

Algae: The Next Biofuel?

Recent Developments and The Financial Landscape

Renewable Energy Finance & Investment Summit

May 20, 2008

Scottsdale, Arizona

Andrew T. Braff, Attorney at Law


 **Wilson Sonsini Goodrich & Rosati**
PROFESSIONAL CORPORATION

- 1. Recent Developments**
- 2. Funding Trends**

Overview

1. | Recent Developments

Recent Developments – Inaugural Algae Biomass Summit



Wilson Sonsini Goodrich & Rosati
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Present:

Algae Biomass Summit
"Algae for Energy"

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Engineering for Optimum Performance

(XL) RENEWABLES

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national title services

November 14-16, 2007
San Francisco, California

- **First ever large-scale international gathering dedicated specifically to pursuing the commercialization of algae as an energy feedstock.**
 - Technologists
 - Scientists
 - Policymakers
 - Entrepreneurs
 - Investors
 - Service Providers
- **Over 350 attendees:**
 - United States
 - Canada
 - Israel
 - New Zealand
 - The Netherlands
 - Chile
 - United Kingdom
 - Philippines
 - Switzerland
 - Japan
 - Spain
 - France
 - Italy
 - Finland
 - Thailand
 - India
 - Germany
 - Australia

Recent Developments – ABS I Speakers

- Paul Dickerson, Office of Energy Efficiency and Renewable Energy, U.S. DOE
- **Dr. John Benemann, Co-Author, ASP Close-Out Report**
- Dr. Joseph C. Weissman, SeaAg Inc., and Aurora Biofuels
- **Dr. Philip T. Pienkos, NREL**
- Dr. Greg Mitchell, Scripps Institute of Oceanography, UCSD
- Dr. Qiang Hu, Arizona State University
- Mr. David Daggett, The Boeing Company
- Dr. Ami Ben-Amotz, Seambiotic and the National Institute of Oceanography (Israel)
- Dr. Amha Belay, Earthrise Nutritionals, LLC
- Dr. Ronald Pate, Sandia National Laboratories
- Dr. Tryg J. Lundquist, California Polytechnic University
- Dr. Ripudaman Malhotra, SRI International
- Mr. Michael H. Gilbert, Global Green Solutions
- Mr. Michael Weaver, Bionavitas, Inc.
- Josh Green, Mohr Davidow Ventures
- Dr. Douglas Kirkpatrick, DARPA
- Mr. Michael Massingill, Kent SeaTech Corp.
- Dr. Michael H. Huesemann, PNNL
- Messrs. Jim Sears and Mark Allen, A2BE Carbon Capture, LLC
- Dr. Mark Tegen, Inventure Chemical
- Mr. Martin Tobias, Imperium Renewables
- Dr. Mark Huntley, University of Hawaii
- Mr. Ron Reeves, Center for Excellence in Hazardous Materials Management
- Dr. Bryan Willson, Solix Biofuels
- Mr. Matthew Caspari, Aurora BioFuels, Inc.
- Mr. Kelly Ogilvie, Blue Marble Energy
- Mr. David Jones, LiveFuels, Inc.
- Dr. Christopher Guay, Community Fuels
- Mr. Ben Cloud, XL Renewables, Inc.
- Mr. Jeff Hassannia, Diversified Energy
- Mr. Matt Jones, Nth Power
- Ms. Robin Kodner, Bodega Algae, Inc.
- Ms. Jennifer Fonstad, Draper Fisher Jurvetson
- Mr. Sanjay Wagle, Vantage Point Venture Partners

Recent Developments – Algal Biomass Association (“ABO”)

- **Mission:** To promote the development of viable commercial markets for renewable and sustainable commodities and specialty products derived from algae.
- **Purpose:**
 - To serve as the national and international trade association for those desiring to promote commercial applications for algal biomass;
 - To facilitate informed business decisions based on sound science, best practices and the latest technologies;
 - To promote interaction between private concerns, non-profits, educational and research institutions and other service providers supporting the industry;
 - To educate policy makers, the media and end users regarding the benefits and barriers to commercialization and use of algal-based products;
 - To develop, advocate for and promote technical best practices; and
 - To aggregate and formalize advocacy efforts for the improvement of federal, state and local policies.

