

See Forward Looking Statements on page five



Bion’s Beef Opportunity

In 1935 inflation-adjusted terms, beef is 63% more expensive today, while pork and chicken, primarily raised indoors at concentrated animal feeding operations (CAFOs), and with highly integrated supply chains, are 12% and 62% cheaper, respectively. At \$66 billion/year (retail value), the beef industry has been a target of consumer groups whose concerns include air emissions and impacts on climate change, water pollution, food safety, and the treatment of animals and workers. Furthermore, the beef industry has also been an economic target for a number of plant-based beef alternative products, such as Beyond Meat, that have gained significant market traction.

The US beef industry is at the doorstep of a transformative opportunity to address the growing demand for a sustainable product offering. Bion believes this can be achieved at scale for a premium segment of the market, with limited disruption to the large, existing commodity beef market, both domestic and export. Further, Bion’s technology and business model is designed to produce sustainable and sustainable+organic *grain-finished* products that are affordable, and with the same quality of taste and texture U.S. consumers have grown to expect from corn-fed American beef vs grass-fed, plant-based, or other alternatives.

“Sustainability” goes well beyond “organic”, a concept that primarily addresses product inputs and is, in fact, most often LESS sustainable than traditional production, due to lower yields and more costly inputs. Sustainability is a more important and relevant concept to the consumer and the beef industry because it also captures outputs, specifically, the environmental impacts of production. To the industry’s detriment, the cost to implement comprehensive waste treatment at the feedlot, where concentration magnifies most of the environmental impacts, is simply not supported by this low-margin commodity business, absent increased prices, subsidies, or new revenues to pay for it.

So how can a premium segment be carved out to meet the demand for sustainability, both in its product offerings and its livestock operations?

Figure 1. The Beef Industry Conundrum – How to Get from “A” to “B”?



Bion has developed and tested its patented technology and advanced livestock waste treatment platform, which is designed to generate significantly greater revenue and better resource recovery than has been previously possible. That platform is couple with a business model focused on improving sustainability AND managing costs over the entire supply chain, from genetics and husbandry, to feed crop production, to finishing through final processing. Proper integration will capture multiple new and expanded revenue streams, some that are available today, some that are evolving. The “Future State” represented in [Figure 1](#) will be financed by the combination of: i) monetizing the value of a premium USDA-certified, sustainable and/or organic brand, ii) selling high-value organic fertilizer products, iii) renewable natural gas sales and iv)

selling air and water quality trading credits related to carbon and nutrients—all of which will be produced in an integrated production approach, supported by Bion’s 3G Technology.

Financial Analysis		<i>All figures in '000s</i>		
Beef Comparison - Snapshot				
Single 15,000-hd module				
	Traditional Feedlot	Bion Sustainable	Bion Organic	
Facility CAPEX	\$ 8,000	\$ 42,900	\$ 42,900	
Revenue				
Base Beef Revenues	\$ 50,943	\$ 65,498	\$ 65,498	
Sustainable Brand Premium		\$ 13,100	\$ 13,100	
Organic Brand Premium			\$ 26,199	
Biogas & RFS/LCFS Credits		\$ 3,602	\$ 3,602	
Coproducts		\$ 10,196	\$ 10,196	
Nutrient Credits		???	???	
Total Revenues	\$ 50,943	\$ 92,396	\$ 118,595	
Expenses				
Cattle Acquisition	\$ 29,824	\$ 44,737	\$ 55,921	
Operations	\$ 20,332	\$ 27,235	\$ 41,448	
Total Expenses	\$ 50,156	\$ 71,972	\$ 97,369	
Delta Δ				
EBITDA	\$ 787	\$ 20,423	\$ 21,225	
Pre-Tax Cash Flow	\$ 323	\$ 16,291	\$ 17,093	

The Financial Analysis Beef Comparison (left) and Project Valuation Potential (below) is based on numerous assumptions (see forward looking statements at the end of this document). It should be noted that Traditional cattle remain ‘on feed’ ~60 days longer than Sustainable/ Organic. Key assumptions include \$7.50/#N value for organic ammonium bicarbonate; \$7.50 MMBTU methane, \$2.75 D3 RIN, \$85.00 LCF credit, values.

