UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-Q

(Mark One)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended March 31, 2024

OR

☐ **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 001-39378

ORIGIN MATERIALS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**87-1388928**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
930 Riverside Parkway, Suite 10 West Sacramento, CA	**95605**
(Address of principal executive offices)	**(Zip Code)**

(916) 231-9329
(Registrant's telephone number, including area code)

N/A
(Former name or former address, if changed since last report)

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

Title of each class:	Trading Symbol(s)	Name of each exchange on which registered:
Common Stock, $0.0001 par value per share	**ORGN**	**The NASDAQ Capital Market**
Warrants	**ORGNW**	**The NASDAQ Capital Market**

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 ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

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

The number of shares of the registrant's Common Stock, par value $0.0001 per share outstanding was 147,022,172, as of May 8, 2024.

ORIGIN MATERIALS, INC.

TABLE OF CONTENTS

WHERE YOU CAN FIND MORE INFORMATION

Investors and others should note that we announce material financial information to our investors using our investor relations website, which can be found at https://investors.originmaterials.com/, as well as press releases, SEC filings, and public conference calls and webcasts. We also use the following social media channels as a means of disclosing information about the company, our products, our planned financial and other announcements and attendance at upcoming investor and industry conferences, and other matters and for complying with our disclosure obligations under Regulation FD:

Origin X (f/k/a Twitter) Account (https://twitter.com/OriginMaterials)

Origin LinkedIn Page (https://www.linkedin.com/company/origin-materials)

Origin Facebook Page (https://www.facebook.com/people/Origin-Materials/100057468488825)

These channels may be updated from time to time on Origin’s investor relations website. The information we post through these channels may be deemed material. Accordingly, investors should monitor them in addition to following our investor relations website, press releases, SEC filings, and public conference calls and webcasts. This list may be updated from time to time. The information we post through these channels is not a part of this Quarterly Report on Form 10-Q.

PART I. — FINANCIAL INFORMATION

Item 1. Financial Statements

ORIGIN MATERIALS, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS

(In thousands, except share and per share data)	March 31, 2024 (Unaudited)	December 31, 2023
ASSETS		
Current assets		
Cash and cash equivalents	$ 75,773	$ 75,502
Marketable securities	70,857	82,761
Accounts receivable and unbilled receivable, net	16,595	16,128
Other receivables	4,234	3,449
Inventory	915	912
Prepaid expenses and other current assets	8,351	8,360
Total current assets	176,725	187,112
Property, plant, and equipment, net	238,184	243,118
Operating lease right-of-use asset	4,310	4,468
Intangible assets, net	108	121
Deferred tax assets	1,123	1,261
Other long-term assets	28,193	25,754
Total assets	**$ 448,643**	**$ 461,834**
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities		
Accounts payable	$ 2,034	$ 1,858
Accrued expenses	5,361	7,689
Operating lease liabilities, current	323	367
Notes payable, short-term	5,303	1,730
Other liabilities, current	973	918
Derivative liability	26	300
Total current liabilities	14,020	12,862
Earnout liability	265	1,783
Canadian Government Research and Development Program liability	15,286	7,348
Common stock warrants liability	692	1,341
Notes payable, long-term	3,459	3,459
Operating lease liabilities	4,123	4,207
Other liabilities, long-term	2,614	8,327
Total liabilities	40,459	39,327
Commitments and contingencies (See Note 15)		
STOCKHOLDERS' EQUITY		
Preferred stock, $0.0001 par value, 10,000,000 shares authorized; no shares issued and outstanding as of March 31, 2024 and December 31, 2023	—	—
Common stock, $0.0001 par value, 1,000,000,000 shares authorized; 146,504,924 and 145,706,531, issued and outstanding as of March 31, 2024 and December 31, 2023, respectively (including 4,500,000 Sponsor Vesting Shares)	15	15
Additional paid-in capital	385,718	382,854
Retained earnings	31,657	45,570
Accumulated other comprehensive loss	(9,206)	(5,932)
Total stockholders' equity	408,184	422,507
Total liabilities and stockholders' equity	**$ 448,643**	**$ 461,834**

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

ORIGIN MATERIALS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE (LOSS) INCOME
(Unaudited)

(In thousands, except share and per share data)	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
Revenues:		
Products	$ 6,822	$ 979
Services	3	725
Total revenues	6,825	1,704
Cost of revenues (exclusive of depreciation and amortization shown separately below)	6,687	960
Operating expenses		
Research and development	5,819	5,075
General and administrative	10,005	7,656
Depreciation and amortization	2,311	288
Total operating expenses	18,135	13,019
Loss from operations	(17,997)	(12,275)
Other income (expenses)		
Interest income	1,864	3,014
Interest expense	(117)	—
Gain in fair value of derivatives	296	760
Gain in fair value of common stock warrants liability	649	6,766
Gain in fair value of earnout liability	1,518	12,872
Other expenses, net	(8)	(1,368)
Total other income, net	4,202	22,044
(Loss) income before income tax expenses	(13,795)	9,769
Income tax expenses	(118)	—
Net (loss) income	$ (13,913)	$ 9,769
Other comprehensive (loss) income		
Unrealized gain on marketable securities	$ 570	$ 1,410
Foreign currency translation adjustment	(3,844)	120
Total other comprehensive (loss) income	(3,274)	1,530
Total comprehensive (loss) income	$ (17,187)	$ 11,299
Net (loss) income per share, basic	$ (0.10)	$ 0.07
Net (loss) income per share, diluted	$ (0.10)	$ 0.07
Weighted-average common shares outstanding, basic	141,828,895	138,651,062
Weighted-average common shares outstanding, diluted	141,828,895	142,454,369

