



Small Scale Algae Biofuel Overview



Presented By

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Executive Overview.

This Overview is to cover:

- Building a roof top raceway open pond for the production of algae biofuels
- Algae Bio reactors considered separately
- Algae incubators construction and fabrication prior to cultivation.
- Algae harvesting equipment
- Oil extraction equipment
- Biodiesel processing equipment
- Textbooks, instruction manuals, teaching PowerPoints, video
- Algae biofuels consulting and trouble shooting

The price range for this undertaking is

Minimum: \$18,750 USD

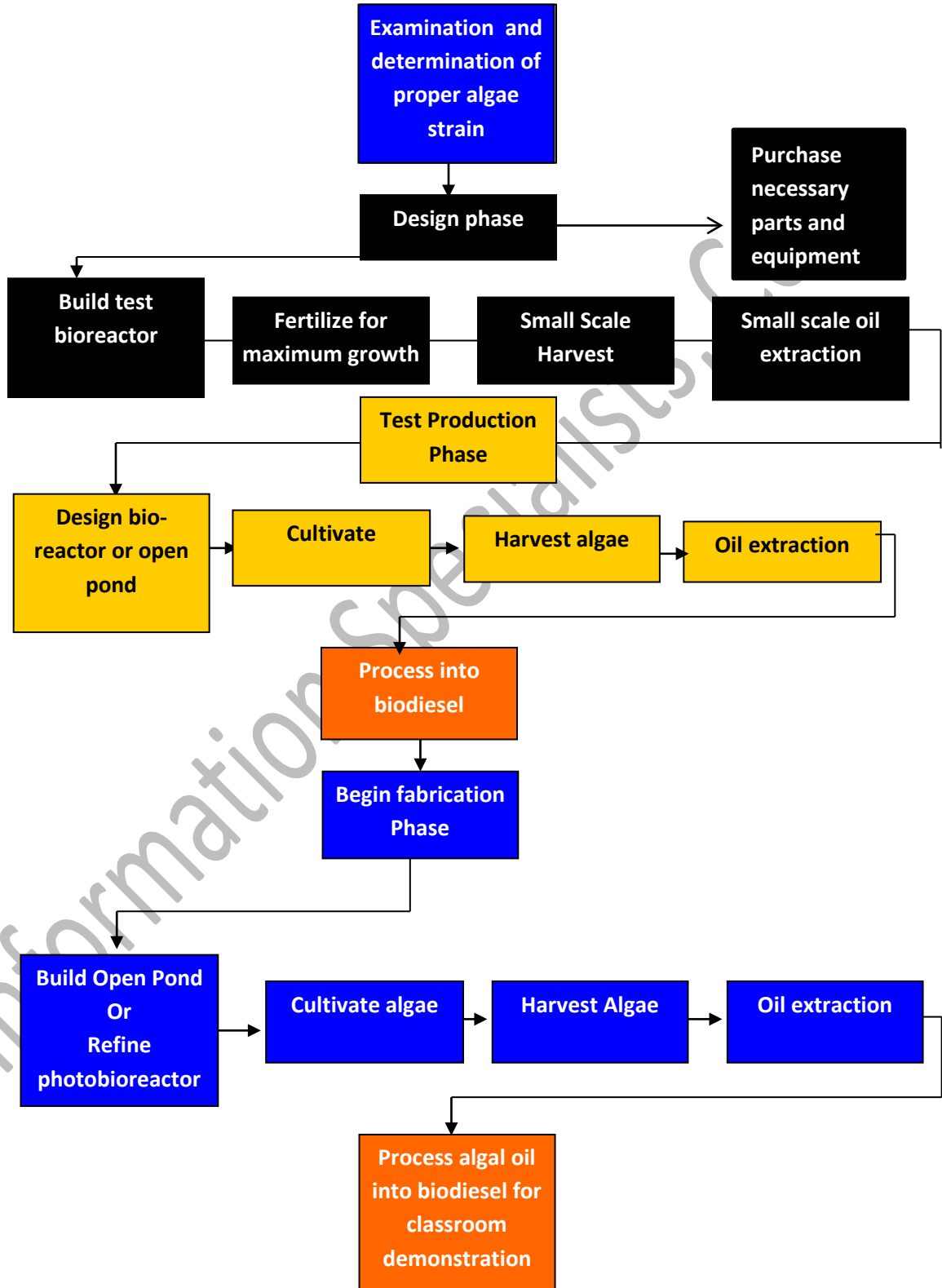
Maximum: \$29, 975

Realistic: \$25, 024

Retainer is 50% of agreed price, due when contract is signed and delivered.

Remainder is due when job is completed and all parties satisfied.

Fabrication/Consulting Process Overview



Cost Estimation and Process Overview

Basic Construction Costs: Please see “Appendix “F” for pricing.