The Beef Comparison is not a projection or illustration of beef production over time. The beef industry is cyclical, and subject to a wide range of variables. Profitability (or lack of) varies widely from year to year. The table is a snapshot to compare the profitability of traditional feedlot operations with the anticipated increased profitability (delta Δ) of Bion’s

sustainable and organic production, with all other conditions being equal. Changing market and other conditions, hedging strategies, etc., will affect the profitability of all three scenarios; however, Bion anticipates those variables will have approximately equal effect on each and that the EBITDA *delta between Bion’s sustainable and Bion’s organic vs traditional feedlot production will remain relatively constant.*

In today’s environment, Bion’s projected revenues from currently available sources can amortize the cost of technology adoption and related infrastructure in under three years. This amortization period can be shortened as evolving revenues, including environmental credit markets, fully mature. The key to these anticipated high returns is that Bion’s 3G Tech platform ‘stacks’ these new and/or expanded revenue streams with minimal incremental operating costs.

Specifically, Bion’s technology converts animal manure to high-value organic fertilizer products onsite, including ammonium bicarbonate crystals, a ‘pure’ readily available nitrogen source that can be used in many applications, including growing lower-cost organic corn (animal feed) at large scale. Such an organic nitrogen source, previously unaffordable, will significantly increase the yields in organic crop production, improving both the economic and environmental sustainability of ‘organic’. The scale at which ammonium bicarbonate can be manufactured from livestock waste is sufficient to support an expansion of organic production (and pricing) to a wider selection of crops. But more important, and unique to Bion, it will support a new organic segment of grass-fed *grain-finished* beef products. The combination of “sustainable” and “sustainable+organic” reinforces the opportunity for premium branding to a wider market segment, with improved revenues and margins.

Beyond a verified sustainable brand and organic ammonium bicarbonate fertilizer, Bion’s integrated production platform will produce renewable natural gas and the associated D3 RINS (and/or Low Carbon Fuel Standard credits in California), organic dry solids (soil supplement) and, eventually, verified nutrient (water quality) credits. In Pennsylvania, Bion has been leading a stakeholder group to enact legislation that

would allow the State, or its municipalities, to purchase verified nutrient reductions, such as those generated by the Bion platform, in lieu of much more expensive traditional options to meet their Chesapeake Bay nutrient mandates under the Clean Water Act. US EPA has expressed its support for water quality trading and other market-driven strategies that can reduce clean water costs. Bion believes policies developed for the Chesapeake Bay watershed will become a model for other watersheds, such as the Great Lakes and Mississippi River Basin, that face similar challenges.

Figure 2. Bion’s Technology Enables the Revenue to Fund the Transition



Bion’s intellectual property, consisting of both four U.S. patents (International applied for) and trade secrets, takes advantage of the arbitrage opportunity between today’s limited and high-cost supply of organic fertilizer/feed, and the essentially limitless supply of livestock waste at CAFOs. This symbiotic relationship is mutually reinforcing – increasing consumer demand for organic meat products generate more organic feed demand which increases the demand for organic fertilizer to support that demand.

Bion and its partners will have the means to open and expand a new market segment of premium-priced meat products by “harvesting” its waste. It should be noted that although the dynamics of the beef and pork sectors differ, Bion also intends to pursue the opportunity to supply sustainable and sustainable+organic products in the pork sector. As a capstone benefit, Bion’s onsite treatment can transform a CAFO from a “brownfield” non-point source permitted facility to a point source permitted facility. This will allow the operation to be valued by the market as any other industrial operation, based on a multiple of earnings, not the liquidation value of the plant, equipment, and animal inventory, as these facilities are valued today.