Recent Developments – Algal Biomass Association (“ABO”)

- **Status and Affiliations:**
 - International launch of the Algal Biomass Organization this week.
 - Product of six months of careful deliberation between the members of the steering committee, who were elected by their peers at ABS I.
 - In the process of filing for status as a tax exempt organization under 501(c)(6).
 - In the process of forming a separate 501(c)(3) foundation.
- **Governance:** Board of Directors consisting initially of 8 Directors
 - Billy M. Glover, *The Boeing Corporation*
 - Tom Byrne, *Byrne & Company, Ltd.*
 - Mark Allen, *A2BE Carbon Capture Corp.*
 - John Benemann, *Benemann Associates*
 - Philip Pienkos, *NREL*
 - Greg Mitchell, *Scripps/UC – San Diego*
 - Tyler Krutzfeldt, *Mont Vista Capital*
 - Keith Cooksey, *Montana State Univ.*
- **Membership open to both organizations and individuals**

Save These Dates!

October 23-24, 2008

**Bell Harbor Conference Center
Pier 66, 2211 Alaskan Way
Seattle, Washington**

Summit:
October 23-24, 2008

Visit www.algaebiomasssummit.com
for more information.

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Algae Biomass Summit

Algae for Energy

Please join us for the second Algae Biomass summit as we survey the emerging industry exploring the use of algae as a feedstock for biofuels and other sustainable commodities. Over the course of two days, we will hear from technologists, producers, scientists, investors, and policymakers on issues of critical importance to this emerging industry including the commercial viability of algae production, current government and private initiatives, evolving technologies, processing concepts, and venture and project finance.

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**ALGAE BIOMASS
ORGANIZATION**

Recent Developments (Past Year) – Collaborations

- **General Atomics/CEHMM Collaboration**
 - **June 4, 2007:** Defense contractor General Atomics opened an office in Carlsbad, NM as part of a collaboration with the Center of Excellence for Hazardous Materials Management.
 - **Open Pond:** CEHMM is constructing outdoor ponds for growing salt-water microalgae on unused, non-arable land for the production of biodiesel.



FOR IMMEDIATE RELEASE
Jun 04, 2007

General Atomics Opens Office in Carlsbad, NM to Create Biofuel From Algae

San Diego, CA. 4 June 2007. General Atomics (GA) of San Diego, California has opened an office in Carlsbad, New Mexico to develop biofuel from algae. GA is collaborating with the Carlsbad-based, not-for-profit Center of Excellence for Hazardous Materials Management (CEHMM), which studies a wide range of issues related to reducing the impact of hazardous materials on the environment.

Recent Developments (Past Year) – Collaborations

- **Solazyme/Imperium Agreement**

- On June 6, 2007, Seattle-based Imperium Renewables and South San Francisco-based Solazyme entered into an agreement.
- Solazyme will grow its proprietary strains of microalgae, extract the oil, and deliver it to Imperium.
- Imperium will convert the algal oil into biodiesel at its Seattle facility.



John Cook's Venture Blog

« [Optimum grabs \\$5 million to regulate energy use](#) | [Main](#) | Tuesday roundup: [Sandlot Games goes mobile](#), [ClayValet's launch](#), [Verizon opens up](#), etc. »

Imperium looks to algae for fuel, a future in farming?

In a [BusinessWeek story](#) titled "Here comes pond scum power," Imperium Renewables Chief Executive Martin Tobias and others discuss the promise of algae in biofuel production.

