



Bion Update and Outlook – August 2019

It's been an eventful and successful 2019, so far. We expect even more this year, including hitting some major milestones as outlined below.

Policy and Pennsylvania Legislation

PA Senate Bill (SB) 575 – the successor to SB 799 – was introduced in the PA Senate Environmental Resources and Energy Committee at the beginning of June. The bill will establish a state-sponsored and funded program to purchase nutrient reduction credits from private sector providers like Bion. The Bill passed in the Senate at the end of June. Like SB 799, SB 575 enjoyed bipartisan support. The prime sponsor of the bill was Senator Gene Yaw (R), the Chairman of the Senate Environmental Resources and Energy Committee. Co-sponsors of the bill included:

Jake Corman (R)	Senate Majority Leader
Joe Scarnati (R)	Senate President pro tempore
Jay Costa (D)	Senate Minority Leader
John Yudichak (D)	Senate Enviro Committee Minority Chair

The Bill was approved by unanimous votes in the Environmental (10-0) and Appropriations (24-0) committees and passed the Senate by a bipartisan vote of 33-17. Further, the House companion bill – HB 1642 – was introduced in the State Government Committee and is anticipated to be taken up in the fall session, commencing Sep. 17, 2019.

Conclusion: Legislative leadership 'gets it'. There are concerns over litigation from Maryland and Virginia, as well as big NGO's that have standing in the Bay issues. The PA Watershed Improvement Plan, which seeks an additional \$250M in state funding annually for six years yet fails to meet the agreed upon nutrient reduction targets, has further highlighted leaderships' interest in a cost-effective alternative approach. Bion has a high confidence level that the combination of avoiding litigation, coupled with the need to act before the 2020 election, will result in passage of the legislation with a dedicated funding source. The alternative is a huge new spending program, based on the very same solutions that have failed to deliver promised results for decades. A dedicated funding source would provide long term funding stability to the program by avoiding the annual budget appropriation wars.

Bion and the national livestock groups supporting PA SB 575 believe that the PA legislation could be a model for a national cost share program. Recently, former USDA Secretary Thomas Vilsack [testified](#) before the Senate Agriculture Committee on the need for modification of USDA programs to directly support technology adoption. Such an approach would provide significant funding support for the implementation of onsite livestock waste treatment systems, such as Bion's. U.S. Representative Kind, of WI, and U.S. Senator Merkley, of OR, have proposed bipartisan tax credit bills that would support onsite livestock waste treatment implementation.

We believe that the PA legislation will be the driver for federal cost share funding in support of the competitive procurement approach. A policy framework comprised of competitive bidding and federal cost-sharing is consistent with recent EPA and USDA guidance. On Feb. 6, 2019, US EPA [announced](#) a new Water Quality Trading Policy Memorandum, titled, *EPA efforts seek to modernize the agency's water quality trading policies to leverage emerging technologies and facilitate broader adoption of market-based programs*. That sounds a lot like Bion and competitive procurement. Further, every state governor is faced with unfunded clean water mandates; a program that would benefit agriculture, clean water, and significantly reduce costs to state taxpayers, has broad appeal nationally.

3G Technology Development

As [announced](#) in April, we successfully concluded a series of computer simulations and evaporator testing directed at improving system efficiency and reducing cost. The pilot also included production of ammonium bicarbonate liquid to support Bion's filings with the Organic Materials Review Institute (OMRI) to secure certification for use as a fertilizer in the production of organic crops. We will be making our initial application to OMRI on the liquid ammonium bicarbonate in the coming quarters.

Applications for the ammonium bicarbonate crystals and the solids will follow to create a broad-based family of OMRI-approved products for various market segments, including organic row crops; organic feed; greenhouse, vertical and hydroponic farming; and lawn and garden markets.

Bion continues to work with its technology partners to streamline the technology platform to reduce both capital and operating costs. The next round of tech upgrade trials is anticipated to be completed by mid-September and Bion believes they will significantly streamline the technology platform, reducing capital costs and operating costs, and increasing capture efficiency. These efforts are all focused on final system configuration prior to the initial full-scale installation at Kreider Farms. The next round of trials is also expected to produce ammonium bicarbonate crystals in quantities sufficient for both OMRI certification and growth trials.

As part of our overall technology development efforts, Bion has retained beef industry experts that have been focused on a wide range of issues related to integrating Bion's technology platform into beef cattle feeding operations. Specifically, they are evaluating the differences between a traditional open feedlot vs. covered barns, including but not limited to housing, manure collection, feed ration, air flow, antibiotic use, rate of weight gain, mortality, etc. More about our beef opportunity below...

Co-Product Development

The 3G platform was designed to recover ammonium bicarbonate without the addition of chemicals, using processes that will qualify the products for use in organic crop production. Bion's patented process has been developed to produce fertilizers absent any additives. The process is based upon using manure as a feedstock to an anaerobic digester which produces a digestate that Bion's technology converts into multiple fertilizer products. Certification by OMRI will substantially increase the value of Bion's ammonium bicarbonate fertilizer products compared to synthetic fertilizers. We are confident the 3G system meets OMRI requirements.

