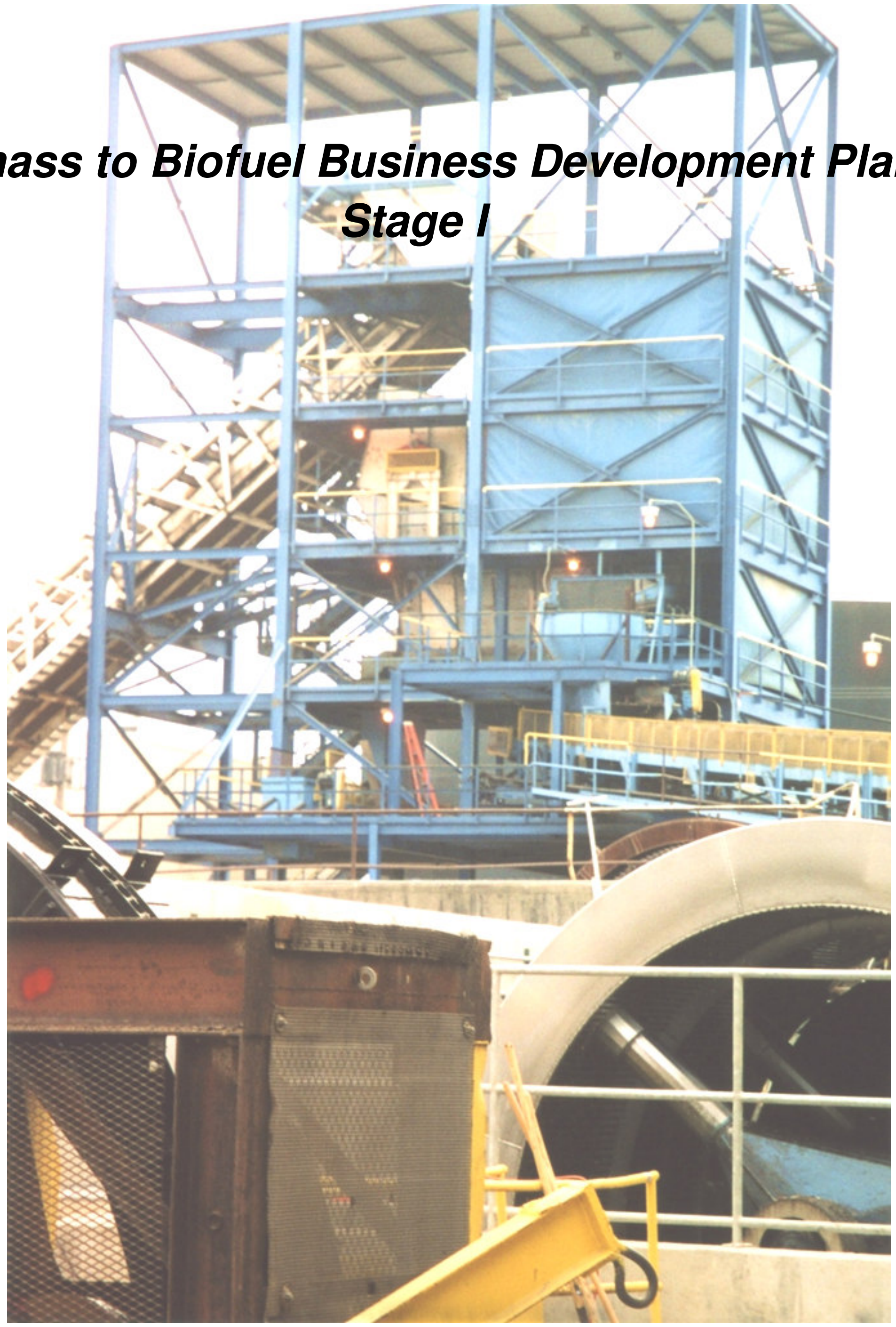
Atlantic Biomass Conversions, Inc.