Recent Developments (Past Year) – Collaborations

- **Chevron/NREL**

- **CRADA:** Announced entry into collaborative research and development agreement on Oct. 31, 2007;
- **Goal:** Advance technology to produce liquid transportation fuels using algae;
- **Funding:** Chevron Technology Ventures is funding the program.



Recent Developments (Past Year) – Collaborations

- **Shell/HR Biopetroleum (Cellena)**
 - **JV:** On Dec. 11, 2007, Royal Dutch Shell and Hawaii-Based start-up, HR Biopetroleum, have formed a joint venture (Cellena).
 - **Pilot:** JV will build a pilot facility in Hawaii on a site leased from the Natural Energy Laboratory of Hawaii Authority (NELHA). Nutritional supplement grower Cyanotech also has a facility at NELHA.
 - **Facility:** Open pond system using saltwater pumped in through OTEC system.



News & Media releases

Shell and HR Biopetroleum build facility to grow algae for biofuel

11/12/2007

Royal Dutch Shell plc and HR Biopetroleum today announced the construction of a pilot facility in Hawaii to grow marine algae and produce vegetable oil for conversion into biofuel.

The announcement is a further step in Shell's ongoing effort to develop a new generation of biofuels using sustainable, non-food raw materials. Algae hold great promise because they grow very rapidly, are rich in vegetable oil and can be cultivated in ponds of seawater, minimising the use of fertile land and fresh water.

Recent Developments (Past Year) – Collaborations

- **Boeing Collaboration**
 - Boeing gathers biojet samples and conducts screening tests;
 - NASA conducts lab tests and flame tube tests;
 - GE & Rolls Royce test biojet samples in jet engines;
 - Virgin Atlantic and Air New Zealand to conduct biojet fuel flight demonstrations;
 - NZ-based Aquaflow Bionomic Corporation;
 - “Algae feedstock looks very promising” - Dave Daggett, Boeing.
 - Boeing is funding several small projects at WSU, UW, and Bioalgane, others



Virgin Atlantic to fly a 747 plane on biofuel

February test flight to measure carbon output

AP Associated Press

updated 8:03 a.m. PT, Mon., Jan. 14, 2008

LONDON - Virgin Atlantic said Monday it would fly one of its Boeing 747 planes on biofuel during a demonstration flight from London to Amsterdam next month.



Virgin expects algae-powered test flight within 12 months

By Victoria Moores

DATE: 04/03/08

Recent Developments (Past Year) – Collaborations

- **Solazyme/Chevron Agreement**
 - **January 22, 2008:** Solazyme and Chevron Technology Ventures announced an agreement to develop and test algal-based biofuel feedstock.
 - **Sundance:** Solazyme powered a Mercedes with algal-based biodiesel at the Sundance Film Festival in Park City, Utah in January.
 - **“Soladiesel”™** exceeds ASTM D6751 standards for use in existing diesel engines.
 - **Defense Energy Support Center Worldwide Conference:** Ran 2008 Ford F450 on Soladiesel™ in April, 2008.

**EAST BAY
BUSINESS TIMES**

Tuesday, January 22, 2008

Chevron partners with Solazyme on developing biofuel from algae

Chevron Corp. is accelerating its research into biofuel derived from algae. On Tuesday, Solazyme Inc. of South San Francisco announced an agreement with the Chevron subsidiary Chevron Technology Ventures to develop and test biodiesel feedstock made from algae.

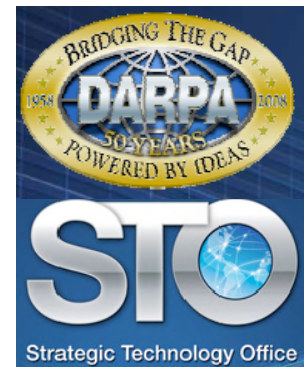
2. | Funding and the Financial Landscape

Funding and the Financial Landscape - Overview

- **Current Federal Initiatives**
 - DOD
 - DOE
- **Federal Labs and Universities**
- **Congress Weighs In?**
- **Venture Funding and Private Equity**
- **The First Project Finance Deal?**

