months ago, when the price of oil was over \$100 per barrel? The reality is that it has to do with the fact that the funding for algae as an alternative fuel has been hijacked by Department of Energy research funding programs that has been, in our humble opinion, misled by its leadership, misguided by its advisors, bought by lobbyists and never held accountable for anything. It led the US taxpayer to believe its mission was to reduce dependency on foreign oil, and told Congress that is what it was working on, but that has neglected to mention that the funds it controls are restricted to research and development and to be paid to groups involving, and frequently led by, institutions of higher education. What about the successful algae fuel tests in commercial airlines and in automobiles? The Department of Energy has refused, despite repeated requests by NAA, private industry and some past research grant recipients, to ask Congress to update

the mandate to accommodate today's private industry needs, not those of 1976 when the mandate was enacted. In other words, you, Congress, the President and I might think they are funding efforts to produce algae for alternative fuels. But, it still remains R&D never reaching commercial scale deployment.

Private industry (not researchers and lobbyists who have no training or experience) have already lowered the CAPEX for the industry. One would conclude private industry should have involvement of writing industrial standards for the algae production industry (not researchers and lobbyists with no experience or training). Shouldn't private industry be involved in these processes, since they are taking all the risk? Are algae researchers running out of things to research?

The reality is that they are only funding for research and development, and only at or through institutions of higher education (we could call it the 'prop up the universities' act). Not only is there no incentive for the researchers to commercialize their technologies, but the funds cannot be used for that purpose, and the Department of Energy has proven time after time that it is not equipped to manage the projects it funded, let alone commercialize anything. The results of the projects that were funded speak for themselves and are dismal at best. Most of the projects that were funded in 2008 – 2010 were fully funded, but very few were completed. Entire management teams have been replaced. The beauty of the situation for the grant recipients as well as the people making and monitoring the awards on behalf of the Department of Energy are not held accountable or responsible. It's been a win-win for them, all at the expense of the US taxpayer. Where are the promised algae biofuels from companies like Sapphire Energy ("the golden child") who in 2009 claimed they would be producing 1 million gallons of diesel and jet fuel per year and in January 2010 were awarded a \$50 million grant by DOE and a \$54.5 million loan guarantee from USDA to substantiate these claims), Solazyme, General Atomics, Algenol, Solix Biofuels, Aurora Biofuels, Synthetic Genomics, Phycal, the government labs like NREL and Sandia, and the universities? In 2010, Solazyme was able to deliver 100% algae-based jet fuel to the Department of Defense and received millions from the DoE for the construction of an integrated biorefinery project. The fuel allegedly met all of the requirements for Naval renewable fuel, aviation fuel, and purportedly met the fuel requirements of the US Air Force and the standards for commercial jet fuel. So, where is it 5 years later? Several companies have replaced all or most of their management teams, but, with all due respect.....

Algae for fuels has apparently run its course. It was hijacked by the DOE Algae Biomass Program/BETO, university researchers and their lobbyists. It was never supposed to be a never-ending research project. Now the focus of private industry has changed from algae fuels to focus on biobased co-products. Why?

... Because the available funding was not made available to private industry for the commercial production of algae fuels.

The few legitimate commercial algae producers (not the hundreds of algae producers referred to by the Washington lobbyists, none of whom have been able to substantiate that claim) decided to

commercialize and deploy or algae co-products first as a way to increase profit margins due to projected low margin fuels but also as of necessity of survival, not by choice but in attempts to diversify into other potential revenue opportunities. Private investors are coming back into the market looking for commercial algae producers who can supply diversified raw materials for co-products, and ingredient blenders who read glorious press releases are interested in algae for nutraceutical Omega 3 EPA/DHA, cosmetics, food, feed and bioplastics. Others in private industry are interested in sequestering CO₂ or cleaning wastewater using algae. They are tired of hearing the same old hype and embellishments. They want to see results! That is why NAA created the Algae Biomass Exchange on LinkedIn as a platform for legitimate commercial algae producers throughout the US and the World to meet potential biomass or oil off-takers/customers with specific needs and specs.

The Algae Biomass Exchange has received very positive feedback from around the world resulting in new connections between real commercial algae producers and potential new off-takers/customers with specific specs and requirements. Every month new algae biomass becomes available, needs and requirements are updated from around the world. Whether a commercial algae producer is commercially cultivating *Botryococcus braunii*, *Chlorella*, *Dunaliella*, *Haematococcus pluvialis*, *Nannochloropsis*, *Spirulina*, *Scenedesmus* microalgae or *Euglena gracilis* or any other macroalgae, the Algae Biomass Exchange on LinkedIn can assist in helping to build various legitimate supply channels for real commercial algae producers.