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

ORIGIN MATERIALS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Unaudited)
(In Thousands, Except Share Amounts)

Three Months Ended March 31, 2023	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
Balance at December 31, 2022	143,034,225	$ 14	$ 371,072	$ 21,772	$ (15,953)	$ 376,905
Common stock issued upon exercise of stock options	163,096	—	23	—	—	23
Vested common stock awards	70,670	—	—	—	—	—
Stock-based compensation	—	—	2,915	—	—	2,915
Net income	—	—	—	9,769	—	9,769
Other comprehensive income	—	—	—	—	1,530	1,530
Balance at March 31, 2023	143,267,991	$ 14	$ 374,010	$ 31,541	$ (14,423)	$ 391,142

Three Months Ended March 31, 2024	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
Balance at December 31, 2023	145,706,531	$ 15	$ 382,854	$ 45,570	$ (5,932)	$ 422,507
Common stock issued upon exercise of stock options	585,760	—	83	—	—	83
Vested common stock awards	212,633	—	—	—	—	—
Stock-based compensation	—	—	2,781	—	—	2,781
Net loss	—	—	—	(13,913)	—	(13,913)
Other comprehensive loss	—	—	—	—	(3,274)	(3,274)
Balance at March 31, 2024	146,504,924	$ 15	$ 385,718	$ 31,657	$ (9,206)	$ 408,184

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

ORIGIN MATERIALS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)

(in thousands)	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
Cash flows from operating activities		
Net (loss) income	$ (13,913)	$ 9,769
Adjustments to reconcile net (loss) income to net cash used in operating activities:		
Depreciation and amortization	2,311	288
Amortization on right-of-use asset	151	157
Stock-based compensation	2,781	2,246
Realized loss on marketable securities	51	775
Amortization of premium and discount of marketable securities, net	(5)	—
Change in fair value of derivative	(296)	(760)
Change in fair value of common stock warrants liability	(649)	(6,766)
Change in fair value of earnout liability	(1,518)	(12,872)
Deferred tax benefits	111	—
Changes in operating assets and liabilities:		
Accounts receivable and other receivables	(1,252)	(3,577)
Inventory	(3)	(328)
Prepaid expenses and other current assets	31	(550)
Other long-term assets	(2,438)	(7,913)
Accounts payable	580	(110)
Accrued expenses	(1,951)	117
Operating lease liability	(122)	(175)
Other liabilities, current	(590)	680
Other liabilities, long-term	(14)	(48)
Net cash used in operating activities	(16,735)	(19,067)
Cash flows from investing activities		
Purchases of property, plant, and equipment	(1,939)	(40,963)
Purchases of marketable securities	(443,475)	(1,028,600)
Sales of marketable securities	441,432	1,000,712
Maturities of marketable securities	13,317	67,021
Net cash provided by (used in) investing activities	9,335	(1,830)
Cash flows from financing activities		
Payment of notes payable short-term	(1,532)	—
Proceeds from Canadian Government Research and Development Program	8,097	10
Proceeds from exercise of stock options	83	23
Net cash provided by financing activities	6,648	33
Effects of foreign exchange rate changes on the balance of cash and cash equivalents, and restricted cash held in foreign currencies	1,023	(40)
Net increase (decrease) in cash and cash equivalents, and restricted cash	271	(20,904)
Cash and cash equivalents, and restricted cash, beginning of the period	75,502	108,348
Cash and cash equivalents, and restricted cash, end of the period	$ 75,773	$ 87,444
Supplemental disclosure of cash flow information		
Stock-based compensation capitalized into property, plant, and equipment	$ —	$ 669
Purchases of fixed assets included in accounts payable and accrued expenses	$ 1,159	$ 12,005
Cash paid during the period:		
Income taxes payment	$ 7	$ —
Interest payment	$ 646	$ —

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

ORIGIN MATERIALS, INC.
NOTES TO UNAUDITED CONDENSED CONSOLIDATED FINANCIAL STATEMENTS

1. Organization and Business

Unless the context otherwise requires, references in these notes to “Origin”, “the Company”, “we”, “us” and “our” and any related terms are intended to mean Origin Materials, Inc. and its consolidated subsidiaries.

In June 2021, Artius Acquisition Inc. (“Artius”), a special purpose acquisition company, completed a merger with Micromidas, Inc., a Delaware corporation (now known as Origin Materials Operating Inc., (“Legacy Origin”)), Pursuant to the terms of the Merger Agreement (a business combination between Artius and Legacy Origin, the “Merger Agreement”) under which Legacy Origin became a wholly-owned subsidiary of Artius (the “Merger”) and Artius changed its name to Origin Materials, Inc. (collectively with its subsidiaries, the “Company”). The Company's mission to help enable the world’s transition to sustainable materials. Our innovative technologies include PET caps and closures that bring recycling circularity, specialty materials, and our patented biomass conversion platform that transforms carbon into sustainable materials for a wide range of end products including food and beverage packaging, clothing, textiles, plastics, car parts, carpeting, tires, adhesives, soil amendments and more. The Company’s biomass conversion technology can transform sustainable feedstocks, such as sustainably harvested wood, agricultural waste, wood waste and corrugated cardboard, into materials and products that are currently made from fossil feedstocks, such as petroleum and natural gas.