Current Federal Initiatives (DOD) – DARPA BAA08-07

- **Announcement:** BAA08-07 made public in the Algae Biomass Summit's Keynote Address by Dr. Douglas Kirkpatrick on 11/15/08.
 - Extension of BAA06-43 for conversion of agricultural feedstocks to JP-8 (EERC, UOP, GE Global)
- **Goal:** Spur development of a highly efficient system for low-cost algal oil production (non-competitive with food) and optimizing its conversion to JP-8, the fuel used by all military aircraft, tanks and non-nuclear ships.
 - Commercialization plan to transition the technology to marketplace.
 - Cost Targets: Phase 1 cost of <\$2 gallon for TAG; Phase 2 cost of <\$1 gallon for TAG (or <\$3 gallon finished cost at 50mmgy).
 - Contemplates construction of a facility (or multiple facilities) to produce 50mmgy of JP-8.
- **Teams:** Approximately ½ dozen teams submitted proposals.
 - Large defense contractors, Fortune 500 companies, Start-ups, Universities, Government labs.



Current Federal Initiatives (DOD) – AFOSR/NREL



- **Recent Workshop in Arlington, VA:** 30-40 experts, primarily from academia and the National Laboratory System met in February, 2008 to:
 - Elucidate various scientific approaches and tools needed for controlling and/or augmenting algal lipid biosynthesis;
 - Identify specific problems/barriers that prevent achievement of cost-effective production of algal oil for jet fuel conversion;
 - Develop a basic science research “roadmap” from which recommendations can be made for future scientific funding opportunities within AFOSR.
- **Funding:** AFOSR and NREL worked together to identify and are currently funding research in four (4) academic laboratories for the development of jet fuel from algae.

Current Federal Initiatives (DOD) – USAF

- **Funding:** Funded a cooperative agreement between Arizona Public Service and DOE-Fossil Energy (FE)/National Energy Technology Laboratory (NETL)
- **Purpose:** Development and demonstration of a coal hydrogasification process for co-production of substitute natural gas and electricity with virtually no CO₂ emissions.
- **Algae Component:** Conducting field assessments of an algae farming technique to fix CO₂, as well as a conversion process to various liquid fuels.

Current Federal Initiatives (DOD) – Defense Energy Support Ctr.

- **Defense Energy Support Center:** DESC recently certified an algal oil-based biodiesel produced by Solazyme (Soladiesel™).
- **DESC Worldwide Energy Conference:** Demonstrated 2008 Ford F450 on B100 from 100% algal feedstock.
- **DOD Interested:**
 - Soladiesel's™ superior cold weather properties;
 - 2007 EISA requires federal agency utilization of renewable fuels but prohibits any government agency from purchasing synthetic fuel unless it is proven to emit less carbon over its lifecycle.



Current Federal Initiatives (DOE) – Small Business Innovative Research (SBIR)/STTR Grants

- **Funds Awarded – Kent SeaTech:**
 - Phase I - \$99,958 awarded and used to culture several strains of microalgae that showed high capacity for CO₂ fixation and to conduct experiments to “determine optimal conditions for producing rapid and consistent blooms of microalgae using nutrient-rich agricultural wastewaters.”
 - Phase II - \$750,000 awarded to continue experiments relating to optimal growing conditions (e.g., temperature, light, water depth and velocity, etc.), evaluations of a belt system to harvest algal biomass, and exploration of techniques to convert biomass to biofuels and coproducts.
- **Funds Awarded – Community Fuels:** Awarded a Phase I research grant to evaluate two processes to produce biodiesel from algae and the use of agricultural waste to grow specific alga species.