NAA interacts with algae companies in the US and around the World that are in commercial algae production, capable of providing samples of algae biomass with Certificates of Analysis. When we receive samples we verify by US-based third-party labs before posting availability on the Algae Biomass Exchange.

Every month we encounter the cast of 'algae wanna be's' – people who want investors and connections but are producing more unsubstantiated press releases than algae or investment money. NAA only aligns with algae producers committed to the algae production industry and nothing less. Our members are dedicated in commercial production and building out new supply channels for algae and have no time for the fraudsters. Over the last decade we have witnessed people breaking NDA's and running scams all to find investment. This cannot stand. More due diligence needs to be conducted in private industry on people purporting to be in the commercial algae production industry vs. a research project. National Algae Association's Incubator Program - Success or Failure?

NAA has established the first Algae Incubator Program in the world for algaepreneur's interested in the emerging commercial algae production industry. Students and private industry learn methods in commercial algae cultivation, harvesting, extraction for potential bio-based co-products, and to experience the challenges, solutions, markets and opportunities.

From a personal perspective, National Algae Association's incubator program has been extremely successful. Students learn how to successfully scale-up commercial cultivation, harvesting and extraction systems. They learn how to provide correct amounts of lighting, adjust nutrients and how air and water quality affect growth and how to compensate for those and other environmental conditions.

We have also witnessed the wrong people trying to lead algae companies – people who are more interested in lining up investors and lining their pockets than they are interested in building a company. Start-up algae companies need leadership that understands what it takes, in time and in commitment, to make a new company successful, and is willing to make the commitment and not relying on others to make or break the company. When that entrepreneurial spirit gets involved in commercial algae production, this industry will take off!

In 2007, President Bush signed Executive Order 13423 requiring federal agencies to reduce energy intensity by 3 percent annually through 2015 or by 30 percent by 2015, compared to the 2003 level. That same year, the Energy Independence and Security Act was signed into law, requiring new Federal buildings and major renovations to reduce fossil fuel energy use by 55 percent by 2010 (relative to 2003 usage levels) and to eliminate its usage altogether by 2030. It annual petroleum consumption by 2015 and a 10 percent increase in annual alternative fuel consumption. In 2009, President Obama signed Executive Order 13514, which was aimed at improving the also required federal agencies to achieve at least a 20 percent reduction in their vehicle fleet's federal government's environmental sustainability. It set a 28 percent reduction target for government greenhouse gas emissions by 2020 with an estimated energy savings target of \$8 billion to \$11 billion. The fact that we have reduced our usage does not negate these Executive Orders and yet there seems to be more excuses than compliance.

Algae transportation fuels will continue to be a dream for private industry and consumers. We can only hope that at some point the DOE Algae Biomass Program/Beto algae research program for fuels will be shut down for its poor performance and nonexistent results, and that maybe someone will be held responsible for the debacle. Taxpayer paid-for algae fuel technologies will continue to sit on shelves at labs throughout the country collecting dust for decades to come while the US is held hostage to foreign oil.

Since 2009 some important parts of algae fuel research have been validated but never executed at scale. Isn't it about time to take the existing proven algae fuel technologies that have been validated by the government researchers in pilot scale and put them into commercial algae production for fuels? NAA has suggested taking the pieces of the algae fuel puzzle with claims that have been validated to date and put them to work in building one commercial algae fuel farm?

NAA has been calling for a 'Algae Manhattan Project for Fuels' bringing algae fuel research experts and private industry in collaboration to build the first commercial algae fuel farm in the world to be located in Texas. Any algae fuel researcher/expert in the World is welcome to join. We currently accepting CV's from algae fuel experts from around the world with algae biofuel validation. Claims and validation of algae fuel technologies/IP have no value to date. NAA believes if we bring together the best and brightest in collaboration to build one commercial fuel farm these technologies be proven in real commercial production, will have more value then they currently have today sitting in labs and will finally prove once and for all that commercial algae biofuels can be a successful and profitable industry. Commercially-minded algae researchers, private industry and consumer demand are the only ones that can make algae fuels a reality.

After a decade of false hopes and misrepresentations about algae fuels NAA continues to bring morals, ethics and accountability to the algae production industry and has no time for anything less. We will continue to highlight the falsehoods as we continue to build a legitimate algae production industry. Over the last decade we have witnessed people breaking NDA's and running scams all to find investment. This cannot stand. NAA only aligns itself with real commercial algae producers, nothing less. Our members are dedicated to the commercial algae production industry and building out new supply channels and have no time for the fraudsters.

In the new year, NAA plans are to continue working with real commercial algae producers growing for co-products, assisting students, private industry and new algae producers through our Algae Production Incubator Program and Certification Program, and continue to help build out raw material and ingredient algae biomass supply channels.

Have a Happy Algae New Year!