The Company achieved the mechanical completion of its first manufacturing plant in Ontario, Canada (“Origin 1”), the world’s first commercial chloromethylfurfural (“CMF”) plant, and the plant is currently fully operational. The Company is also currently in the planning phase for the construction of a significantly larger manufacturing plant (“Origin 2”).

2. Summary of Significant Accounting Policies

Basis of Presentation

The Company’s unaudited condensed consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America (“U.S. GAAP”) as determined by the Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (“ASC”) and pursuant to the regulations of the U.S. Securities and Exchange Commission (“SEC”).

Use of Estimates

The preparation of the condensed consolidated financial statements in accordance with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of commitments and contingencies at the date of the financial statements as well as reported amounts of revenues, costs and expenses during the reporting periods. Estimates made by the Company include, but are not limited to, valuation of the earnout liability, carrying amount and useful lives of property, plant and equipment and intangible assets, impairment assessments, stock-based compensation expense and probabilities of achievement of performance conditions on performance stock awards, among others. The Company bases these estimates on historical experience and on various other assumptions that it believes are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying amounts of assets and liabilities that are not readily apparent from other sources. Actual results could differ materially from those estimates.

Unaudited Interim Condensed Consolidated Financial Statements

The December 31, 2023 condensed consolidated balance sheet was derived from the annual audited consolidated financial statements included in the Company's Form 10-K as filed with the SEC on March 4, 2024 (the “Form 10-K”). The accompanying interim condensed consolidated balance sheet as of March 31, 2024, and the interim condensed consolidated statements of operations and comprehensive (loss) income, stockholders’ equity, and cash flows for the three months ended March 31, 2024 and 2023, and the notes to such interim condensed consolidated financial statements are unaudited.

These unaudited interim condensed consolidated financial statements have been prepared in accordance with U.S. GAAP and the applicable rules and regulations of the SEC for interim financial information. As permitted under those rules, we condensed or omitted certain footnotes or other financial information that are normally required by GAAP for annual financial statements.

The unaudited interim condensed consolidated financial statements have been prepared on the same basis as the audited annual consolidated financial statements and, in management's opinion, include all adjustments consisting of only normal recurring adjustments necessary for the fair presentation of the Company's financial position as of March 31, 2024 and its results of operations and cash flows for the three months ended March 31, 2024 and 2023. The results of operations for the three months ended March 31, 2024 are not necessarily indicative of the results to be expected for the full fiscal year or any other period.

These unaudited interim condensed consolidated financial statements should be read in conjunction with the Company's audited annual financial statements and notes thereto for the year ended December 31, 2023 included the Company's Form 10-K.

Principles of Consolidation

The unaudited interim condensed consolidated financial statements have been prepared in accordance with U.S. GAAP and applicable rules and regulations of the SEC and include the accounts of the Company and its wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentrations of credit risk are primarily cash, cash equivalents, marketable securities and accounts receivable. The Company maintains its cash, cash equivalents, and marketable securities accounts with financial institutions where, at times, deposits exceed federal insurance limits. Management believes that the Company is not currently exposed to significant credit risk as the Company's deposits are held at financial institutions that management believes to be of high credit quality. While the Company has not experienced losses of these deposits to date, future disruptions of financial institutions where we bank or have credit arrangements, or disruptions of the financial services industry in general, could adversely affect our ability to access our cash and cash equivalents. If we are unable to access our cash and cash equivalents as needed, our financial position and ability to operate our business could be adversely affected. For accounts receivable, our top two customers from product sales, in the aggregate, accounted for approximately 83% and 85% as of March 31, 2024 and March 31, 2023, respectively, of total accounts receivable outstanding balances and accounted for approximately 92% and 86% of total revenue for the three months ended March 31, 2024 and 2023.

Cash and Cash Equivalents

The Company considers all highly liquid investments with an initial maturity of three months or less at the date of purchase to be cash equivalents. The Company maintains such funds in cash deposits and money market accounts with balances of $75.8 million and $75.5 million as of March 31, 2024 and December 31, 2023, respectively.

Marketable Securities

The Company's investment policy requires the Company to purchase investments that are consistent with the classification of available-for-sale securities. The Company does not buy and hold securities principally for the purpose of selling them in the near future. The Company's policy is focused on the preservation of capital, liquidity, and return. The Company considers all of its marketable debt securities as available for use in current operations, including those with maturity dates beyond one year, and therefore classifies these securities within current assets on the condensed consolidated balance sheets. Securities are classified as available for sale and are carried at fair value, with the change in unrealized gains and losses, net of tax, reported as a separate component in the condensed consolidated statements of operations and comprehensive (loss) income until realized. Fair value is determined based on quoted market rates when observable or utilizing data points that are observable, such as quoted prices, interest rates and yield curves. Securities with an amortized cost basis in excess of estimated fair value are assessed to determine what amount of the excess, if any, is caused by expected credit losses. Expected credit losses on securities are recognized in other expenses, net in the condensed consolidated statements of operations and comprehensive (loss) income, and any remaining unrealized gains and losses, net of taxes, are included in accumulated other comprehensive loss in the condensed consolidated statements of stockholders' equity. For the purposes of computing realized and unrealized gains and losses, the cost of securities sold is based on the specific-identification method. Amortization of discounts and premiums, net, and interest on securities classified as available for sale are included as a component of interest income within other income (expenses).