Current Federal Initiatives (DOE) – Small Business Innovative Research (SBIR)/STTR Grants

- **FY2008 Solicitation:** Office of Energy Efficiency and Renewable Energy administers SBIR grants under 9 categories, one of which is “Production of Biofuels from Biomass”.
- **Subtopics:** One of four subtopics under this category is “**Algae for Biodiesel**”.
- **Award Announcement – April 29, 2008:** 3 Phase I Awardees (\$100,000)
 - *Accent Laboratories, LLC (New York):* Developing a low-cost, high efficiency algae harvesting and dewatering technology.
 - *Renewable Algal Energy, LLC (Tennessee):* Developing a low-cost method for growing and harvesting algae.
 - *Touchstone Research Laboratory, Ltd. (West Virginia):* Developing a closed algae cultivation system that controls seasonal temperature fluctuations at a competitive cost.

Current Federal Initiatives (DOE) – Other Initiatives

- **International Network on Biofixation of CO₂ and Greenhouse Gas Abatement:** See Dr. Benemann's presentation.
- **Department of Science:** Office of Basic Energy Sciences supports basic research on biological conversion of solar energy to stored chemical energy. Algae and cyanobacteria are studied, but there are no open funding opportunities for algae.
- **Office of Biological and Environmental Research:** Issued a Funding Opportunity Announcement (DE-PS02-08ER08-12) in January, 2008, for systems-level research to improve understanding of microbial regulatory and metabolic networks related to hydrogen production.
- **DOE Joint Genome Institute:** Completed the sequencing of ten algal genomes. The Community Sequencing Program allows for the submission of sequencing projects to JGI.

Current Federal Initiatives – Federal Labs

- **NREL:** Has invested more than \$1 million of internal funds to restart its algal biofuels program.
 - Strategic Initiative – Defining an Algae Biofuels portfolio.
 - R&D Project – Development of a comprehensive High-Throughput Technique for Assessing Lipid Production in Algae.
 - External Funding:
 - AFOSR collaboration
 - Seed grant to Colorado Center for Biorefining and Biofuels
 - Technical Service Agreement with LiveFuels, Inc.
 - Technical Service Agreement with GreenFuel Technologies
 - CRADA with Chevron

Current Federal Initiatives – Government Labs

- **Pacific Northwest National Lab:** Performs basic and applied research in the area of microalgal biofuels. Internal funding from various sources of over \$1 million.
- **Sandia National Laboratories:** Have received approximately \$5 million from various governmental sources to conduct a research program relating to algal-based production of biofuels and co-products with an emphasis on water resources and utilization. Cooperative agreement with LiveFuels, Inc.
- **Oak Ridge:** Cooperative research with Utah State University on discrete challenges in the production process (e.g., photosynthetic saturation, minimizing surface shading, “hydrophobic” materials to prevent biofouling in photobioreactors, and scalable photobioreactor design).
- **Los Alamos National Laboratory:** Undertaking applied research in the algal biofuels area and assist several companies in the private sector (CEHMM; General Atomics).

University Research

- **Surge in Interest:** A number of universities and institutions of higher education have labs focusing on a variety of aspects relating to algal culture and its use as a CO₂ fixer/recycler and biofuels. A few include:
 - UC San Diego/Scripps
 - Montana State University
 - Old Dominion University
 - Clemson University
 - University of Washington
 - University of Hawaii
 - California Polytechnic State Univ.
 - University of Maryland
 - UC Berkeley (\$500M BP Funding)
 - Arizona State University (\$1M BP)
 - Utah State University
 - Ohio State University
 - Michigan State University
 - Brooklyn College
 - UT – Austin
 - Colorado School of Mines
 - Princeton University
- **Funding Fragmented:** “[F]unding of algae research in the academic setting lags so far behind other systems because no federal agency has taken ownership of studying the potential of algae.” [Draft Report to Congress, *Microalgae Feedstocks for Biofuels Production* (March 12, 2008)].

