Algae Biomass Organization
2014 Industry Survey – Executive Summary

The Algae Biomass Organization's 2014 Industry Survey was conducted in March through an electronic questionnaire sent via email to ABO's 7,000+ contact list. The survey asked for opinion and projections on the industry's growth, barriers to advancement, and policy priorities through 2020.

The results broadly show an industry that is growing, from increased production of biomass and oils, to increased hiring, to a wider variety of end products. The survey was conducted in March 2014 and includes more than 280 responses from companies and individuals involved in directly producing and buying algae or algae-derived products, as well as equipment manufacturers, research laboratories, providers of equipment or materials, government agencies and service providers.

As in the previous two annual surveys, respondents this year continued their optimism that algae-derived fuels are likely to be price competitive with fossil fuels by 2020 (83% agreement); that production will increase in existing and new facilities (72 percent agreement); and that improved supportive federal policy would accelerate both the production of algae based fuels, feeds, fertilizers and other products as well as the number of jobs across the industry (86 percent agreement).

Optimism for co-products, such as feed, food and chemicals was significant, with 97 percent predicting that algae-based feeds and 96 percent predicting algae-based plastics and chemicals will be commercially available by 2020. Respondents noted that in some cases these products were already reaching certain markets.

Some of the increased optimism in the 2014 results could be attributed to the widespread progress of the industry in commercialization efforts and research breakthroughs in the past year. During 2013 several companies opened or continued successful operations at pilot or commercial production facilities, made new advances in yields and algae biology, and attracted renewed policy attention with the formation of the Congressional Algae Caucus.

In addition, expectations for policy priorities may illustrate the industry's next steps. Survey respondents ranked regulatory approvals for algae-derived products and siting of cultivation or production facilities as high priorities.

It is perhaps no surprise then, that optimism about the price competitiveness of algae—derived fuels, and the commercial viability of algae-derived feeds, plastics and chemicals were strong across the board.

The key highlights of the survey's findings are described in this executive summary. ABO members can request the survey's full results and further analysis by sending email to info@algaebiomass.org. A

PowerPoint slide deck of key findings in the 2014 Algae Industry Survey is available via Slideshare at http://www.slideshare.net/AlgaeBiomass/2014-algae-industry-survey.