The nature of these financial instruments include instruments for which quoted prices are available but traded less frequently, instruments whose fair value has been derived using a model where inputs to the model are directly observable in the market, or can be derived principally from or corroborated by observable market data, and instruments that are fair valued using other financial instruments, the parameters of which can be directly observed. Level 2 financial instruments include agency mortgage-backed securities, corporate fixed income securities infrequently traded, and other securities, which primarily consist of sovereign debt, U.S. government agency securities, loans, and state and municipal securities.

Derivative Financial Instruments

The Company enters into foreign currency derivative contracts with financial institutions to reduce foreign exchange risk related to marketable securities. The Company uses forward currency derivative contracts to minimize the Company’s exposure to balances primarily denominated in the British Pound Sterling and Australian Dollar. The Company’s foreign currency derivative contracts, which are not designated as hedging instruments, are used to reduce the exchange rate risk associated primarily with marketable securities. The Company’s derivative financial instruments program is not designated for trading or speculative purposes. Outstanding foreign currency derivative contracts are recorded at fair value on the condensed consolidated balance sheets.

Foreign currency derivative contracts are marked-to-market at the end of each reporting period with gains and losses recognized in the change in fair value of derivatives within other income (expenses). While the contract or notional amount is often used to express the volume of foreign currency derivative contracts, the amounts potentially subject to credit risk are generally limited to the amounts, if any, by which the counterparties’ obligations under the agreements exceed the obligations of the Company to the counterparties.

Fair Value of Financial Instruments

The Company applies the fair value measurement accounting standard whenever other accounting pronouncements require or permit fair value measurements. Fair value is defined in the accounting standard as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value hierarchy under current accounting guidance prioritizes the inputs to valuation techniques used to measure fair value into three broad levels (Level 1, Level 2, and Level 3).

Level 1 inputs are unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date. Level 2 inputs are inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. Level 3 inputs are unobservable inputs for the asset or liability and reflect the Company’s own assumptions about the assumptions that market participants would use in pricing the asset or liability (including assumptions about risk) in a principal market.

The carrying amounts of working capital balances approximate their fair values due to the short maturity of these items. Unless otherwise noted, it is management’s opinion that the Company is not exposed to significant interest rate, currency, or credit risks arising from its financial instruments.

The fair values of cash equivalents and the Common Stock Warrants which are publicly traded are level 1 inputs. The fair value of the Common Stock Warrants which are not publicly traded, marketable securities, and foreign currency derivative contracts are level 2 inputs as the Company uses quoted market prices or alternative pricing sources and models utilizing observable market inputs. The earnout liability was estimated using Level 3 inputs.

Accounts Receivable and Unbilled Receivable, net

We record accounts receivable at the stated amount of the transactions with our customers, and we do not charge interest. The allowance for credit losses, known as the Current Expected Credit Losses (“CECL”) model, is our best estimate of the amount of probable credit losses associated with our accounts receivable. We determine the allowance based on current conditions, and reasonable and supportable forecasts. Past-due balances are reviewed individually for collectability. We charge off account balances against the allowance after we have exhausted all means of collection and we consider the potential for recovery to be remote. Our accounts receivable generally have net 30 to net 90-day payment terms, and we usually receive consideration in accordance with the payment terms of the contract. As of March 31, 2024 and December 31, 2023, we do not have any allowance for credit losses. Unbilled receivables arise when the timing of customers billing differs from the timing of revenue recognition for the obligations performed.

(in thousands)		March 31, 2024		December 31, 2023
Accounts receivable	$	16,569	$	15,204
Unbilled receivable		26		924
Accounts receivable and unbilled receivable, net	$	16,595	$	16,128

Other Receivables

Other receivables consist of amounts due from foreign governmental entities related to the Canadian harmonized sales tax (“HST”) and goods and services tax (“GST”) for goods and services transacted in Canada, and amounts due from cash collateral held by others for foreign currency derivative contracts.

Inventory

Inventory is stated at the lower of cost or net realizable value. Cost is determined using a weighted-average cost approach, assuming full absorption of direct and indirect manufacturing costs, or based on cost of purchasing from our vendors. If inventory costs exceed expected net realizable value due to obsolescence or lack of demand, valuation adjustments are recorded for the difference between the cost and the expected net realizable value.

(in thousands)		March 31, 2024		December 31, 2023
Finished goods	$	—	$	24
Raw materials		883		888
Spare parts		32		—
Total	$	915	$	912

Property, Plant, and Equipment

Additions to property, plant, and equipment are recorded at cost and depreciated or amortized using the straight-line method over the estimated economic useful lives of the respective assets. The estimated useful lives of assets are as follows:

Computer equipment and software	3 years
Lab equipment	5 years
Furniture, fixtures, and machinery	5 years
Land improvements and infrastructure	20 years
Manufacturing equipment and pilot plant	25 years
Buildings	40 years

Land is non-amortizing. Computer equipment and software includes an immaterial amount of internal use software. Major additions and improvements are capitalized, while replacements, repairs, and maintenance that do not extend the life of an asset are charged to expenses.

Upon retirement or sale, the cost of assets disposed and the related accumulated depreciation or amortization are removed from the accounts and any resulting gain or loss is charged to income or loss from operations. Costs incurred to acquire, construct or install property, plant, and equipment during the construction stage of a capital project and costs capitalized in conjunction with major improvements that have not yet been placed in service are recorded as construction in progress, and accordingly are not currently being depreciated. The Company capitalizes stock-based compensation expenses and interest cost incurred on funds used to construct property, plant and equipment.

