

THE LAW OF ALGAE
Setting Up Shop:
—Design, Engineering, and Construction
of Algae Biofuels Projects—

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The role of algae in the renewable fuels space is principally as a feedstock brought in at the front end of a biofuels generation process. Algae offers some options that other biofuels production processes cannot easily match. At a corn-based ethanol plant, for example, the feedstock is typically grown off-site and brought into the plant for pretreatment (crushing in a hammer mill). Algae can be grown and pretreated off-site by a third party to remove water and extract oil (the “extraction process”), but it can also be grown, pretreated, and used to produce biofuel at a single processing facility. If this complete end-to-end process is implemented, the plant will have three distinct parts to support the following distinct processes: (1) the algae or microalgae growth and harvesting process, (2) the extraction process, and (3) the biofuels production process in which the algae oil is converted to biofuel. The developer may elect to build all three parts of the plant using a single contractor, or may elect to enter into multiple construction agreements for different parts of the plant. The developer’s decision will depend on the availability of appropriate contractors in the marketplace. The information set forth in this chapter should apply no matter what decision the developer makes.

This chapter provides an overview of the contractual structures that apply to the construction of an algae biofuels production facility, including design and engineering, procurement, construction, and related technology licensing agreements, as well as the construction of ancillary facilities that may need to be integrated either upstream or downstream with the principal conversion facility. This overview is written from the perspective of an algae biofuels project developer; however, the information set forth below should interest design and engineering, construction, and procurement contractors as well. As with any complex negotiated transaction, there is a large amount of value to be gained or lost by all parties, and often the potential exists for using creative legal strategies to increase value for those on both sides of the table.

I. Construction-Related Agreements. Certain agreements are critical to the construction and development of an algae biofuels project, including agreements on the following issues:

- design and engineering;
- procurement of necessary equipment (tanks, bioreactors, pumps, piping, and related components) and materials to construct “balance-of-plant” facilities, oil storage tanks, foundations, roads, and maintenance facilities;
- performance guarantees, warranty, and insurance arrangements set forth in the agreements; and
- operation and maintenance of the completed facility.

Engineering, procurement, and construction tasks are frequently combined in a single agreement referred to as an “EPC agreement.” The EPC agreement may provide for, or anticipate the provision of, other services such as warranty services or operations and maintenance services for the completed facility. Sometimes all the design and engineering, procurement, and construction services are addressed in a single agreement (a “full-wrap agreement”), and a single general contractor is responsible for the whole project. However, it is more common to have separate agreements for different areas of the work, with a specialty firm engaged to provide proprietary process equipment and another contractor engaged for the balance-of-plant construction work. Warranties, insurance, and other matters may also be addressed in a single agreement or individual agreements, depending on contractual structure.

II. Preliminary Design and Engineering Services. Algae biofuels projects require design and engineering expertise that is unique to this sector of the renewable energy industry. Relatively few firms design, engineer, and manufacture specialty process equipment for algae biofuels projects because this process technology is in the early stages of development. The designer must understand the complexities and interrelations of the algae production and harvesting process, the oil extraction process, and the biodiesel refining process that uses the algae oil. In balancing these and other factors, the designer will determine the type of process technology the project will use as well as the power source that will be needed. Thoughtful design becomes even more critical if the project site contains existing facilities that are to be incorporated into the new production plant, or if the developer's plans include a co-generation system, *i.e.*, the recovery of useful energy from the biofuels processes (such as the generation of electricity from waste heat).

III. EPC Contractual Structure. Given the multiple factors influencing the development of an algae biofuels project, no single contractual structure will apply to all projects. An algae biofuels facility that grows the algae and produces the biodiesel at the same site will have many construction issues to address. A project developer may want to retain one contractor to provide proprietary process equipment and a second contractor to undertake the design and engineering of the balance of plant. The balance-of-plant contractor will be responsible for the commissioning, start-up, and performance testing of the entire facility and will provide warranty services. In this arrangement, the work of the two contractors will need to be closely coordinated both in space and in time. The balance-of-plant contractor will need information about the specialty contractor's process equipment to design, construct, and lay out the entire plant in a way that economically connects the various parts to power, controls and data systems, and other facilities. The balance-of-plant contractor will also need a delivery schedule for the process equipment to formulate a schedule for preparing foundations and erecting process equipment.