Biomass to Biofuel Business Development Plan
Stage I



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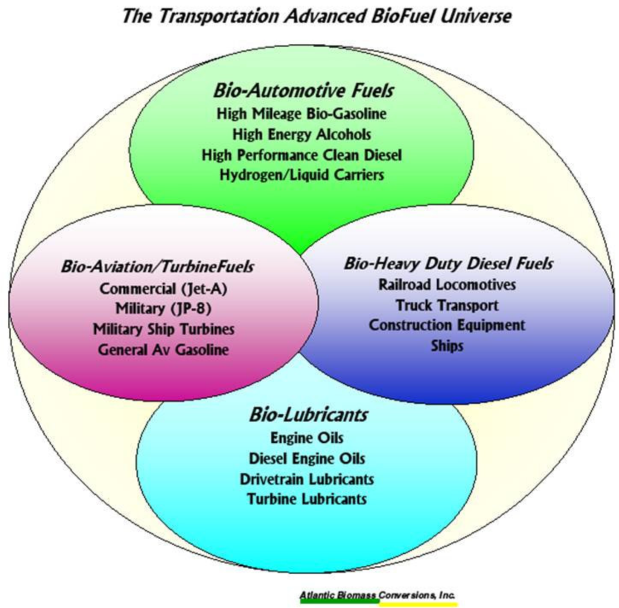
Biomass to Biofuel Business Development Plan: Stage I

The future success of an advanced non-corn based biofuel and bioproducts industry will require a wide variety of affordable biofuel feedstocks, everything from fieldgrasses and forest residue to algae. On the product side, success will come by quickly responding to market forces with the production of a variety of fuels and products from the same feedstock – much as petroleum refineries currently do.

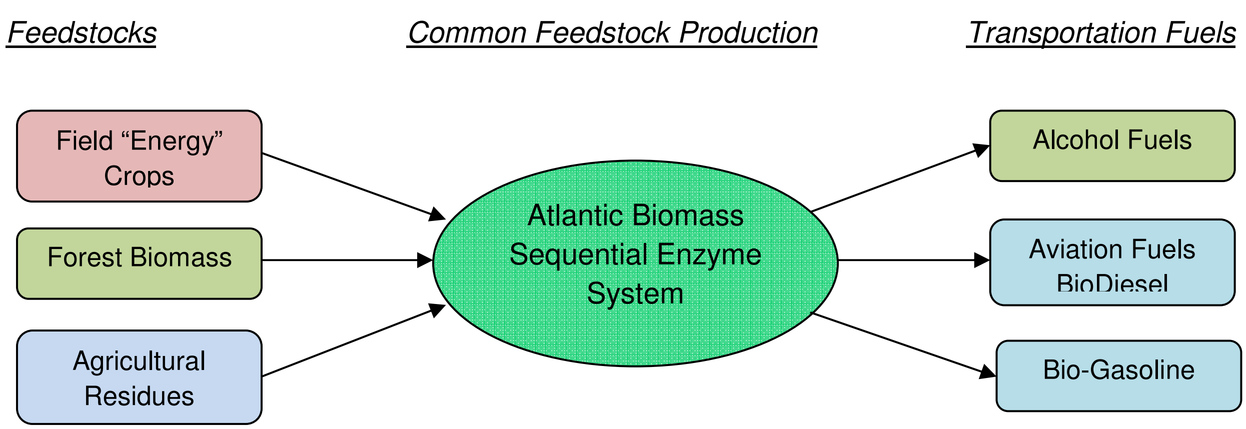


Piper-Jaffray in a 7 September 2010 research report, identify the two keys to making a non-corn biofuels industry profitable as; 1) improved performance/lower cost enzymes, and 2) expanded use of the biomass content of feedstocks.

These two keys succinctly state the business strategy of Atlantic Biomass Conversions.