Congress Weighs In? – EISA (P.L. 110-140) (12/19/07)

- **Section 201 - RFS:** Adds “algae” to the list of feedstocks qualifying as *renewable biomass*, which also qualifies as *advanced biofuel* for purposes of meeting the dramatically expanded Federal Renewable Fuel Standard.
 - RFS Mandate: 36 bgpy of renewable fuel, advanced biofuel, cellulosic biofuel, and biomass-based diesel must be blended into transportation fuel sold or introduced into commerce in the contiguous 48 states.
- **Section 228 - Report:** Secretary of Energy must submit a report on progress of the R&D being conducted on the use of algae as a feedstock for the production of biofuels. Report is currently in draft form and is to address:
 - R&D challenges
 - Regulatory or other barriers that hinder the use of this resource
 - Recommendations on how to encourage and develop this source as a viable transportation fuel.

Congress Weighs In? – Farm Bill (Presidential Signature?)

- **Food Conservation and Energy Act of 2008 - Conference Report:**
 - House: Passed on May 14, 2008. Vote of 318-106
 - Senate: Passed on May 15, 2008. Vote of 81-15
- **Title IX Opportunities:** Definition of *renewable biomass* specifically includes “Algae”.
 - Section 9003 - Biorefinery Assistance: Grants and Loan Guarantees for the commercialization of processes to convert *renewable biomass* to advanced biofuels.
 - Eligible entities include corporations.
 - Grant capped at 30% of cost of project
 - Loan Guarantee principal capped at \$250million and guaranteed amount cannot exceed 80% of loan.
 - Authorized: \$75M for FY09 and \$245M from FY10 from CCC; \$150M for each of FY09-12.

Congress Weighs In? – Farm Bill (Presidential Signature?)

- **Title IX Opportunities (Cont.):**
 - Section 9005 – Bioenergy Program for Advanced Biofuels: Requires USDA to make direct payments to eligible producers to facilitate expansion of advanced biofuel production.
 - Producer of advanced biofuels enters into a contract with USDA.
 - CCC Funding: \$55M for FY09 and FY10, \$85M in FY11 and \$105M in FY12
 - Discretionary Authorization: \$25M for FY09-FY12
 - Section 9011 – Biomass Crop Assistance Program: Program to support the production of eligible crops for conversion to bioenergy in certain to-be-designated “BCAP Areas”. An *eligible crop* is any crop of *Renewable Biomass*, so algae is included. Producers enter into 5-year contracts with USDA and receive payments for production of the eligible crop.
 - *Funding Auth.*: “Such sums as are necessary for each of FY08 through FY12.
 - *NOTE*: Second mention of “algae” is in this section where algae is excluded from the definition *eligible materials*; however, this term is used rarely and appears only related to payments to third parties who collect, store harvest and transport the feedstock to a biomass conversion facility.

State and Local Funding

- **New Mexico:** New Mexico Energy Innovation Fund \$1 million to CEHMM.
- **Texas:** State's Emerging Technology Fund provided \$4 million to Texas A&M and General Atomics for microalgal biofuels research. Construction of a research facility dedicated to microalgae-to-biofuels research is planned at the Texas AgriLife Research Center in Pecos.
- **Iowa (Iowa Power Fund):** On April 10, 2008, the Iowa Power Fund board authorized final negotiations for a \$2,190,407 state grant for Green Plains Renewable Energy where GreenFuel Industries, Inc. would take waste water, waste carbon dioxide, and waste heat from driers at GRPE's Shenandoah plant to grow algae.
- **Minnesota/Metropolitan Council:** Metropolitan Council and University of Minnesota requested \$1 million in state funding. MC used energy rebates from Xcel to fund research.
- **Virginia:** \$1.5 million granted to the newly-formed Virginia Energy Coastal Research Consortium. Approximately \$500,000 was expected to go towards algae research (Old Dominion University).