Intangible Assets

Intangible assets are recorded at cost and are amortized using the straight-line method over the estimated useful lives of the respective assets, ranging from 7 to 15 years. The cost of servicing the Company’s patents is expensed as incurred. Upon retirement or sale, the cost of intangible assets is disposed of and the related accumulated amortization is removed from the accounts.

(in thousands)	March 31, 2024	December 31, 2023
Patents	$ 405	$ 413
Less accumulated amortization	(297)	(292)
Total intangible assets	$ 108	$ 121

The weighted average remaining useful life of the patents was 3.16 years. For the three months ended March 31, 2024 and 2023, amortization expense was immaterial and annual amortization expense over the remaining useful life is not expected to be material.

Impairment of Long-Lived Assets

The Company reviews its long-lived assets, including property, equipment, software and intangibles, for impairment whenever events or changes in circumstances indicate that the carrying amounts of the assets may not be fully recoverable. If indicators of impairment exist, management identifies the asset group which includes the potentially impaired long-lived asset, at the lowest level at which there are separate, identifiable cash flows. If the total of the expected undiscounted future net cash flows for the asset group is less than the carrying amount of the asset, a loss is recognized for the difference between the fair value and carrying amount of the asset. As of March 31, 2024, no impairment was identified.

Common Stock Warrants Liability

The Company assumed 24,149,960 public warrants (the "Public Warrants") and 11,326,667 private placement warrants (the "Private Placement Warrants", and the Public Warrants together with the Private Placement Warrants, the "Common Stock Warrants" or "Warrants") upon the Merger, all of which were issued in connection with Artius' initial public offering and entitle each holder to purchase one share of Class A common stock at an exercise price of at $11.50 per share. As of March 31, 2024, 24,149,960 Public Warrants and 11,326,667 Private Placement Warrants are outstanding. The Public Warrants are publicly traded and are exercisable for cash unless certain conditions occur, such as the failure to have an effective registration statement related to the shares issuable upon exercise or redemption by the Company under certain conditions, at which time the Public Warrants may be cashless exercised. The Private Placement Warrants are transferable, assignable or salable in certain limited exceptions. The Private Placement Warrants are exercisable for cash or on a cashless basis, at the holder's option, and are non-redeemable so long as they are held by the initial purchasers or their permitted transferees. If the Private Placement Warrants are held by someone other than the initial purchasers or their permitted transferees, the Private Placement Warrants will cease to be Private Placement Warrants, and become Public Warrants and be redeemable by the Company and exercisable by such holders on the same basis as the other Public Warrants. There were no Private Placement Warrants that became Public Warrants as of March 31, 2024.

The Company evaluated the Common Stock Warrants under ASC 815-40, *Derivatives and Hedging-Contracts in Entity's Own Equity ("ASC 815-40")*, and concluded they do not meet the criteria to be classified in stockholders' equity. Specifically, the exercise of the Common Stock Warrants may be settled in cash upon the occurrence of a tender offer or exchange that involves 50% or more of our Class A stockholders. Because not all of the voting stockholders need to participate in such tender offer or exchange to trigger the potential cash settlement and the Company does not control the occurrence of such an event, the Company concluded that the Common Stock Warrants do not meet the conditions to be classified in equity. Since the Common Stock Warrants meet the definition of a derivative under ASC 815, the Company recorded these Warrants as liabilities on the condensed consolidated balance sheets at fair value, with subsequent changes in their respective fair values recognized in the change in fair value of common stock warrant liabilities within the condensed consolidated statements of operations and comprehensive (loss) income at each reporting date. The Public Warrants were publicly traded and thus had an observable market price to estimate fair value, and the Private Placement Warrants were effectively valued similar to the Public Warrants, as described in Note 5.

Earnout Liability

The Company has recorded an earnout liability related to future contingent equity shares related to the Merger (Note 9). The Company recorded these instruments as liabilities on the condensed consolidated balance sheets at fair value, with subsequent changes in their respective fair values recognized in earnings at each reporting date.

Leases

We determine if an arrangement is a lease at inception. Where an arrangement is a lease, we determine if it is an operating lease or a finance lease. The Company has leases for office space and equipment, some of which have escalating rentals during the initial lease term and during subsequent optional renewal periods. The Company accounts for its leases under ASC 842, *Leases*. The Company recognizes a right-of-use ("ROU") asset and lease liability for leases based on the net present value of future minimum lease payments. Lease expense is recognized on a straight-line basis over the non-cancelable lease term and renewal periods that are considered reasonably certain to be exercised.

Revenue Recognition

The Company began to recognize revenue in 2023. Our revenues are from product sales and service agreements. The majority of our contracts with customers typically contain multiple products and services. We account for individual products and services separately if they are distinct—that is, if a product or service is separately identifiable from other items in the contract and if a customer can benefit from it on its own or with other resources that are readily available to the customer.

The Company recognizes revenue in accordance with ASC 606, *Revenue from Contracts with Customers ("ASC 606")*. The core principle of ASC 606 requires that an entity recognize revenue to depict the transfer of promised goods or service to customers in an amount that reflects the consideration to which the Company expects to be entitled in exchange for those goods or services. In determining the appropriate amount of revenue to be recognized as we fulfill our obligations under our product revenue and service agreements, we perform the following steps:

1. Identifying the contract with a customer;
2. Identifying the performance obligations in the contract;
3. Determining the transaction price;
4. Allocating the transaction price to the performance obligations; and
5. Recognizing revenue when, or as, the performance obligations are satisfied.

