

THE LAW OF ALGAE
—Algae Biofuels Intellectual Property Issues—

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I. The Race Is On. The production of fuel from algae utilizes a variety of technologies, few of which have been widely adopted commercially for algae biofuels production. Various approaches to ponds and contained growth systems, photosynthesis and dark fermentation, genetic modification of algae, optimization methodologies related to light, water, carbon dioxide, harvesting, and techniques to remove water and extract oil for algae fuels are in the process of being developed and perfected. For each approach, different mechanisms, methodologies, and processes are being developed and promoted. Some of the available technologies and products have been used only in pilot projects while others are in the process of commercialization. In addition, some strains or combinations of strains of algae are “proprietary” and subject to licensing requirements.

In effect, there is a race to the marketplace. Numerous inventors and companies are pursuing technologies to economically develop algae fuels. The potential environmental benefits and high productivity of algae biofuels, compared to crop-based biofuels, have helped to attract major investments from angel investors, venture capital firms, and major oil companies.

Each developer of a specific technology or product for the commercialization of algae fuels wants its technology to be successful and to be widely adopted. And if the technology or product is successful, the developer will want to extract a profit from others’ use of the technology, or in some cases to block others from using the technology. This is where intellectual property (“IP”) laws apply. If others can freely copy the developer’s invention or successful product, the developer may reap little benefit from its innovation. IP laws can be used to prevent this from happening, and some of the most valuable assets of algae fuel companies are likely to be these IP rights.

II. Legal Rights. IP rights include patents, trade secrets, copyrights, and trademarks. In the development of algae-based fuels, the two most important legal rights for most companies will be patents and trade secrets. Companies will need to take the proper steps to secure their ownership of the IP rights in the technologies they develop.

Algae fuel companies will in some cases acquire or use technology protected by the IP rights of others. An algae fuel company that plans to utilize or acquire technology subject to third-party IP rights will want to conduct a thorough review of the rights claimed to be held by the third party. The risk is that the third party may not hold all of the rights it purports to convey. These issues should be considered prior to entering into any licensing agreement, as described in [Chapter 4](#).

An algae fuel company seeking to develop technology will want to consider patent applications and records at the U.S. Patent and Trademark Office prior to investing a significant amount of money in research and development. If similar technology already exists, it may be more cost effective to enter into a licensing arrangement. Additionally, an understanding of what technology has already been developed or patented can be used as a tool to identify patent opportunities.

III. Patents. During the last few years, there has been an increase in patent applications at the U.S. Patent and Trademark Office for patents related to algae-based fuels. Recent patent applications cover a range of technologies, including photobioreactor systems, harvesting systems, refining processes, and methods for producing ethanol from algae. A U.S. patent gives the patent owner the right to exclude others from making, using, selling, or importing products in the United States that would infringe the patent for a set term. For patent applications filed today, the term begins on issuance of the patent and ends 20 years from the date the patent application was first filed. The patent owner’s right to exclude others from using the invention applies even if a second comer independently developed the same invention. In other words, ignorance of the patent is no defense. To be patentable, an invention must be new, useful, and nonobvious in view of the prior art. It may be a

machine, an article of manufacture, a process, or a composition of matter. Mathematical formulas and laws of nature, such as photosynthesis, are not patentable.

Patent applications are made in writing and in the name of the inventors, signed by the inventors, and filed with the U.S. Patent and Trademark Office. (The owner's rights under a U.S. patent apply only in the United States, but similar patent protection can be obtained in all industrialized nations if their filing and timing requirements are met.) The application must include a specification that describes how the invention is made and used, and the best mode of realizing the invention. The application must also include claims, which describe in particular terms the unique aspects of the invention for which legal protection is sought. The claims and specification are generally published 18 months after the first filing date. (However, in the United States, an applicant can avoid publication if it agrees not to file the application anywhere outside the United States and requests "nonpublication" when the application is filed.) Even if "nonpublication" is requested, the specification, including the final claims, will be published in the issued patent. It usually takes approximately 18 to 36 months, or longer, from filing the patent application to issuance of the patent. Patent law is technical, and to maximize the scope and the value of a patent, patent counsel should normally be retained for advice regarding patent strategy and to write and prosecute patent applications.

