BioAmber Inc.
Form 10-K
March 15, 2016

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2015

OR

o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission file number: 001-35905

BioAmber Inc.

(Exact name of registrant as specified in its charter)

Delaware	20-1579162
(State or other jurisdiction of incorporation)	(I.R.S. Employer Identification No.)
1250 Rene Levesque West, Suite 4310	
Montreal, Quebec, Canada H3B 4W8	H3B 4W8
(Address of principal executive offices)	(Zip Code)

(514) 844-8000

(Registrant's telephone number, including area code)

Securities Registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Exchange on Which Registered
Common Stock, par value $0.01 per share	New York Stock Exchange

Securities Registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes o No x

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes o No x

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes x No o

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes x No o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer¨		Accelerated filer	x
Non-accelerated filer ¨	(Do not check if a smaller reporting company)	Smaller reporting company¨	

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes o No x

The aggregate market value of common stock held by non-affiliates of the registrant based on the closing price of the registrant's common stock as reported on the New York Stock Exchange on June 30, 2015, was $205 million. As of March 15, 2016, there were 28,781,753 shares of the registrant's common stock, par value $0.01 per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement relating to its 2016 Annual Meeting of Stockholders are incorporated by reference into Part III of this Annual Report on Form 10-K where indicated. Such Proxy Statement will be filed with the U.S. Securities and Exchange Commission within 120 days after the end of the fiscal year to which this report relates.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains “forward-looking statements” that involve risks and uncertainties, as well as assumptions that, if they never materialize or prove incorrect, could cause our results to differ materially from those expressed or implied by such forward-looking statements. The statements contained in this Annual Report on Form 10-K that are not purely historical are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or Exchange Act. Such forward-looking statements include any expectation of earnings, revenue or other financial items; any statements of the plans, strategies and objectives of management for future operations; factors that may affect our operating results; statements related to adding employees; statements related to future capital expenditures; statements related to future economic conditions or performance; statements as to industry trends and other matters that do not relate strictly to historical facts or statements of assumptions underlying any of the foregoing. Forward-looking statements are often identified by the use of words such as, but not limited to, “anticipate,” “believe,” “can,” “continue,” “coul
“estimate,” “expect,” “intend,” “may,” “will,” “plan,” “project,” “seek,” “should,” “target,” “will,” “would,” and similar expres
variations intended to identify forward-looking statements. These statements are based on the beliefs and assumptions of our management based on information currently available to management. Such forward-looking statements are subject to risks, uncertainties and other important factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those identified below, and those discussed in the section titled “Risk Factors” included in Item 1A of Part I of this Annual Report on Form 10-K, and the risks discussed in our other Securities and Exchange Commission, or SEC, filings. Furthermore, such forward-looking statements speak only as of the date of this report. Except as required by law, we undertake no obligation to update any forward-looking statements to reflect events or circumstances after the date of such statements. Forward-looking statements in this Annual Report on Form 10-K may include statements about:

- the expected funding sources of our future planned manufacturing facilities and the expected timing of the completion of construction and the start of commercial operations at each of these facilities;

- our joint venture with Mitsui & Co. Ltd., or Mitsui;

- our offtake agreements with Vinmar International Ltd., or Vinmar, related to bio-based 1,4-butanediol, which we refer to as 1,4 BDO or BDO, tetrahydrofuran, which we refer to as THF, and bio-based succinic acid, and with PTTMCC Biochem Company Limited, or PTTMCC Biochem, for bio-succinic acid;

- the expected market applications for our products and the sizes of these addressable markets;

- our ability to gain market acceptance for bio-succinic acid, its derivatives including 1,4 BDO and THF and other building block chemicals;

- our ability to ramp up commercial sales and execute on our commercial expansion plan, including the timing and volume of our future production and sales;

- the expected cost-competitiveness and relative performance attributes of our bio-succinic acid and the products derived from it;

- our ability to cost-effectively produce and commercialize bio-succinic acid, its derivatives and other building block chemicals;

- customer qualification, approval and acceptance of our products;

- our ability to maintain and advance strategic partnerships and collaborations and the expected benefits and accessible markets related to those partnerships and collaborations;