We account for a contract with a customer when there is approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance and collectability of consideration is probable. Non-cancellable purchase orders received from customers to deliver a specific quantity of product, when combined with our order confirmation, in exchange for future consideration, create enforceable rights and obligations on both parties and constitute a contract with a customer.

Our service agreements are customized, specified, and often include various stages at which transaction prices are agreed to. These service agreements often include multiple performance obligations within each stage. We identify each performance obligation at contract inception and allocate the consideration to each distinct performance obligation based on the stand-alone selling price of each performance obligation. Our services are tailored to each individual customer and the stand-alone selling prices are not directly observable. As our service agreements include customers that are not in similar geographic markets and for different services, therefore the Company uses the expected cost plus margin approach to estimate the stand-alone selling price for each of our performance obligations. We recognize revenue from the service agreements over the period during which the services are performed and recognize the associated costs as they are incurred.

In general, we recognize revenue when, or as, our performance obligations under the terms of a contract with our customer are satisfied. For product sales, this happens when we transfer control of our products and risk of loss to the customer or when title passes upon shipment. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring our products. Taxes collected from customers and remitted to governmental authorities are excluded from revenues. The Company recognizes its revenue from direct product sales which is recognized at a point in time when the performance obligation is satisfied upon delivery of the product.

For service agreements, the timing of satisfying performance obligations may differ from the timing of the invoicing of customers and the receipt of customer payments. The Company records a receivable prior to payment if there is an unconditional right to payment. Alternatively, when payment precedes the provision of the related services, the Company records contract liability (deferred income) until the performance obligations are satisfied.

Revenue is recorded in an amount that reflects that consideration we expect to be entitled to in exchange for those goods or services. We have elected to treat shipping and handling activities as fulfillment costs.

Cost of revenues

Cost of revenues for product sales consists primarily of cost associated with the purchase of finished goods. Cost of revenues for service agreements is based on the actual cost incurred, which mainly consists of the direct cost from vendors and overhead costs such as payroll and benefit related to our employees who provide the services to customers.

Research and Development Cost

Costs related to research and development are expensed as incurred.

Stock-Based Compensation

The Company has issued common stock awards under three equity incentive plans. Origin measures stock options and other stock-based awards granted to employees, directors and other service providers based on their fair value on the date of grant and recognizes compensation expenses of those awards over the requisite service period, which is generally the vesting period of the respective award. In addition, the Company capitalizes stock-based compensation related to employees whose costs are necessary to bring the asset to its intended use. For awards with performance conditions, compensation is recorded once there is sufficient objective evidence the performance conditions are considered probable of being met. Origin applies the straight-line method of expense recognition to all awards with only service-based vesting conditions. Origin estimates the fair value of each stock option grant on the date of grant using the Black-Scholes option-pricing model and the grant date closing stock price for RSU awards and performance awards. The Black-Scholes option-pricing model requires the use of highly subjective assumptions including:

- *Expected term* – The expected term of the options is based on the simplified method, which takes into consideration the grant's contractual life and vesting period and assumes that all options will be exercised between the vesting date and the contractual term of the option which averages an award's vesting term and its contractual term.
- *Expected volatility* – The Company uses the trading history of various companies in its industry sector in determining an estimated volatility factor.
- *Expected dividend* – The Company has not declared common stock dividends and does not anticipate declaring any common stock dividends in the foreseeable future.
- *Forfeiture* – The Company estimates forfeitures based on historical activity and considers voluntary and involuntary termination behavior as well as analysis of actual historical option forfeitures, netting the estimated expense by the derived forfeiture rate.
- *Risk-free interest rate* – The Company bases the risk-free interest rate on the implied yield currently available on U.S. Treasury zero-coupon issues with the same or substantially equivalent remaining term.

Income Taxes

Deferred income taxes are determined using the asset and liability method. Under this method, deferred income tax assets and liabilities are determined based on differences between the financial reporting and tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. A valuation allowance is recorded when the expected recognition of a deferred income tax asset is considered to be unlikely.

The Company recognizes the tax benefit from an uncertain tax position only if it is more likely than not that the tax position will be sustained on examination by the tax authorities, based on the technical merits of the position. The tax benefit is measured based on the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement. The Company recognizes interest and penalties related to income tax matters as a component of income tax expense.

Functional Currency Translation

The functional currency of the Company's wholly-owned Canadian subsidiaries is the Canadian dollar, whereby their assets and liabilities are translated at period-end exchange rates except for non-monetary capital transactions and balances, which are translated at historical rates. All income and expense amounts of the Company are translated at average exchange rates for the respective period. Translation gains and losses are not included in determining net (loss) income but are accumulated in a separate component of stockholders' equity. Foreign currency transaction gains and losses are included in the determination of net (loss) income in the period in which they occur. These amounts are included in other expenses, net, of the unaudited condensed consolidated statements of operations and comprehensive (loss) income.

Comprehensive Income (Loss)

The Company's comprehensive income (loss) consists of net income (loss) and other comprehensive income (loss). Foreign currency translation gains or losses and unrealized gains or losses on available-for-sale marketable debt securities are included in the Company's other comprehensive income (loss).