A patent owner can sue a patent infringer for damages, and in some circumstances a prevailing owner can also obtain a court order that will prevent the infringer from any further use of the invention. The patent owner can therefore prevent competitors from using the patented invention, or the patent owner may decide to license the patent to others in exchange for royalty payments.

Patent protection is potentially very powerful, but protection can be lost if the filing and timing requirements are not met. Inventors and companies involved in developing technology for production of algae fuels must be aware of these requirements. They should consult with patent counsel early on—especially before any public use or disclosure of the invention. Compliance procedures should be implemented at the start of any technology development project.

A. One-Year Bar. One of the more problematic requirements in patent law is the so-called "one-year bar." If the invention is described in a printed publication anywhere in the world, or if it is put on sale or used publicly (nonexperimental, or not subject to a nondisclosure agreement) in the United States more than one year before the U.S. patent application is filed, all patent rights are lost. Any publication, such as in an academic journal, Web site, or trade magazine, starts the one-year grace period. So does demonstrating or using the invention at a trade show, or selling the invention or offering it for sale. Once any of these events take place, the one-year clock is ticking and patent counsel should be immediately consulted about starting the application process.

The timing requirements are even stricter if foreign patent protection is to be obtained. In most foreign countries, any publication or public disclosure of the invention anywhere in the world, before filing of the patent application, will cause loss of patent rights in that country. So if foreign patent protection is required, strict nondisclosure and nonpublic use procedures must be followed until the U.S. patent application is filed. In most industrialized countries, counterpart patent applications can claim the benefit of an earlier filing date of a U.S. patent application as the effective filing date for the foreign application, provided the foreign application is filed within one year of the U.S. filing date.

In most of the world, priority between multiple independent inventors of the same invention is based on the filing dates of their respective patent applications. The first to file wins. The U.S. patent system, however, uses a

“first-to-invent” system rather than a “first-to-file” system. In the United States, subject to certain timing requirements, the inventor who first conceived of the invention and reduced the invention to practice with reasonable diligence has priority, even if someone else filed a patent application first.

B. Record Keeping. In order to have evidence to back up a claim of having invented something at an earlier date, inventors must keep good records. The uncorroborated testimony of the inventor may not be enough to establish priority of invention, particularly if the inventor has a pecuniary interest in the outcome. Written records, such as an engineer’s lab notebook, should be kept and should show all activities related to the invention. Entries should be periodically signed and dated by a witness (*e.g.*, weekly or monthly). Ideally, the witness should have some knowledge of the subject matter, and may be an employee of the same company.

C. Ownership of the Patent. Companies with employees researching or developing new technologies or products should take steps to ensure the company’s ownership of patentable inventions made by the employees. Under U.S. law in most states, the employer owns the rights to inventions that are made by employees within the scope of their employment. When the employee owns the invention, in some cases the employer may have a nonexclusive “shop right” to use the invention, without compensation to the employee. This can occur when the invention was developed on the employer’s time or using the employer’s materials, facilities, or equipment, even though it was outside the employee’s regular duties. That is not usually a satisfactory outcome, since the company will not have full ownership of the invention.

To avoid uncertainty, a better solution is to address this issue with an invention agreement. The employer should require all new employees, as a condition to being hired, to sign an agreement assigning to the employer all inventions made by the employee during the course of employment. This type of agreement is extremely common in all industries that rely on technology development.

Some states have laws limiting the allowed scope of such agreements and requiring special notices to the employees, so state law should be checked. The invention agreement should also cover the employee’s confidentiality obligations and protection of the employer’s trade secrets. In addition, a similar type of agreement should be used for all independent contractors doing technology development work, to ensure that the company paying for the contractor’s work will own the patent for any invention developed by the contractor.