- the impact of our off-take agreements on our business with our customers, our distributors and our current and future equity partners;

- our ability to economically obtain feedstock and other inputs;

- the achievement of advances in our technology platform;

- our ability to obtain and maintain intellectual property protection for our products and processes and not infringe on others rights;

- government regulatory and industry certification approvals for our facilities and products;

- government policymaking and incentives relating to bio-chemicals; and

- our ability to maintain an effective system of internal controls, remediate our existing material weakness and prevent future material weaknesses or significant deficiencies from occurring;

PART I

Item 1.Business

Overview

We are an industrial biotechnology company producing sustainable chemicals. Our proprietary technology platform combines industrial biotechnology and chemical catalysis to convert renewable feedstocks into sustainable chemicals that are cost-competitive replacements for petroleum-derived chemicals, which are used in a wide variety of everyday products including plastics, resins, paints, food additives and personal care products. We currently sell our first product, bio-succinic acid, to customers in a variety of chemical markets. We produce bio-succinic acid at our facility in Sarnia, Ontario, pursuant to a joint venture agreement with Mitsui.. Prior to the completion of our Sarnia facility, we produced our bio-succinic acid in a large-scale demonstration facility in Pomacle, France.

Succinic acid can be used to manufacture a wide variety of products used every day, including plastics, food additives and personal care products, and can also be used as a building block for a number of derivative chemicals. Today, petroleum-derived succinic acid is not used in many potential applications because of its relatively high production costs and selling price. We believe that our low-cost production capability and our development of next-generation bio-succinic derived products including 1,4 BDO, which is used to produce polyesters, plastics, spandex and other products, will provide us with access to a more than $10 billion market opportunity. Combining these opportunities with other building block chemicals we are developing, such as adipic acid which is used in the production of nylons, we believe that our total addressable market is in excess of $30 billion.

We believe we can produce bio-succinic acid that is cost-competitive with succinic acid produced from oil priced as low as $30.00 per barrel, based on management’s estimates of production costs at our facility in Sarnia, Ontario and an assumed corn price of $4.00 per bushel. While we can provide no assurance that we will be able to secure corn at $4.00 per bushel given the fluctuations in corn prices, we believe this assumption is reasonable given the historic price of corn and management’s expectations as to their ability to manage the cost of corn and other inputs for our facility in Sarnia, Ontario. Over the past five years, the price of corn ranged from a low of $2.82 per bushel to a high of $8.44 per bushel. As of March 7, 2016, the spot price was $3.49 per bushel and the six-month forward price was $3.64 per bushel. We estimate that a $1.00 increase or decrease in the per bushel price of corn would result in just a $0.024 per pound change in the variable cost of our bio-succinic acid. We expect the productivity of our yeast and on-going process improvements to further reduce our production costs. Our ability to compete on cost is not dependent on government subsidies or tariffs.

We are working to rapidly expand our accessible markets and product portfolio. We have entered into strategic relationships with several leading companies, such as our multi-year agreements with PTTMCC Biochem for bio-succinic acid and Vinmar for bio-succinic acid, 1,4 BDO and THF. We have also entered into agreements with other companies for the supply of bio-succinic acid.

We have also entered into technology partnerships to lower our production costs, expand our product portfolio and enhance our biochemical production platform. For example, we entered into a technology partnership with Cargill, Inc., or Cargill, through which we exclusively license a proprietary yeast organism for use in our fermentation process to produce our products. We refer to the yeast organism that we have licensed from Cargill as “our yeast.” We have also established other technology licenses and collaborations, including with Johnson Matthey Davy Technologies, or Davy, and Celexion, LLC, or Celexion.

Our business strategy is to leverage the value of our technology by building and operating production facilities around the world. However, depending on our access to capital and third-party demand for our technology, we may also enter into technology licenses on an opportunistic basis.

We have entered into a joint venture agreement with Mitsui & Co. Ltd. for our facility in Sarnia, Ontario, which has a nameplate capacity of 30,000 metric tons of bio-succinic acid per year. We started commercial scale production at our Sarnia facility in October 2015 and ramp-up to full production capacity is expected by 2017. We terminated production at the large-scale demonstration facility in Pomacle, France at the end of 2014. Our joint venture with Mitsui also contemplates the potential construction and operation of an additional facility, which we expect to occur over the next three to five years.