Capital Sources

Venture Funding

- Auroa Biofuels
- BioFuelBox
- Cequesta
- Cobalt Technologies
- Euglena
- GreenFuel Technologies
- Inventure Chemical
- Solazyme
- Synthetic Genomics

Other Private Funding

- Algae Biosciences Corp.
- AlgaTechnologies, Ltd.
- A2Be Carbon Capture
- Bioverda (JV w/ Virgin GF)
- Blue Sun Biodiesel
- Community Fuels
- GreenFuel Technologies
- LiveFuels
- Petro Algae
- Primafuel

Public Sector Funding

- Aquaflow Bionomic
- CEHMM
- Community Fuels
- General Atomics
- GreenFuel Technologies
- Kent SeaTech
- Patriot Biofuels

Venture Capital Investor Summary



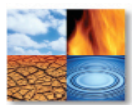
PINNACLE VENTURES



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THE RODA
GROUP



ELEMENT PARTNERS



green fund



The First Project Finance Deal?



GreenFuel Snags \$92 Million Deal To Build European Algae Fuel Plant

Robert Buderl 3/14/08

GreenFuel Technologies seems to be continuing its rebound under interim CEO Bob Metcalfe. The Cambridge, MA, alternative energy company has reached an agreement—worth up to some \$92 million—to build an algae-based fuel plant in Europe, according to sources close to the firm. What makes the deal even more interesting is that it was reportedly negotiated largely by former GreenFuel CEO Cary Bullock, who stepped down from the top slot when Metcalfe took the reins last June on an emergency basis, but stayed on at the company in a business-development capacity.

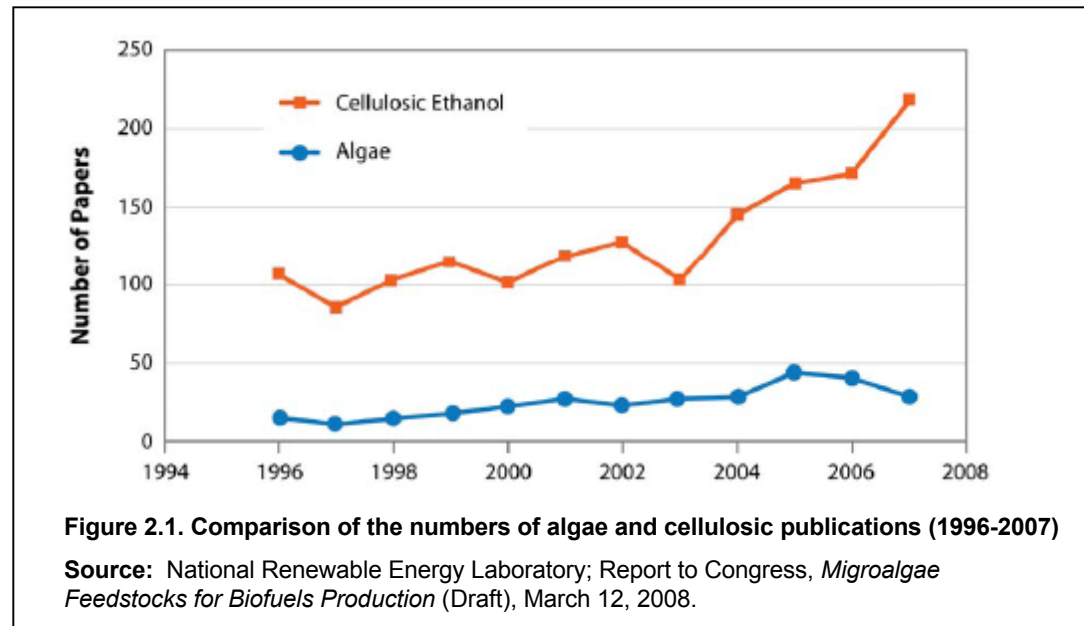
- **\$92 Million Deal:** On March 14, GreenFuel Technologies Corp. announced that it had closed a \$92 million deal to construct a commercial scale algal-feedstock fuel production facility in Europe.
- **Contingency:** According to Xconomy's sources, the financing is "contingent on GreenFuel building a small-scale pilot plant and meeting cost and productivity goals along the way."
- **Closed a final "inside extension" of their Series B Round last week, raising \$13.9 Million.**

Closing Thoughts – Government Support Critical

- **Lack of Government Funding is a Significant Issue**
 - After the \$25 million ASP, government funding in this area has been abysmal and does not reflect a proportional commitment to the theoretical potential of this feedstock.
- **Peer Reviewed Works Low:**

The total body of work in the past decade has been small.