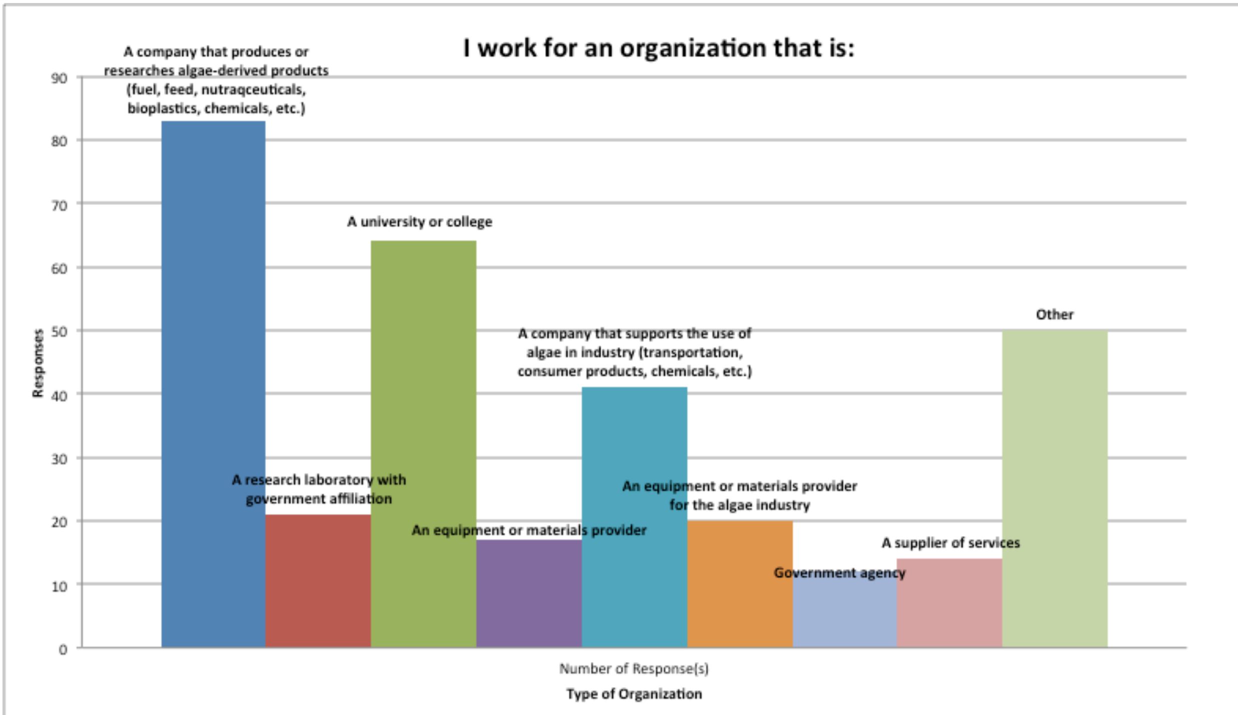
KEY HIGHLIGHTS

- The 2014 survey shows that optimism on the price competitiveness of algae fuels remains—83% of respondents say it is likely that algae-based fuels will be cost-competitive by 2020.
- 28% of producers say the price will be below $3.00 per gallon by 2020, while 42% believe prices will be below $5.00 per gallon. Many producers did feel that specific price projections were difficult for an emerging industry like algae.
- Congressional engagement is high—68% of respondents' organizations either have met with or plan to meet with legislators.
- Employers again confidently predicted Job growth for 2014. Many anticipated broad industry growth through 2020.
- 86% of employers say better federal policy support would likely accelerate hiring.
- The most important existing federal policies for building a robust algae industry were identified as: 1. research & development grants, 2. tax credits & incentives, 3. the renewable fuel standard.

DEMOGRAPHICS

Of the 285 respondents, 33% were ABO members.

When asked what segment of the value chain they represented 32% reported being from a company that produces or researches algae products. About 32% reported working at research laboratories and universities or colleges. Six percent reported working at a company that is an end user of algae products.



Respondents reported holding all types of positions in the algae industry. The largest segment, 37%, was scientists and researchers, closely followed by executives (29%). Smaller percentages were reported in marketing or sales (5%), and those in operations or production (4%).

A range of algae-related activities is being undertaken at respondents' organizations. More than half (54%) said they were cultivating algae and 40% said they were involved in harvesting algae. Almost 45% reported being involved directly in processing algal biomass into fuels or chemicals, and 18% reported being involved in refining algal oils into other products. About 1 in 3 (33%) are involved in developing algal strains, and 13% reported being involved in the manufacture of equipment used in the industry.

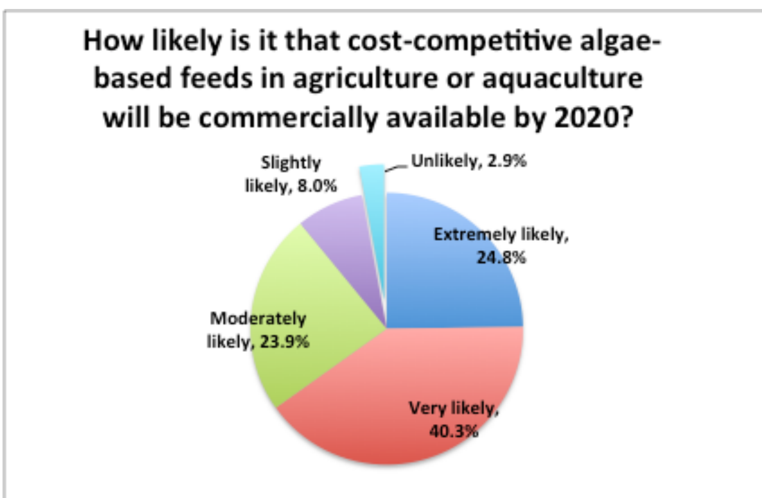
FUELS

Survey respondents remain positive about the prospects for cost-competitive algae-derived fuels such as gasoline, ethanol, diesel and aviation fuel. More than 83% believe it was at least somewhat likely that algae-based fuels will be able to compete with fossil fuels by 2020.

Given what you know about the algae industry, in your opinion, how likely is it that algae-based fuels will be cost-competitive with fossil fuels by 2020?			
	2012 Response Ratio	2013 Response Ratio	2014 Response Ratio
Extremely likely	13%	12%	15%
Very likely	22%	26%	19%
Moderately likely	34%	29%	29%
Slightly likely	20%	24%	20%
Not at all likely	10%	9%	17%

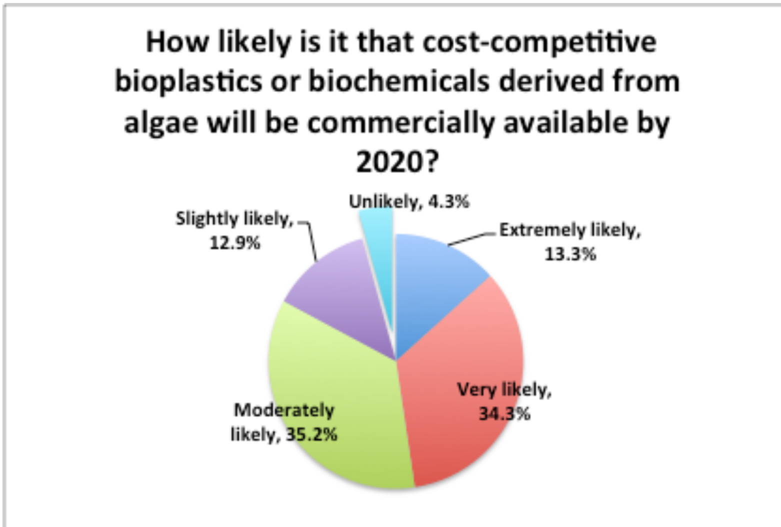
FEEDS

Even more optimism was recorded about expectations for commercially available feeds for aquaculture or agriculture. Many commenters noted that some markets are already seeing algae-derived feeds, and more than 97% of all respondents felt that such feeds would be broadly available by 2020.