On January 22, 2014, we entered into a 15 year offtake contract for bio-based 1,4 BDO with Vinmar, a privately held marketing, distribution, and project development company headquartered in Houston, Texas. Under the terms of the master offtake agreement, Vinmar has committed to purchase 100% of the bio-based 1,4 BDO and THF produced in our next plant, a 100,000 metric ton per year capacity plant that we plan to build in North America and commission in late 2018. Vinmar also plans to invest in the facility alongside us. While this agreement is binding, our inability to finance and construct this BDO and THF plant would relieve Vinmar of its obligation to purchase BDO and THF under the terms of the offtake agreement. We signed a second offtake agreement on July 3, 2014 with Vinmar to supply 10,000 metric tons of bio-succinic acid per year for 15 years from the Sarnia plant. A second agreement includes Vinmar off-taking 50,000 metric tons of the 70,000 metric tons of bio-succinic acid that we plan to produce in our next plant for 15 years. Vinmar has also committed to off-take 150,000 metric tons of the production from a third bio-succinic acid plant with 200,000 metric tons of annual capacity that we plan to begin building in 2019 and commission in 2021.

We are committed to managing our economic, social, environmental and ethical performance through continued sustainable business practices. We have completed a life cycle analysis for our facility in Sarnia that indicates that no carbon dioxide equivalent (greenhouse gases) will be emitted per kilogram of our bio-succinic acid produced, making our process carbon neutral. This is significantly less carbon emission intensive than the current petrochemical process for making succinic acid, in which 7.1 kilograms of carbon dioxide equivalent are emitted per kilogram of succinic acid produced. This represents a 100% reduction in greenhouse gases for our bio-succinic acid process, relative to the current petrochemical process for making succinic acid. The life cycle analysis also indicates that our facility in Sarnia will consume 64% less energy than the current petrochemical process.

We were incorporated in the State of Delaware in October 2008 as DNP Green Technology, Inc. and were established as the result of a spin-off of certain assets from Diversified Natural Products, Inc. In September 2010, we acquired the 50% interest in our joint venture Bioamber S.A.S. that we did not already own, after which, Bioamber S.A.S. became wholly owned by us. Concurrent with this acquisition, the Company changed its name from DNP Green Technology, Inc. to BioAmber Inc. and changed its fiscal year end from June 30 to December 31. Bioamber S.A.S. was wholly owned by the Company until its liquidation in December 2014.

Our Industry

The global chemical industry is a $2.5 trillion market, according to a 2015 report by Roland Berger Strategy Consultants. Chemicals are utilized in a broad range of end-use markets, including heavy industry, mining, construction, consumer goods, textiles and healthcare. While there is significant ongoing process innovation and technological development in the broader chemicals industry, producers are still heavily reliant on petroleum-derived feedstocks. The following table lists five of the key chemical classes from two carbon, or C2, to six carbon, or C6, that are primarily being produced from fossil fuels today along with examples of derivative compounds and end-use applications.

	C2	C3	C4	C5 and greater
	Ethylene	Propylene	n-Butane Butadiene	Benzene/Toluene/Xylene
Derivatives	•Ethylene glycol	•Acrylic	•Maleic anhydride	•Adipic acid
	•Polyethylene	•Polypropylene	•Succinic Acid	•Caprolactam
	•PVC		•1,4 BDO and THF	•Caprolactone
	•Vinyl			•Cyclohexane
				•Hexamethylenediamine (HMDA)

				•Hexanediol
Applications	•Anti-freeze	•Automotive components	•Adhesives	•Carpet fiber
	•Building materials	•Coatings	•Elastomers	•Clothing
	•Foam packaging	•Packaging	•Footwear	•Nylon
	•Plastic bags	•Plastic parts	•Synthetic rubber	•Thread, ropes and netting
	•Plastic films	•Textiles and fibers	•Tires	

Reliance on Petrochemicals

While the global chemical industry provides many value-added products to industrial and consumer end-markets, it is facing an increasing number of challenges as a result of its significant reliance on petroleum as its primary feedstock for the following reasons:

• A Finite, Non-Renewable Resource as its Primary Input. Chemical companies are heavily dependent on oil, a finite, non-renewable resource that is in growing demand, particularly from developing economies such as India and China.
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Recent supply growth has been limited. Given the demand pressures on such a critical input, the purchasers of chemical have shown growing interest in finding cost-effective, renewable alternatives.