 - Reflects low level of research funding.
 - The few academic researchers in this area are starting their own companies or being hired as CTOs. Information being guarded as patentable or trade secrets.



Closing Thoughts – Funding/Financing Outlook Improving

- **JV/Collaborative Agreements:** Joint ventures and collaborative partnerships between start-ups, big oil, defense contractors, airlines and a spike in interest among other large industrial concerns.
- **First Generation Thrashing:** Attention to algal feedstocks and other methods being explored by the biotech industry has been aided by the thrashing that “First Generation” biofuels has received on a daily basis and an enhanced focus on CO2 options.
- **Legislative Recognition:** “Algae” specifically mentioned in both EISA 2007 and Farm Bill, with the latter providing an avenue to a variety of programmatic funding sources.
- **Massive Projects – Project Finance:** There are no industrial scale algae-to-biofuels projects in existence in the world and only a handful of “pilot plants”. Industrial scale (50MMGY) will require project financing of hundreds of millions of dollars and will come with significant process, construction, market and regulatory risk.

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Andrew Braff is an associate in the Seattle office at Wilson Sonsini Goodrich & Rosati, where his practice focuses on renewable energy project development. His experience includes drafting and reviewing engineering, procurement, and construction agreements, operation and maintenance agreements, energy supply agreements, and equipment supply agreements for the wind, solar, biomass, and biofuels industries. Andrew also has advised on federal and state legislative and regulatory process, including the Environmental Protection Agency's implementation of the federal Renewable Fuel Standard mandated by the Energy Policy Act and various state renewable portfolio standards.

Andrew previously served as an extern for Justice Mary E. Fairhurst of the Washington State Supreme Court and as director for policy and public affairs for California State Assemblyman, now State Senator, Mark Wyland. In addition, he was a legislative assistant to Congressman George R. Nethercutt, Jr. where he advised on numerous federal policy issues.

EDUCATION:

- J.D., University of Washington School of Law, 2006
External Affairs Editor, Shidler Journal for Law, Commerce & Technology; Berman Environmental Law Clinic
- B.A., Whitman College, 2000
With Honors; Magna Cum Laude; Phi Beta Kappa; Recipient, Chester C. Maxey Politics Award

SELECT PUBLICATIONS AND PRESENTATIONS:

- "Biofuels from Algae," Testimony Before a Joint Session of the House Technology, Energy and Communications Committee and the Senate Water, Energy and Telecommunications Committee, February 21, 2008, Olympia, WA
- "The Federal Renewable Fuel Standard ("RFS") Program: Operational Highlights and Outlook, Presentation at 2007 Biofuels Workshop and Trade Show—Western Region, October 10, 2007, Portland, OR
- "RFS Rulemaking: EPA Proposes Implementation of Renewable Fuels Standard," *Biofuels Journal*, 2006
- "The Spy Act: Ditching Damages as an Element of Liability for On-Line Conduct between Private Parties," 2 *Shidler Journal of Law, Commerce & Technology* 17, 2006
- "Defining Spyware: Necessary or Dangerous," 2 *Shidler Journal of Law, Commerce & Technology*, 2005
- Co-author with The Honorable Mary E. Fairhurst, "William O. Douglas: The Gadfly of Washington," 40 *Gonzaga Law Review* 259, 2005

Algae for Energy

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- Steering Committee, Algae Biomass Summit
- Member, Energy Bar Association
- Member, Washington State Bar Association
- Member, American Bar Association

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