In operational terms, our strategy is simple and straight-forward – develop the conversion technologies necessary to convert a wide variety of biomasses into common feedstocks that can be used for the production of multiple fuels and products.

Advanced Biofuels Supply Chain



1. Kick-Off Project: Beet Pulp Sugars for Biofuels

Beet Pulp Ready for Processing

Our first implementation of this strategy is the cost-effective production of non-cellulosic (hemicelluloses and pectin) biofuel sugars, and cellulosic glucose, from low-value sugar beet pulp. Beet pulp is the residual byproduct of sucrose (table sugar) production. Currently, over 1 million tons/year of the pulp is produced in the US and over three-times that quantity world-wide.
Sugar beet pulp is ideally suited for the pioneering use of our sequential enzyme system.

- Beet pulp is high in sugar containing biomass (cellulose, hemicelluloses, pectin) and low in hard to process lignin.
- Beet pulp sugars have low animal feed value while proteins left after our processing have good value, hence processors will increase their income.
- Beet pulp production conditions are especially suitable for our enzyme process.

Our fast, high yield process **will produce** galacturonic acid (C-6 sugar), xylose and arabinose (C-5 sugars) in addition to the C-6 glucose sugar produced from cellulose. This means about **70 percent** of the total beet pulp biomass (the rest is protein and minerals) could be sold **for biofuel/ biochemical production.** This is a substantial **revenue increase over** the income from the same tonnage of beet pulp if only the **cellulose** (**21 percent** of total biomass) was converted to **glucose**, which represents about.

Furthermore, the range of C-6 and C-5 sugars produced allows biofuel producers to expand their offerings beyond just fuel alcohols. For instance, C-5 sugars can be fermented into higher value biochemical building blocks such as succinic acid.

The successful use of our sequential enzyme process will also demonstrate that our new paradigm for the production of biofuel precursors from plant biomass overcomes the primary roadblock to cost-effective non-corn biofuel production. That roadblock is known as ***Biomass Recalcitrance***. Overcoming Biomass Recalcitrance is just about the Holy Grail of biofuel production. With it, a wide variety of biomass feedstocks can be converted with low enzyme costs. Without it, production costs of biofuels such as 2nd generation cellulosic ethanol will remain above the current selling price.

For Atlantic Biomass, sugar beet pulp is just the beginning. In the future we see our portable “Follow-the-Crop” system and future varients transforming the production of biofuels worldwide.

Together, the beet pulp system and later "Follow-the-Crop" could create a new type of biotech industry. Investors in the beet pulp system could reap the financial benefits of this new paradigm.

2. Partnership Approach to Project Success

In today's tough financing and business environment, success of this project work will require a total supply-chain partnership. We are working on both ends of the chain.

Together with the American Sugar Beet Growers Association and the US Beet Sugar Association we are developing a pilot plant project. These associations represent the farmer based co-ops that now own all the sugar beet refineries in the US. This portable 1,000 gallons/day pilot system would be installed at one of their member facilities in the Upper Midwest to demonstrate the in-line operation of our process with their technology. The cost of this pilot plant would be approximately $1 million, including construction and operating costs. The strong position of these beet sugar groups with members of the Congressional agricultural committees will be very helpful in securing USDA/DOE loan guarantees and related funding for this project.

Atlantic Biomass has been working with a Minnesota company on this unit and a preliminary design has been completed.

On the other end of the biofuel production chain, building partnerships with innovative biofuel and bioproduct producers is especially important since extracting the maximum value of the C-5 and C-6 sugars produced from the beet pulp is the key to success. Atlantic Biomass is developing partnerships with both ethanol and jetfuel producers. Our goal is to have a commitment from a major producer to the sugar beet project by the end of the year.

3. Sugar Beet Biofuel Economics

The biofuel business is one of tight margins. And everyone in the supply-chain must balance their profits with the overall selling price. Fortunately, even when using the lowest value biofuel, ethanol, as the end-product, and keeping beet pulp prices well below the international market price, the use of our sequential enzyme system makes sense for the sugar beet people, the ethanol producers, and investors in Atlantic Biomass. The following table provides annual estimates based on the operation of the 1st commercial plant.