- Hydrocarbon Feedstock Price Volatility. Crude oil prices have experienced significant price volatility over time. For example, during the last five years, the market price per barrel of West Texas Intermediate crude oil ranged from a low of $26.21 to a high of $112.93 and was $37.90 on March 7, 2016. As a result, we believe chemical companies are looking for more stable solutions.
- Potential for Margins Pressure at Existing Petrochemical Facilities. Given the price volatility around crude oil, chemical companies are increasingly concerned about rapid raw material price increases driven by supply shortages in basic petrochemical inputs that could negatively impact their profit margins. Due to the nature of contracts with their customers, chemical companies often cannot pass-through rising raw materials costs to their customers quickly.
- Reduced Supply of C4 Chemicals. In certain geographies including North America, there has been a shift away from naphtha cracking to natural gas liquid cracking as a means of producing ethylene. As such, there is significantly less crude C4 fraction produced, which is a principal source of supply for C4 chemicals. Consequently, the shift to natural gas cracking has led to a drop in the supply of crude C4, a primary feedstock for C4 chemicals. This has led to increased volatility in the prices of C4 derived chemicals, including butadiene, maleic anhydride and 1,4 BDO. While the significant reduction in global oil prices over the past 18 months has led to an increase in naphtha cracking in Europe and, to a lesser extent, the United States, which moderately reversed the shift from naptha cracking in favor of natural gas cracking, we believe this shift is temporary and will continue only for as long as oil prices remain low.
- Increasing Governmental Regulation. Increasing government regulation and climate change initiatives are driving up the cost of using high carbon emitting processes, such as chemical production via petrochemicals. The third phase of the European Union’s Emission Trading System when implemented is expected to more broadly cover petrochemical production activities, potentially increasing costs at European petrochemical plants. In addition to regulation of carbon emitting processes, the use of petrochemicals in certain products, such as plasticizers containing phthalates, are subject to increasing regulatory pressure.
- Customer Demand for Renewable and Sustainable Products. Consumers are increasingly choosing renewable alternatives to products when available. As consumers become more aware of the environmental footprint of petroleum-derived products, they may shy away from less sustainable products in favor of readily available, non-petrochemical based alternatives, especially if these products are priced competitively. We believe that there is demand among certain players in the chemical industry for sustainable alternatives in order to differentiate themselves from their competitors.

Biochemical Alternatives

We believe there is significant and growing demand for a low-cost and sustainable alternative to using petroleum for chemical production. Multiple biochemical processes have been developed to address this demand, primarily using microorganisms that can convert sugars derived from renewable feedstocks into various chemical building blocks including:

- Bio-succinic acid: A biologically produced, chemically identical replacement for petroleum-derived succinic acid that can be utilized to produce derivative products such as bio-based 1,4 BDO, and can substitute petrochemicals such as maleic anhydride, phthalic acid and adipic acid in a number of applications. Target end-uses for bio-succinic acid include plasticizers, polyurethanes, personal care products, resins and coatings, de-icing solutions, lubricants and food additives.
- Bio-adipic acid: A biologically produced, chemically identical replacement for adipic acid. Target end-uses for bio-adipic acid include nylon fibers, resins, plasticizers, solvents and adhesives.

Bio-succinic acid and bio-adipic acid are often referred to as “building block” chemicals because they can be converted into intermediate chemicals that are then used in the production of a wide array of consumer end-products.
Bio-succinic acid is produced from renewable sugars in a carbon dioxide-sequestering process, which results in higher theoretical yields than other bio-based chemicals, as shown in the table below.

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Chemical	Theoretical Yield	Kg Sugar Needed to Produce a Kg of Product
Bio-succinic acid	112%	0.9
Lactic acid	100%	1.0
Bio-based 1,4 BDO via succinic acid	85%	1.2
1,3 Propanediol	63%	1.6
Adipic acid		