The project developer and the specialty contractor often enter into a supply agreement where the contractor agrees to engineer, procure, and construct process equipment components and deliver them to the site on a definite schedule and to provide expert assistance in commissioning and testing that equipment after it is erected and connected to the balance-of-plant facilities. The specialty contractor also provides a performance guarantee measured in terms of inputs (including energy usage) and outputs.

The project developer then enters into a balance-of-plant agreement with a general contractor who agrees to design and construct the other necessary facilities for the project, including foundations, roads, storage facilities, biodiesel storage and loading facilities, and electrical and control systems for the entire algae biofuels facility. Both sets of agreements will attempt to avoid interference, duplication, or omission between the scopes of work of the specialty contractor and the balance-of-plant contractor and to ensure that, collectively, the agreements will result in a fully constructed, integrated, and operational project.

In drafting contracts for process equipment and the balance-of-plant construction, the developer must focus on the scope of work, measures of completion, respective warranty obligations, limitations of liability, and related insurance issues. These issues are discussed below.

IV. Scope of Work. The parties should place great emphasis on the description of the scope of work set forth in the agreements. Generally, whatever is not included in the contractors' scopes of work remains the project developer's responsibility. The scopes of work should describe, in detail, the design, engineering, and construction obligations of the contractors, and any obligations relating to the commissioning, start-up, and performance testing of the algae biofuels facility. The contractors' scopes of work typically include the control systems and related warranty work. As with other aspects of such an agreement, the scope-of-work provisions will probably be heavily negotiated.

V. Completion and Start-Up Obligations. Details of how, when, and by whom the plant is to be commissioned are usually set forth in the scope-of-work provisions of the relevant agreements. Because of the specialty contractor's in-depth knowledge of the work and role in plant design, that contractor is typically responsible for commissioning the equipment that it supplies. However, this work may be undertaken by the project developer (with assistance from the specialty contractor) or by the balance-of-plant contractor. Attention must be given in the agreements to defining the stages of completion, such as the actual delivery of equipment to the project site, the installation of the equipment, and the commissioning, start-up, and performance testing of the plant. Once these progress milestones are established, completion is generally shown by the contractor's certifications of, for example, interim completion, substantial mechanical completion, final mechanical completion, and final sign-off. Each such certification is considered an incremental measure that the project must satisfy to progress to the next measure. As with other supply- and construction-related agreements, progress payments by the project developer to the contractors (as set forth in the relevant agreements) are normally based, in part, on the milestones described above.

VI. Performance Guarantees and Warranty Obligations. Performance guarantees and warranty-related obligations are likely to be an issue of substantial negotiation between parties to these types of agreements. The nature and scope of a contractor's obligations will, however, depend on what services, materials, and equipment the contractor is contracted to provide. A contractor's obligations generally include such things as a general parts warranty (the definition of a defect can be important when determining what is included or excluded as a defective or nonconforming part or component), utilities consumption rate and output guarantees, and related matters.

The issues that contracting parties consider with respect to warranties include (1) the period or term of a particular warranty and whether the term can be extended, (2) the definition of a defect, (3) limitations on a warranty due to third-party services (such as operation and maintenance services), and (4) the remedial measures a contractor may take to cure any defect. Additionally, a project developer may want third-party contractor or subcontractor warranties applicable to parts or components used in the plant to be "passed through" to the project developer.

VII. Limitation of Liability. As with other construction and procurement agreements, contractors will seek to limit their liability to the project developer and request a waiver of consequential, indirect, incidental, and special damages. Those clauses must be negotiated carefully to ensure that excluded categories of damages are clearly defined (they may not be clearly established in the law). A contractor will usually seek to have its liability for damages limited to a stated percentage of the value of the relevant agreement. The parties may carve out particular issues and may specify the contractor's maximum aggregate liability.