Basic and Diluted Net (Loss) Income Per Share

Basic net (loss) income per common share is calculated by dividing the net (loss) income attributable to common stockholders by the weighted-average number of common shares outstanding during the period, without consideration of potentially dilutive securities. Diluted net (loss) income per share is computed by dividing the net (loss) income attributable to common stockholders by the weighted-average number of common stock and potentially dilutive securities outstanding for the period. For the purposes of the diluted net (loss) income per share calculation, common stock options, RSU awards, performance stock awards, warrants, earnout shares, and Sponsor Vesting Shares (as defined in Note 9) are considered to be potentially dilutive securities. For the periods presented that the Company has reported a net loss, diluted net loss per common share is the same as basic net loss per common share for those periods.

Segment Reporting

The Company operates in a single segment. Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker ("CODM") in making decisions regarding resource allocation and assessing performance. The Company has determined that its Co-Chief Executive Officers are the CODM. As of March 31, 2024, the Company's CODM has made such decisions and assessed performance at the Company level.

As of March 31, 2024 and December 31, 2023, the Company had $208.2 million and $206.1 million, respectively, of assets located outside of the United States.

3. Recent Accounting Pronouncements

In November 2023, the FASB issued ASU 2023-07, *Segment Reporting ("Topic 280") - Improvements to Reportable Segment Disclosures*, which updates disclosures about a public entity's reportable segments, including more detailed information about a reportable segment's expenses. The amendments in this update require that we disclose (i) on an annual and interim basis, significant segment expenses that are regularly provided to the chief operating decision maker ("CODM") and included within each reported measure of segment profit or loss (collectively referred to as the "significant expense principle"), (ii) on an annual and interim basis, an amount for other segment items by reportable segment and a description of its composition. The other segment items category is the difference between segment revenue less the segment expenses disclosed under the significant expense principle and each reported measure of segment profit or loss, (iii) annual disclosures about a reportable segment's profit or loss and assets currently required by Topic 280 in interim periods, (iv) clarify that if the CODM uses more than one measure of a segment's profit or loss in assessing segment performance and deciding how to allocate resources, we may report one or more of those additional measures of segment profit. However, at least one of the reported segment profit or loss measures (or the single reported measure, if only one is disclosed) should be the measure that is most consistent with the measurement principles used in measuring the corresponding amounts in the public entity's consolidated financial statements, (v) the title and position of the CODM and an explanation of how the CODM uses the reported measure(s) of segment profit or loss in assessing segment performance and deciding how to allocate resources, and (vi) requires that a public entity that has a single reportable segment provide all the disclosures required by the amendments in this update and all existing segment disclosures in Topic 280. This guidance is required to be applied retrospectively to all prior periods presented in the financial statements. This guidance is effective for the Company for its annual consolidated financial statements for the fiscal year ending December 31, 2024, and interim periods within its fiscal year beginning January 1, 2025. The Company does not expect that the adoption of this guidance will have a material impact on its consolidated financial statements, other than additional disclosures in the notes to our annual and interim consolidated financial statements.

In December 2023, the FASB issued ASU 2023-09, *Income Taxes (“Topic 740”) - Improvements to Income Tax Disclosures,* to provide information to better assess how an entity’s operations and related tax risks and tax planning and operational opportunities affect its tax rate and prospects for future cash flows. The amendments in this update require that on an annual basis we (i) disclose specific categories in the rate reconciliation, (ii) provide additional information for reconciling items that meet a quantitative threshold (if the effect of those reconciling items is equal to or greater than 5 percent of the amount computed by multiplying pretax income or loss by the applicable statutory income tax rate), (iii) disclose additional information about income taxes paid and expensed disaggregated by federal, state, and foreign taxes, and (iv) disclose income (loss) from continuing operations before income tax expense disaggregated between domestic and foreign. The guidance should be applied on a prospective basis however a retrospective application is permitted. The guidance is effective for the Company for annual periods beginning after December 15, 2024. Early adoption is permitted for annual financial statements that have not yet been issued or made available for issuance. The Company does not expect that the adoption of this guidance will have a material impact on its consolidated financial statements, other than additional disclosures in our notes to the consolidated financial statements.

The Company has determined that all other recently issued accounting pronouncements will not have a material impact on the Company’s consolidated financial statements or do not apply to its operations.

4. Revenues

The Company began to recognize revenues in 2023. We recognize revenues when, or as, our performance obligations under the terms of a contract with our customer are satisfied. We generally procure, will produce, and sell product to be utilized in the manufacturing of finished products, for which we recognize revenue upon shipment. Our service contracts generally pay us at the commencement of the agreement and then at additional intervals as outlined in each contract. We recognize contract liabilities for such payments and then recognize revenue as we satisfy the related performance obligations. To the extent collectible revenue recognized under this method exceeds the consideration received, we recognize contract assets for such unbilled consideration. We recognize revenue from the service agreements over the period during which the services are performed.

The Company did not receive payment before the provision of services during the three months ended March 31, 2024 and 2023. Therefore, deferred income was zero.