By expanding into premium branded products and realizing more effective supply chain integration, valuations related to livestock production can be further propelled by higher gross margins, reduced unit costs and reduced environmental impact. The end result is the opportunity for extraordinary wealth creation.

The Financial Impact – Potential Valuation

The financial impact analyses of Bion’s beef opportunity, both above and below, include premium pricing for two specific 15,000 head feedlot scenarios:

- “Environmentally Sustainable” branding where the livestock is confined for up to 120 days and fed a diet of conventional grains and distillers’ grains.
- “Environmentally Sustainable+Organic” branding for organic feeder cattle where the livestock are confined for up to 120 days and fed a ration of organic grains.

In both scenarios, the cattle will be housed in a covered barn feedlot with daily/continuous manure collection feeding Bion’s onsite waste treatment platform, resulting in the cattle being marketed with a USDA Processed Verified Program (PVP)-certified environmentally sustainable brand. In the Sustainable+ Organic scenario, those cattle will be sourced and finished subject to USDA organic guidelines.

For the sake of simplicity from a financial modeling standpoint, a single purpose vehicle (SPV) is assumed to be established to finance and own the cattle and the Bion technology platform, including the barns, anaerobic digesters and Bion’s 3G Tech treatment modules at the feeding operation. All incremental revenues and expenses are assumed to flow to the SPV so that the economics of the SPV can be isolated from that of the host feeding operation.

The capital requirements for the Bion technology platform are the same in both scenarios and is estimated at \$42,900,000. In both scenarios, we assume the CAPEX is financed 75% with 7-20-year debt at 6-7% p.a. For purposes of the IRR calculations, capital is assumed to be invested one year in advance of operations.

In both scenarios, revenue would be generated from the sale of organic ammonium bicarbonate fertilizer and carbon credits under California’ Low Carbon Fuel Standard (LCFS). The assumed price of the ammonium bicarbonate is based on market analysis, as well as a recent agreement to supply *liquid* ammonia that was made between a large dairy producer and a major national fertilizer producer. The value of LCFS credits is based on current market value using a low-end carbon intensity score (CI).

A branding premium will be available as a result of Bion’s sustainable branding capability, and we have assumed, as described above, that 100% of this premium flows to the SPV. We have estimated this premium at 20% of the carcass value. We have chosen a conservative figure based on existing practices for premiums paid for ‘program beef’.

The organic scenario takes credit for the increased revenue for having animals that have been fed and raised according to strict organic guidelines. We have estimated this premium at 50% for purposes of the proforma, and we have again assumed 100% of this premium flows to the SPV. As a point of reference, we note that *grass*-fed organic beef presently commands at least a 40% to 50% premium over conventional grain-fed beef.

No credit is taken in either scenario for the sale of nutrient credits, a market which is still evolving, or the value of recovered water, or residual processed manure solids containing irons, minerals, nutrients, and salts, because the market value of this material can vary widely by region. Further, no credit is taken with respect to the impact of probable Investment Tax Credits (related to biogas production) on CAPEX or any other government (federal, state or local) incentives/grants.

Utilizing the above assumptions, we estimate the leveraged IRR for a single 15,000 head module to be approximately 152% and 159% for the Sustainable and Sustainable+Organic scenarios, respectively, assuming no escalation of any unit prices associated with revenue or expense. Capital is fully returned in less than three years in both the Sustainable and Sustainable+Organic scenarios.

A further analysis was prepared to examine the financial performance of staging ten 15,000 head modules, both conventional (70%) and organic (30%), over time as follows:

Year	0	1	2	3	4	5	6
COMBINED SCENARIO (10 x 15,000-hd modules)							
Sustainable (15K-hd modules)		1	3	5	7	7	7
Organic (15K-hd modules)		0	1	2	3	3	3

In this scenario, a total of \$429 million invested (equity and debt) over 5 years (starting in Year 0) would generate annual EBITDA of approximately \$207 million, at full run-rate, by Year 4. Project value, based