- Price: \$5,000 -\$20,000 USD
- Time expected: one week (5-7 days)

Algae incubation bioreactors: (See appendix “A”)

- Made from locally obtained materials. \$999
- 15 gallon prefabricated bioreactor. \$2,500

Algae Harvesting Equipment (See appendix “B”)

- Low cost, low yield separator \$300 + shipping
- Professional model \$1,499 + shipping
- Heavy duty separator \$1,999 + shipping

Algae drying units: (See appendix “C”)

- Low cost option: (screens)
- Middle: food dehydrator \$249 + shipping
- High: good food dehydrator \$499 + Shipping

Algae Oil Extraction (See appendix “D”)

- Screw press \$199 + shipping
- Hydraulic crusher: \$500 + shipping

Biodiesel processing units (See appendix “E”)

- Teacher biodiesel processing Kit: \$75
- Extra student kits: \$40

Consulting (see appendix “G”)

\$100/per hour and/or \$800/per day + per diem + airfare

Minimum: 3 people: One day \$6,300 + airfare (approx. \$3,000)

Engagement Process:

Once you agree to the initial estimate and choose the various options you prefer we will begin tentatively scheduling your project.

- Our current scheduling time frame for jobs in 4-6 weeks in advance.
- We will send you a contract spelling out and detailing all job actions undertaken by us, as well as your rights and responsibilities.
- Once contract is signed, retainer is due and we'll send you an invoice with all bank wire information.
- Once retainer is received, project is green lighted and construction scheduled is positively booked.
- An in person meeting is scheduled, and in consultation with client as to best days available to their schedule, airline/hotel arrangements will be made.
- At first meeting final details decided, questions answered. Final decisions made to go ahead.
- Construction/fabrication/installation begins.

Appendix "A" Algae incubators

Option A: Made from locally obtained materials. \$999

The purpose of an algae incubator is three-fold:

- To have a ready supply of algae on hand so you aren't buying algae cultures continually.
- To have enough culture to be able to constantly "feed" your pond. This reduces the chances of contamination as well as maintains the integrity of the pond itself to the desired algae strain.
- Can also be used as a test bioreactor to test different strains and/or nutrients to maximize growth and production.

This is a "homemade" algae bioreactor with harvesting base made from easily obtained parts. It's not pretty or sexy. It simply gets the job done.



Advantages:

- Inexpensive
- Easy to clean and maintain
- Can easily be built by amateurs.
- Customization easier:
 - Can install doors and insulation easily and cheaply to have an enclosed out of the way unit.
- Easy to fix if needed. Because it is "home built" from off-the-shelf parts, if something breaks or needs to be replaced, no costly replacement parts or specialists needed.

Disadvantages:

- It isn't "pretty" and won't impress any visiting dignitaries.
- Lacks professional quality parts.

Option B: Professional grade incubator fabricated on location. \$2500 + shipping

This is a professional grade bioreactor which will include



- Tank and stand
- Submersible pumps
- Interior installed lighting
- Automatic timed lighting
 - No need to worry about light.
- Internal water temperature control
 - No need to worry about water temp.
- Harvesting included.
 - No separate harvesting unit necessary.
- All Fittings, valves, and hoses.
- Power source in one location

Advantages:

- Professional quality parts and equipment.
- Designed to last longer and work better.
- Can be fabricated on location

Disadvantages:

- Not easily cleaned.

Appendix "B" Algae Harvesting

Option A –algae separator \$300 + shipping

Purpose: When microalgae is taken from the pond the water has to be separated from the algae in order to continue processing the algae into oil. There are many different ways to accomplish this. The easiest, least expensive method is to use an off-the-shelf separator.

Advantages:

- Easy to use
- Durable

Disadvantages:

- Will only separate small amounts at a time.



Option B –Professional separator \$1,600 + shipping



Option C- Heavy duty package \$1,995 + shipping

This is a professional quality centrifuge designed for separating oil from solids and/or liquids.

Advantages:

- Heavy duty, rugged and durable
- Will last for years
- Easy to use
- Easy to clean
- No pumps or high pressure

Disadvantages:

- None

Appendix "C" Algae Drying Units

Purpose: Once the alga leaves the separator it still needs to be dried before processing into oil.

Option A- Free or nearly so.

Algae can be dried by solar energy simply by laying them out on screens in the sun. Ordinary window screens can be used.



Option B: Dehydrators \$249 + shipping



Advantages

- Easy to use
- Easy to clean
- Convenience

Disadvantages

- Uses a lot of electricity

Option C- \$500 +shipping

Advantages:

- Professional quality
- Long lasting
- Quick drying

Disadvantages:

- Electricity usage



Appendix "D" Oil Extraction Units

Purpose: Once algae has been separated and dried, oil can be extracted. Again, there are a number of ways to extract oil. Two of the most common used in small scale extraction is called "Mechanical Rupture." These methods employ pressure to rupture the algae cells and release the oil.

Option A- Screw Press \$199 + shipping

Advantages:

- Low cost
- Easy to use

Disadvantages:

- Requires manual labor
- Good for small amounts only.



Option B: 20 ton air/hydraulic press \$400 + shipping

Advantages:

- Air /hydraulics do the work for you.