Table 1
Annual Revenue Projections for Beet Pulp Biofuel Sugar Process

Pulp Biofuel Sugars	Atlantic Biomass Process Costs	**Atlantic Biomass Royalties**	Total Biomass Costs	Ethanol Production Costs	Total Production Cost	Pre-Subsidy Ethanol Sale Price	**Gross Ethanol Profit (Pre Subsidy)**
Per/Lbs	Per/Lbs	**Per/Lbs**	Per/Lbs	Per/Lbs	Per/Lbs	Per/Lbs	**Per/Lbs**
$ 0.125	$ 0.040	**$ 0.014**	$ 0.139	$ 0.06	$ 0.23	$ 0.29	**$ 0.06**
Per 200,000/Ton Sugar Beet Plant (Industry Average)		**Per 200,000/Ton Sugar Beet Plant (Industry Average)**					**Per 200,000/Ton Sugar Beet Plant (Industry Average)**
$50,000,000	$20,000,000	**$5,600,000**	$71,600,000	$24,000,000	$95,600,000	$111,428,571	**$15,828,571**

Notes: 1. Pulp biofuel sugar price is $.045/lb below international non-tariff sucrose price ($.17/lbs).
2. Ethanol pre-subsidy price is $1.95/gallon.

Return on Investment (ROI) for this implementation also looks favorable for Atlantic Biomass investors as well as the sugar beet pulp producers.

Table 2-A

Atlantic Biomass Year 1 ROI Calculation		
R&D	$	750,000
Pilot Plant	$	1,000,000
Technical Support for Commercial Plant	$	500,000
Total Costs	$	**2,250,000**
1st Year Revenue	$	**2,800,000**
(1/2 Total annual harvest due to processing schedule: Sept-March)		
ROI		**1.2**

Table 2-B

200,000 Ton Sugar Beet Plant Year 1 ROI		
Atlantic Biomass System Installation	**$**	**10,000,000**
Gross Pulp Biofuel Sugar Revenue	$	25,000,000
Pulp Biofuel Operating Costs	$	8,000,000
Net Pulp Biofuel Sugar Revenue	$	17,000,000
Pulp Animal Feed Revenue	$	8,700,000
Total Income	**$**	**25,700,000**
(1/2 Total annual harvest due to processing schedule: Sept-March)		
ROI		**2.6**

Assuming that the funding for the completion of the pilot plant process design is available in 2011, the five year pro forma for Atlantic Biomass Conversions would be as follows.

While the costs listed for R&D in years four and five may seem high, they are in fact consistent with our aim of using the sugar beet revenues, rather than outside investments to fund further company growth. The R&D costs of $4.5 million and $8 million would be used to expand the use of our sequential enzyme system to field “energy crops” and additional agricultural residuals with the “Follow-the-Crop” discussed below.

Table 3

Atlantic Biomass Conversions: Revenue and Cost Estimates: 2011-2015					
Projected					
	2011	2012	2013	2014	2015
1. Revenue					
Grants					
MD Translational	$200,000				
Licenses		$50,000	$200,000	$1,000,000	$5,000,000
Royalties on sugars @ $.014/lbs		$20,000	$2,000,000	$7,500,000	$16,000,000
Investments					
Biofuel Partnerships	$50,000	$150,000	200,000	1,000,000	
Total Revenue	$250,000	$220,000	$2,400,000	$9,500,000	$21,000,000
2. Expenses					
Enzyme Production Costs	$0	$5,000	$437,500	$1,312,500	$6,000,000
Inlcudes Licenses					
Hardware/Software			$150,000	$250,000	$1,000,000
Technical Support	$0	$0	$250,000	$1,250,000	$3,125,000
R & D	$160,000	$120,000	$500,000	$4,500,000	$8,000,000
Management	$90,000	$100,000	$150,000	$750,000	$1,000,000
Total Expenses	$250,000	$220,000	$1,337,500	$7,812,500	$18,125,000
Gross Profits	**$0**	**$0**	**$1,062,500**	**$1,687,500**	**$2,875,000**
Early Round Investment Payback	$0	$0	$250,000	$500,000	$750,000
Net Profits	**$0**	**$0**	**$812,500**	**$1,187,500**	**$2,125,000**