Sustainable Branding

Bion's previous work with USDA's Process Verified Program (PVP), to secure a USDA-certified sustainable brand, opens up a unique opportunity to address consumer concerns with the beef industry. The beef industry is under fire from a diverse group for its impact on climate change, the environment and natural resources: consumers, regulatory agencies, competitors, investors, big (some global) environmental advocacy groups and NGOs. The success of Beyond Meats, Impossible Meats and other vegetarian alternatives to animal protein is proof that a growing number of consumers demand a more sustainable alternative.

Bion believes that the existing beef industry is the more sustainable model, *once the now-socialized environmental impacts have been addressed*. Bion can provide that model, at scale, within the existing U.S. supply chain. Bion's technology platform can deliver dramatic reductions in nutrient and carbon footprint, and water use, that will provide the most sustainable production available today. These metrics will form the initial basis for a USDA-certified sustainable brand. Bion has identified a blockchain firm that will integrate these third party verified environmental improvements into a blockchain that will provide further traceability to the marketplace and consumer.

Kreider 2

The Kreider 2 goals and timeline have not changed. Bion has an agreement in place with Kreider Farms to develop a large-scale 3G system to treat the waste and recover nutrients from nine million chickens (egg layers), as well as their 1,600 dairy cows. At full capacity, the system will treat approximately 450 tons per day of manure waste and capture approximately 92 percent of the nitrogen in the waste stream. As stated above, while we are confident that SB 575/ HB 1642 will be adopted in PA in 2019, Bion anticipates that completion of its technology platform and OMRI approval will enable the Kreider Project to move forward in the second half of 2019, absent the legislative program being operational.

Organic Beef Opportunity

Beyond the sustainable brand, Bion may also have a unique opportunity to produce organic corn-fed beef, which is essentially unavailable in the marketplace today. Organic is an appeal to consumer safety concerns and is the fastest growing segment in American agriculture. With successful OMRI certification of Bion's fertilizer products, Bion will be positioned to provide a consistent flow of OMRI-approved fertilizers to crop farmers in support of organic corn production. In essence, Bion anticipates its fertilizers will be utilized to produce the organic inputs used to produce organic corn-fed beef cattle in a closed loop system.

Today, organic beef is almost exclusively grass-fed, which lacks the texture and marbling consistent with consumer expectations for U.S. beef (it's tough and dry). Even so, an organic T-bone sells at prices over \$50 per pound, as much as four times the cost of a regular corn-finished T-bone. Bion believes the value of producing a corn-fed organic beef product, that is in keeping with consumers' developed tastes AND their demand for safety and sustainability, cannot be overemphasized. At the same time, Bion projects

that its cost to deliver an organic corn-fed beef to the consumer will be significantly more competitive than grass-fed, compared to regular beef prices.

Bion management has visited the Midwest on multiple occasions to discuss opportunities related to our policy/ technology/ consumer-based business model with various stakeholders. Bion is working towards developing a Midwest-based legal/ banking team to assist the company in its industry partnering objectives. We intend to focus on this exclusive opportunity, where we can generate branded premium pricing, converting our livestock partners and their feed suppliers from price-takers to price-makers.

Final Thoughts

The livestock industry is changing. It's not going to happen; it's happening now. The accelerating pace of the transition is being driven by various watchdog agencies and advocates, consumer reaction, and the industry's own inertia in avoiding its environmental issues until they reached crisis levels. It is this ripe and essentially untapped opportunity that explains the recent phenomenon that is Beyond Meat (BYND) and, I believe, bodes very well for Bion, assuming some success.

For those unfamiliar with BYND, they produce a plant-based alternative to ground beef and recently debuted a wildly successful Initial Public Offering (IPO). Their product is highly processed with insignificant (and debatable) nutritional differences with beef. It is marketed almost exclusively on its benefits to the environment and climate change, as well as animal welfare. Their substitute ground beef product sells for \$12 per pound, and they are a long way from profitability. That said, their stock had its IPO in May at \$35 and has traded as high as \$239, over \$12 Billion in market capitalization.

There is a lot more to the BYND story. It's a sexy story and it's gotten a lot of publicity. It is not directly related to Bion or indicative of Bion's success. However, a large part of the reason it has had the success it has, is the potential size of the market it addresses. In the world of U.S. and global food supply markets, there are no small markets; so, any success translates to big success. Wall Street predicts a \$40 to \$100 Billion market for alternative meat products in the next 10 to 15 years. The market addressed by Bion – essentially the entire animal protein market – is far larger. And cleaning up the largest pollution source in the U.S. is a pretty sexy story too. Food for thought.

This material includes forward-looking statements based on management's current reasonable business expectations. In this document, the words 'intend', 'expect', 'will (be)', and similar expressions identify certain forward-looking statements. These statements are made in reliance on the Private Securities Litigation Reform Act, Section 27A of the Securities act of 1933, as amended. There are numerous risks and uncertainties that could result in actual results differing materially from expected outcomes.

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