Disadvantages

- Good for small scale only.



Appendix "E" Biodiesel Processing Units

Purpose: Biodiesel processing comes in many shapes and sizes. From small one person classroom kits, to processors which can be used to create enough biodiesel to generate electricity for the entire university. This estimate assumes small scale classroom processing. This set would be an excellent choice for a teacher demonstrating the basic aspects of biodiesel processing.

Option A- small scale classroom biodiesel kits. \$75 + shipping

Includes:

Deluxe Biodiesel Starter Kit Contents

- 350 mL New Vegetable Oil In A Sealed 16 oz Bottle
- 70 mL Methanol In A Sealed 4 oz Bottle
- 2 Dust Masks
- 1 Pair Of Safety Glasses
- 1 Mini Thermometer
- 1 Pair Of Heavy Duty Safety Gloves
- PLUS 15 mL Phenolphthalein Titration Indicator
- PLUS 4 oz Sealed Bottle Of Isopropyl Alcohol
- PLUS 1 400 Micron 5 Gallon Oil Strainer
- PLUS 1 150 Gram Digital Scale
- PLUS 2 250 mL Plastic Mixing Beakers
- PLUS 3 100 mL Plastic Titrating Beakers
- PLUS 3 10 mL Titrating Syringes
- PLUS 1 Small Liquid Funnel
- PLUS Full Set Of Instructions & Titration Instructions



Extra student kits available for \$40 each + shipping

Appendix "F" Raceway Open Pond Design and Fabrication

Option 1: Custom designed raceway PLANS Price: \$5000

Advantages:

- Lower cost option
- Includes installation telephone/email customer support
- Detailed instructions included.

Disadvantages:

- School assumes responsibility for hiring contractor
- School assumes responsibility for proper installation of raceway pond and machinery.
- Permit fees and local contractor fees not included.
- Information Specialists, Corp not responsible for incorrect installation or problems arising from incorrect installation of raceway pond or machinery..

Option 2: Prefab kit Price-\$10,000

Advantages:

- Custom designed to your needs and budget
- Fabricated at our facility in California. Shipped to your school. (shipping not included)
- Price includes: 1 week on-site installation manager to insure our high standards are met to our specifications

Disadvantages:

- Must be installed by local professional licensed contractor of your choosing.
- Permits and local contractor fee not included. (we can however get 3 professional estimates for you to choose from if needed)
- School takes responsibility for correct installation of raceway pond and machinery.

Option 3: Custom design and on site construction Price: \$20,000

Advantages

- Custom designed to your school
- "One stop" solution
- Hiring of local contractors
- Insures proper fabrication and installation
- Local permits included
- Price includes: 1 week on-site installation manager to insure our high standards are met to our specifications.

Disadvantages:

- None

Appendix "G" Project consulting fees

Project Consulting

- \$100/hr. for on-site consultation and/or \$800/day per eight hour day. Hourly rate goes into effect after 8 hours of a continuous day. (overtime)
- Per diem of \$250/day in USA
- Travel days billed at 50% of daily rate and/or days off (holiday/weekends) while on assignment.
- Travel (air fare) billed at actual rate.

Minimum necessary: One day for on-site inspection

- One day consulting 3 @ \$800/per day = \$2,400
- + 2 days travel: 3@ \$800 = \$2,400
- + Two days per diem: 3@ \$500 = \$1,500
- + Business class air fare (3)
- Total: \$6,300 + air fare (approx.: \$3000)

Initial 1 day consultation will consist of 3 people. One construction specialist to inspect building prior to construction, Chief Technology Officer to for design conceptualization, Chief Consulting Officer for strain identification and creating algae production values.

On site Consultation after initial consultation is at your discretion at the above rates for single person.

Textbooks, teaching materials, videotaping, etc.

- \$1000 for textbook creation.
- \$500 editing textbook with teacher input and customization
- \$250 for each custom designed PowerPoint presentation
- \$1,000 for videotaping, splicing, editing, formatting for computer/school use.

I, the undersigned, agree with this estimate and choose the following options:

Basic Construction Costs: (see appendix "F")

- Raceway pond plans (\$5,000) _____ (Initials)
- Prefabricated Kits (\$10,000) _____
- On-site construction and installation (\$20,000) _____

Algae incubation bioreactors: (See appendix "A")

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Biodiesel processing units (See appendix "E")

- Teacher biodiesel processing Kit: \$75 _____
- Extra student kits: \$40 _____

Number of kits: _____

Project consulting:

Number of day's _____

Total: _____

Signature/Date _____

Estimates are an approximation of charges to you, and they are based on the anticipated details of the work to be done. It is possible for unexpected complications to cause some deviation from the estimate. If additional parts or labor are required you will be contacted immediately. Unless specifically stated as a fixed price quote, any cost estimates that are or have been given by Information Specialists, Corp are estimates only. Actual time spent and Products supplied may be used as the basis for billing. Prices of equipment and material are subject to change.