4. *Risks Discussion: Biofuel Market*

While it is no secret that the emerging biofuels industry has been through a couple of rough years, it seems that those still around in late 2010 are products of both Darwin and Nietzsche. We have survived by adapting and we are stronger.

2008 delivered a double whammy to the emerging biofuel market. Not only did the freezing of the credit markets take away venture capital funding, but the decrease in oil prices from over $120/barrel to the current price of about $80/barrel removed much of the urgency to increase US biofuel production. These sea-changes were felt most directly by the corn-ethanol portion of the industry where over twenty plants were idled, several companies sought protection in Chapter 11 (including the large producer Vera Sun whose assets became part of Valero Refining on 18 March 2009), and other companies have consolidated.

As an example of a company that is adapting for the future, POET, a major corn-to-ethanol producer, has begun operating a 2nd generation pilot cellulosic plant in Emmetsburg, Iowa and has announced they will only build cellulosic biofuel plants in the future.

The production of 2nd generation cellulosic fuels (*Defined by DOE/EPA as not having starch as a feedstock. Cellulose, hemicelluloses, pectin, and lignin are all defined as "cellulosic.")* is being driven in the US by the ***Renewable Fuel Standard (RFS*)** that was included in the Energy Independence and Security Act of 2007. The RFS establishes targets and provides incentives for the use of low Green House Gas cellulosic biofuels as well as corn based ethanol as blend components of gasoline from now until 2022.

Table 4: Renewable Fuel Standard (RFS)
Section 202 Energy Independence and Security Act of 2007

Year	Total Renewables Billion Gallons/Year	Corn Ethanol BGY	Advanced Biofuels Cellulosic Ethanol & Additional Fuels BGY
2007	4.70	4.7	
2008	9.00	9.0	
2009	11.10	10.5	0.60
2015	20.50	15.0	5.50
2017	24.00	15.0	9.00
2020	30.00	15.0	15.00
2022	36.00	15.0	21.00

In support of meeting this standard, US DOE has provided funding for eight biorefinery demonstration projects. In addition, the 2009 Economic Recovery legislation provided funding for the biorefinery loan guarantee programs in the 2007 Energy Bill and the 2008 Farm Bill.

POET is among those companies using these DOE funds for their pilot cellulosic plants. Various approaches to producing cellulosic biofuels are being investigated and tested at these facilities. One of the currently favored approaches is something called Consolidated Bioprocessing. Microorganisms are genetically engineered to include genes for both saccharfication, converting biomass into sugars and ferementation, turning the sugars into biofuels. However, low efficiencies and low yields have been reported with all approaches (19 March 2009 DOE biorefinery annual peer review sessions) that prevent biorefineries from economically achieving the goals included in RFS. POET themselves admit that their corn cob based system **produces ethanol at $2.35/gallon** which is **about $.40/gallon above** the **ethanol wholesale** price.

Costs of production are therefore the primary risk to advanced biofuel investors.

However, Atlantic Biomass proposes that our sugar beet pulp sequential enzyme system, by overcoming Biomass Recalcitrance offers a way to reduce that investment risk. As presented in Table 1, our projected cost of ethanol is about $.23/lb. For a gallon of ethanol @7 lbs/gallon that would translate to approximately $1.61/gallon.

For the investor, our sequential enzymatic system helps to de-risk investments in advanced biofuels two ways.