VIII. Project Financing. The high capital costs of an algae biofuels project mean that the project likely will require some form of substantial debt financing or joint venture financing to support the design, engineering, procurement, construction, and initial operations. Before committing funds to a project, financial institutions and potential investors may demand to review and comment on a project's design and engineering, procurement, process engineering, licenses, construction agreements, operations and maintenance agreements, and warranties. For example, lenders and investors want to be able to enter into the project if the project developer (as the borrower) defaults and will be interested in provisions specifying the extent and nature of available damages in the event of a contractor's subpar performance.

Because of the involvement of investors and lenders and to avoid issues arising from any potential inconsistencies, the project developer should be prepared to present a consistent and complete set of project agreements to lenders and investors and should be prepared for the possibility that lenders and investors may demand substantial changes in the negotiated documents.

IX. Performance and Payment Guarantee Issues. A project developer may want its contractors to ensure, for the project developer's benefit, (1) procurement of performance and payment guarantees or bonds to ensure timely performance of contractors under the relevant agreements and (2) that no liens or undesired security interests are lodged against the project in relation to unpaid subcontractors. These guarantees and bonds are described below.

A. Performance Guarantee or Bond. A performance guarantee or bond is usually issued by a parent company or another creditworthy entity, such as a bonding company, selected or approved by the project developer. Under the guarantee or bond, an agreed-on sum is available to satisfy the project developer's damages arising out of the contractor's failure to perform as specified in the relevant agreement. The bonding company charges a fee and retains the right to seek reimbursement from the contractor or contractor's guarantor. If the contractor defaults or cannot complete the project, the project developer may call on the guarantor or bonding company to perform the contractor's obligation (for example, by paying another contractor to complete the project). The project developer will want to reserve all rights against the defaulting contractor if the performance guarantee or bond does not fully cover the project developer's costs of completing the project or costs associated with any damages for which the project developer has to pay to a third party.

B. Payment Guarantee or Bond. A payment guarantee or bond provides assurance that upon the contractor's default, employees and subcontractors will be paid for work performed so no liens or other security interests will attach to the project developer's property or to the project. A lien claim, normally filed against the project developer's property, may be bonded over so the lien attaches to the bond rather than to the property. Lenders, upon their review of the agreements, may demand or require such payment guarantees or bonds to enhance the lenders' security interests in the project, particularly if the commencement of work (which may give rise to lien rights) predates the lenders' recorded interests in the property.

The project developer or the lenders may require other security from contractors such as standby letters of credit and insurance listing the developer and lenders as additional insureds. The contractors will demand ample opportunity to cure any default or delay and will seek to limit the project developer's ability to call on performance or payment bonds or other security that may be given. Further, contractors will usually demand some form of reciprocal security issued by the project developer or its parent company, such as a parent guarantee, particularly if the project developer's only substantial asset is the project itself.

X. Liens and Releases Issues. When the project developer makes periodic payments to contractors, the developer should obtain a lien release from each contractor and major subcontractor. A lien release will help protect the project developer from liens being filed on the project by subcontractors who have not been paid. Liens are undesirable because (among other reasons) once filed, they can delay or interfere with the project's financing or sale. Worse still, if a lien claimant is successful, a lien could be used to force a foreclosure sale of the project property.

XI. Insurance and Indemnity Issues. A project developer should obtain appropriate indemnities against and insurance coverage from the various parties with whom it contracts and should require those parties to obtain similar protections from their subcontractors and material suppliers for the benefit of the project developer.

Relevant indemnities include indemnities against personal injury, death, and property damage claims; contractor and subcontractor lien indemnities; an indemnity for taxes (other than those attributable to the developer); an indemnity for violation of applicable laws; and an indemnity for intellectual property infringement claims. Appropriate insurance policies include commercial general liability, workers' compensation and employer's liability, automobile, errors and omissions (for design and engineering services), and builder's all-risk (for the project). Policies should name the developer and its financing party (if any) as additional insureds and contain appropriate waivers of subrogation. Appropriate policy limits will vary with respect to the nature of the work being performed by the insured and the scope of the project. It is advisable for project developers to consult with an insurance or a risk management specialist to ensure that appropriate types and levels of coverage are obtained.