PLASTICS AND CHEMICALS

Commenters were also noted that some plastics and chemicals derived from algae were already hitting markets. Survey respondents were nearly unanimous (97%) that these products would be commercially available in 2020.



POLICY

ABO asked several questions pertaining to policies that might accelerate the commercialization of algae-based products or stimulate research and development breakthroughs. Nearly 7 in 10 (67%) reported that they do reach out, or plan to reach out, to legislators or policy makers about algae.

The impact of policy goes beyond algae-derived fuels, as many respondents reported interests in a range of markets. While nearly 34% marked "Fuels," (an increase over the 28% reported last year) there were extremely healthy marks for a variety of other products such as feeds, nutraceuticals and fertilizers.

Does your company or organization produce any of the following algal products? (select all that apply)	
	Response Ratio
Oils for use in food products	19.5%
Feeds (fish and/or farm)	39.1%
Bioplastics	11.9%
Chemicals	15.2%
Nutritional products or nutraceuticals	35.8%
Fuels	33.6%
Fertilizers	18.4%
Biomass for energy or other uses	35.8%
Non-food specialty oils (cosmetics, lubricants, etc.)	15.2%
Other	21.7%

When asked to rank a list of **existing** policies according to how important they were to building a robust algae industry the averaged responses placed “research and development grants” in the #1 spot, the same category that was ranked number one in 2013.

1. Research & development grants
2. Tax credits & incentives
3. Renewable fuel standard
4. Loan guarantees
5. Regulatory approval for food, nutritional or feed products
6. DOD opportunities
7. Climate change policy
8. Regulatory approvals for siting algae cultivation or processing facilities

An interesting picture of the industry’s trajectory comes to light when considering how respondents ranked a list of **prospective** policies according to their potential impact on growth. The most important federal policies not in effect today were ranked as:

1. Regulatory approvals for algae-derived products
2. Regulatory approvals for siting facilities
3. Climate legislation
4. Technology neutral Renewable Fuel Standard
5. Multi-year extension of the biofuel tax credit
6. Green banks
7. Master Limited Partnerships

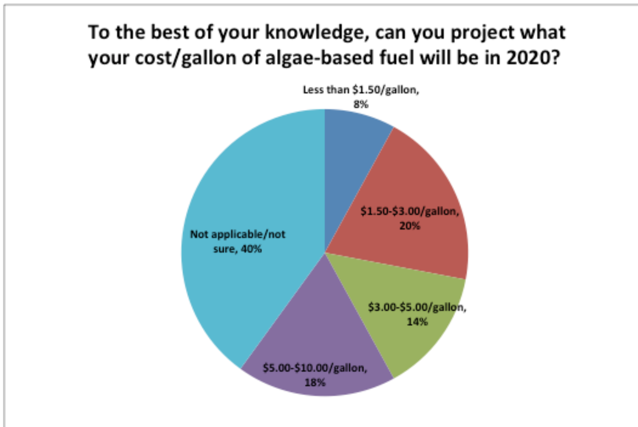
The survey also asked if respondents felt that state or federal support programs had accelerated the growth of their company or organization, with 29% saying yes.

PRODUCTION

A separate set of questions was asked of producers of algae biomass or algae-derived products. A full 43% of producers reported that elected officials had visited their facilities, a number that held steady from 2013 (44%).

Producers reported a positive view on the prospects for and expansion of production capacity in 2014. Twenty nine percent reported they would be expanding at an existing facility, 29% said they would expand with new facilities, and 13% reported expansion and both new and existing facilities.

For the third year in a row we asked producers about their opinion on the price of algae-based fuel in 2020. This year the number of producers that projected prices below $5.00/gallon by 2020 increased by five percentage points, to 42%. While only 18% predicted prices in the $10-$15 range, a significant number (40%) indicated they "weren't sure."



Finally, producers were asked what they felt the biggest challenge was to making cost-competitive algae-based fuels. The most-favored response by far was "Cost-efficient production systems," selected by 40%, followed by "harvesting and extraction systems," selected by 16% of producers. These two challenges were also ranked in the same top spots in our 2013 survey.

JOBS

Those working at an organization that directly employed people in algae-related work received a separate set of questions. As they predicted in 2013, the survey's employer respondents predicted job growth throughout this year. They also indicated larger (but more uncertain) projections for 2020.

To the best of your knowledge, approximately how many people in your organization or company (or division) are directly working (or will be working) on algae-related business at the following times?

	Beginning 2013	End of 2013	End of 2020
1-10	58%	49%	19%
11-50	24%	33%	29%
51-100	4%	3%	15%
101-500	4%	5%	12%
500+	0.7%	0.7%	3%
Not sure	9%	9%	20%

Employers were strongly in favor of better federal policy support for the algae industry. More than 86% of the producers in the ABO Industry Survey said that better policy would be likely to lead them to accelerate hiring. More than half were “very” or “extremely” confident they could accelerate hiring with better federal policy support.