1. By reducing sugar production costs and expanding the amount of plant biomass that can be used as a feedstock, we reduce biofuel feedstock prices.

2. Because income from the Atlantic Biomass system is derived from a biomass and biofuel independent process, we can maximize revenue by selling sugars for higher value biofuels and bioproducts and reduce costs by using lower cost biomass sources.

In essence our system can become the basis for a true market-driven advanced biofuels industry. I think Darwin would be proud of our evolution.

5. To the Future: Making Biofuel Sugars and Precursors in the Field: "Follow-the Crop"

As we've said, the beet pulp system is just the beginning. The real transformational potential of our system will come about through ***"Follow-the-Crop."***

The *"**Follow-the-Crop**"* system will transform the production of biofuels by basing production on a nationwide mixture of **environmentally and economically sustainable "energy" crops and grasses**. Many of these crops will be grown in rotation, in conservation areas, or in small stands. By creating a viable market for these "non-traditional" sustainable energy crops, grasses and agricultural residues grown in **stands as small as 10 acres**, the *"**Follow-the-Crop**"* system would **improve the income of small and medium growers**. It will allow farmers to utilize their marginal lands and expand their selection of crops without the necessity of planting hundreds of contiguous acres. This would allow significant quantities of total energy biomass to be grown outside the Midwestern "grain-belt" and would greatly help rural economies in the southeast and northeast. This is something the **current integrated biorefinery** paradigm which requires both short biomass transport distances and the same input crop each year **simply cannot do.**

"Follow-the-Crop" will transform the advanced biofuels industry into one **coherent system** rather than remaining a collection of uncoordinated, geographically constrained small industrial facilities. By **changing the feedstock** of biofuel refineries from individual specialized crops **into**

common commodities, the entire biofuel industry can then respond to real **market forces**. This will enable the United States to **domestically produce** the nearly 60 **billion gallons/year of biofuel** that would power a fuel-efficient US vehicle fleet in 2030.

In the *"Follow-the Crop*" system the pretreatment and sacacharification (conversion of biomass to sugars) of field biomass is taken out of the biorefinery and instead placed in a number of low-capital portable systems. These systems will use the Sequential Enzyme Biofuel Sugar process to convert the low-density, low value biomass into high density, medium value biofuel intermediates.

The sugars would then be shipped via truck or train to large scale biorefineries for production of market driven biofuels. This system's breakthrough would overcome the high costs of transporting low-density biomass thereby allowing biorefineries to achieve the lower production costs of petroleum refineries that on average produce 1.7 billion gallons/year.

Hemicellulose and pectin components of biomass, in addition to cellulose, would be converted to common C-5 and C-6 based intermediates no matter what plants are used as inputs. On average this would make available 70% of total plant biomass for biofuel production with most of the remainder available as high protein animal feed.

Following the model of mobile wheat harvesting combines, The "*Follow-the-Crop"* system will consist of: a) modular units of the enzyme based biofuel intermediate production process, and b) a control/deployment system for the scheduling, monitoring, and control of the individual units. Environmentally controlled shipping containers will be the basis for the modules. This will allow for inexpensive transport. A combination of GPS locators on the modules and a database of contracted growers, including GIS location software, will be used to maximize deployed/processing time while minimizing transportation costs. Individual modules will include software and hardware connections so they can be operated in single or multiple mode to process crops on fields as small as 10 aces or as large as 1,000. Atlantic Biomass is currently partnering with Encore Bioenery LLC on the development of the hardware for this system. This hardware is based on the sugar beet pilot system. The following table is a preliminary estimate of the annual income that could be produced from one "*Follow-the-Crop"* module.