IV. Trade Secrets. Trade secrets are important in the development of algae-based fuels, whether or not patent protection is available. Unlike patents, trade secrets do not expire and can be continued indefinitely, so long as the information remains confidential. But trade secrets do not prevent third parties from independently developing and using the same information.

A trade secret is any information, including a formula, method, program, device, process, or technique, that has economic value because it is not generally known and is not readily ascertainable by proper means, provided the owner takes reasonable measures to maintain its secrecy. For example, the mechanism or the composition of a product that can be reverse engineered is not a strong candidate for trade secret protection. On the other hand, the mechanism or composition of a product that is a secret and that cannot be determined by studying the finished product would be a good candidate for trade secret protection. Likewise, the source code for a computer program that is kept secret because the software is only distributed in object code form would be a good candidate for trade secret protection. And even if a product is not protected by patent law and is subject to being reverse engineered once it is on sale, trade secrecy during the development process will protect the company’s head-start advantage of being the first to market with that particular product.

A. Protective Procedures. The following are suggested steps a company can take to help protect its trade secrets:

- Have all employees sign written confidentiality agreements as a condition of employment.
- Label all written documents, drawings, etc. that are considered confidential with a “confidential and proprietary” legend.
- Use physical and electronic security to restrict access to sensitive information to those having a need to know.
- Include the company’s confidentiality policies in employee manuals.
- Require all third parties who may have access to the company’s confidential information, such as vendors, consultants, and potential customers, to sign written nondisclosure agreements.
- When an employee leaves, appropriate steps should be taken, such as an exit interview, to collect company materials and to confirm the employee’s obligations as to trade secrets.

V. Copyrights. Copyrights protect the expression of an author’s ideas. They apply to materials such as articles, white papers, manuals, brochures, and computer software. Copyright protection is automatically available when a work is created, and no copyright notice or filing is required. However, using a copyright notice and registering the copyright with the U.S. Copyright Office will provide additional remedies if enforcement becomes necessary. A notice at the beginning of the work, such as “© 2009 by John Smith, Inc.,” will suffice.

A. Problems with Independent Contractors. One potential trouble area is ownership of copyrights. Generally, copyrightable work developed by employees in the course of employment will be owned by the employer, but copyrightable work developed by an independent contractor will be owned by the contractor unless the parties agree otherwise. If the contractor owns the work, the company that hired the contractor will have a license to use the work, but the scope of the license may not be clear. It may seem counterintuitive that the contractor will own the copyright when the company is paying the contractor to create the work, but that is the result under the copyright law unless the parties agree otherwise.

The bottom line: The company should have a written agreement with all independent contractors, clearly stating that the company will own the copyrights in all works created under the contract. There should also be an employee invention agreement as described above to cover the employer’s ownership of the copyright in all work created by employees.

VI. Trademarks. A trademark is an identifying word, picture, or symbol that a seller of goods uses to identify and distinguish its product from the products of other sellers. (Service marks protect services much as trademarks protect products.) Trademarks protect the seller’s commercial interest by tying its products to the true source of the goods, the seller.

Trademarks are protected both by the common law of the states and by federal statutory law. Federal protection is generated by using a mark and filing a trademark registration application with the U.S. Patent and Trademark

Office, assuming the application is approved. However, trademark protection can also be derived from the common law, simply by using a trademark in commerce. A federal registration gives broader and stronger protection and is highly recommended.

If two sellers are attempting to use the same or a similar trademark for the same or similar goods, generally the first user will have priority. If there is a likelihood of confusion between the two marks, the first user will be able to prevent the second comer from using the trademark for those goods.

A. Conduct a Search. A trademark search should always be conducted before commencing use of a trademark. This will avoid building up good will in a trademark and then having to change trademarks because of a prior user. There are companies that will conduct a trademark search for a few hundred dollars, and complete search results can be obtained in a few days. Interpreting the search results is a matter of legal analysis and is best conducted by trademark counsel.

A “TM” symbol should be used adjacent to any mark used in commerce, to give notice of the company’s intent to use the name or symbol as a trademark. However, it is illegal to use the registration notice (®) unless and until a trademark is actually registered in the Patent and Trademark Office.