Table 5: Estimated Production/Income of Follow-the-Crop Module

1. Field Module Output		
Daily Sugar Output: Gallons @20 Hrs/Day		11,333
Annual Sugar Output: Gals@ 200 Days/Year		2,266,667

2. Income		
Daily Income	**$**	**9,917**
@ Per Lbs Price	$	0.13
Yearly Income @ 200 Days/Yr.	**$**	**1,983,333**
3. Daily Crop Capacity Input		
Tons/Acre (Dry Biomass)		6
Acres		10
Daily Biomass Input (Dry Tons)		**60**
4. Field Module Equipment Costs 1st Production Unit Only Price Will Fall for Later Units		
TOTAL DIRECT COST		$733,700
Contingency @ 20%		$146,740
TOTAL INSTALLED COST		**$880,440**
5. ROI		
Gross Income @ 1 Year Payback		0.45 Year
Gross Income @ 3 Year Payback		0.15 Year
Net Profit @ 20% Gross Income @ 1 Year Payback		2.2 Years
Net Profit @ 20% Gross Income @ 3 Year Payback		0.7 Year

6. Company History and Structure

Atlantic Biomass Conversions, Inc. was founded in June 2000 by Robert Kozak on the basis of preliminary research that had been conducted at George Washington University. It is a “C” corporation incorporated in the state of Delaware. Atlantic Biomass is registered to do business in the State of Maryland. Company headquarters is in Frederick, Maryland. There are two classes of company stock, Class A, non-voting common stock, and Class B voting stock. Since the creation of Atlantic Biomass Mr. Kozak has put nearly $80,000 of his own money in the company. Additionally, he did not draw any salary from 2000 to 2006 and 2008-2010 despite working full-time. Funding to the company also came from two competitive State of Maryland venture fund programs and a NSF Phase I award (150,000). The Maryland Technology Development Corporation (TEDCO) awarded $50,000 for enzyme development work at Hood College and the Maryland Industrial Partnerships (MIPS) award was used for scale-up studies at the University of Maryland/College Park.

We are a shoestring company, but this experience has paid off handsomely in the current recession as we are able to continue to produce important results without much funding.

7. Founder’s Experience

Robert Kozak, the President of Atlantic Biomass, came to the biofuel arena after working in the automotive emissions business with firms such as Sun Electric/Snap-On, in government agencies including the Metropolitan Washington Council of Governments, and consulting for states including California and New Jersey, and for the US Trade and Development Agency in Mexico City. During that time he learned how to forge productive, cooperative working teams from people with differing backgrounds and agendas.

More important for the success of commercializing this and related biofuel projects, he also successfully introduced new technologies into challenging markets. This included introducing the 3.5" disk drive into the garage and service bay environment in the middle 1980s. From that background, he has developed Atlantic Biomass into a company that specializes in working with university research departments and other small businesses to cooperatively produce good results at low costs. Since 2003, Atlantic Biomass has successfully managed programs with funding from the Maryland Technology Development Corporation (TEDCO), the Maryland Industrial Partnership (MIPS), and the National Science Foundation STTR program.

Mr. Kozak is treasurer of Advanced Biofuels USA (a 501 (c) (3) educational organization) and a frequent contributor to its website www.AdvancedBiofuelsUSA.org. He has also done presentations for Congressional committees. In the lab he heads process development and HPLC analysis for Atlantic Biomass.

8. Current Intellectual Property Position

In July 2009 Atlantic Biomass signed an agreement with Hood College assigning patent and commercialization rights of enzyme and biofuel related process development work performed by Hood College to Atlantic Biomass Conversions.

Atlantic Biomass has retained Ken Colton and John Nabers of Fitch Evan to advise us on intellectual property. Mr. Colton is a both a biochemist and a lawyer and has a strong understanding of the biotech intellectual space. We have filed a US PTO provisional application (61262504) for the thermostable pme (JL25) detailed in ("Thermal Stabilization of *Erwinia chrysanthemi* Pectin Methylesterase," Applied and Environmental Microbiology, Dec. 2009, pp. 7343-7349, Vol. 75, No. 23) and are finalizing the complete patent application.

We are currently working on an IP strategy for the sugar beet process that will involve a mixture of patents and trade secrets.