5. Fair Value Measurement

The Company’s financial assets and liabilities subject to fair value measurements on a recurring basis and the level of inputs used for such measurements were as follows:

	Fair Value as of March 31, 2024			
(in thousands)	Level 1	Level 2	Level 3	Total
Assets:				
Cash equivalents	$ 37,941	$ —	$ —	$ 37,941
Marketable securities	—	70,857	—	70,857
Derivative asset	—	48	—	48
Total fair value	$ 37,941	$ 70,905	$ —	$ 108,846
Liabilities:				
Common stock warrants (Public)	$ 471	$ —	$ —	$ 471
Common stock warrants (Private Placement)	—	221	—	221
Earnout liability	—	—	265	265
Derivative liability	—	26	—	26
Total fair value	$ 471	$ 247	$ 265	$ 983

(in thousands)	Fair Value as of December 31, 2023 Level 1	Level 2	Level 3	Total
Assets:				
Cash and cash equivalents	$ 75,502	$ —	$ —	$ 75,502
Marketable securities	—	82,761	—	82,761
Total fair value	$ 75,502	$ 82,761	$ —	$ 158,263
Liabilities:				
Common stock warrants (Public)	$ 913	$ —	$ —	$ 913
Common stock warrants (Private Placement)	—	428	—	428
Earnout liability	—	—	1,783	1,783
Derivative liability	—	300	—	300
Total fair value	$ 913	$ 728	$ 1,783	$ 3,424

The Company performs routine procedures such as comparing prices obtained from independent sources to ensure that appropriate fair values are recorded. The cash, cash equivalents and Public Warrants are categorized as Level 1 instruments as the fair value was determined based on the unadjusted quoted prices are available in active markets for identical assets or liabilities as of the reporting date. The marketable securities, derivative asset and derivative liability are categorized as Level 2 instruments as the estimated fair value was determined based on the estimated or actual bids and offers of the marketable securities in an over-the-counter market on the last business day of the period. The Warrants are classified within Level 1 or Level 2 because the transfer of Private Placement Warrants to anyone outside of certain permitted transferees of Artius Acquisition Partners LLC (the "Sponsor") would result in the Private Placement Warrants having substantially the same terms as the Public Warrants, the Company determined that the fair value of each Private Placement Warrant is consistent with that of a Public Warrant. Accordingly, the Private Placement Warrants are classified as Level 2 financial instruments.

The value of the Earnout liability is classified as Level 3 measurements under the fair value hierarchy, as these liabilities have been valued based on significant inputs not observable in the market (see Note 9). A gain of $1.5 million and $12.9 million during the three months ended March 31, 2024 and 2023, respectively, was recorded on the unaudited condensed consolidated statement of operations and comprehensive (loss) income in the gain in fair value of earnout liability.

The following table summarizes the activities for the earnout liability:

(in thousands)	March 31, 2024	March 31, 2023
Balance at beginning of period	$ 1,783	$ 42,533
Gain in fair value of earnout liability	(1,518)	(12,872)
Other	—	233
Balance at end of period	$ 265	$ 29,894

As of March 31, 2024 and December 31, 2023, the carrying values of accounts receivable, accounts payable, accrued liabilities and deferred income approximate their respective fair values due to their short-term nature. We have determined the fair value of notes payable approximates the carrying value due to the standard terms of the arrangement including but not limited to the amount borrowed, the term, and the interest rate.

Marketable Securities

The Company's marketable securities that are measured at fair value on a recurring basis and are categorized using the fair value hierarchy. Amortized cost net of unrealized gain (loss) is equal to fair value. The following table summarized the marketable securities by major security type as follows:

	As of March 31, 2024			
(in thousands)	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Corporate bonds	$ 13,271	$ 23	$ (730)	$ 12,564
Asset-backed securities	48,478	29	(1,901)	46,606
U.S. government and agency securities	11,551	2	(192)	11,361
Foreign government and agency securities	372	—	(46)	326
Total marketable securities	$ 73,672	$ 54	$ (2,869)	$ 70,857

	As of December 31, 2023			
(in thousands)	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Corporate bonds	$ 21,869	$ 26	$ (847)	$ 21,048
Asset-backed securities	52,199	26	(2,289)	49,936
U.S. government and agency securities	11,706	—	(270)	11,436
Foreign government and agency securities	372	—	(31)	341
Total marketable securities	$ 86,146	$ 52	$ (3,437)	$ 82,761

The realized gains and losses are included in other expenses, net in the unaudited condensed consolidated statements of operations and comprehensive (loss) income.

We sold marketable securities for proceeds of $441.4 million and $1,000.7 million during the three months ended March 31, 2024 and 2023, respectively. As a result of those sales, we realized a loss of $0.1 million and $0.8 million during the three months ended March 31, 2024 and 2023, respectively. We regularly review our available-for-sale marketable securities in an unrealized loss position and evaluate the current expected credit loss by considering factors such as historical experience, market data, issuer-specific factors, and current economic conditions. The aggregate fair value of the marketable securities in an unrealized loss position was $57.6 million and $73.2 million as of March 31, 2024 and December 31, 2023, respectively. The unrealized losses were attributable to changes in interest rates that impacted the value of the investments, and not related to increased credit risk. Accordingly, we have not recorded an allowance for credit losses associated with these investments.

The contractual maturities of the investments classified as marketable securities are as follows:

	As of March 31, 2024			
(in thousands)	Mature within one year	Mature after one year through two years	Mature over two years	Fair Value
Corporate bonds	$ 11,098	$ 1,264	$ 202	$ 12,564
Asset-backed securities	—	1,212	45,394	46,606
U.S. government and agency securities	8,994	—	2,367	11,361
Foreign government and agency securities	326	—	—	326
Total marketable securities	$ 20,418	$ 2,476	$ 47,963	$ 70,857

(in thousands)	As of December 31, 2023 Mature within one year		Mature after one year through two years		Mature over two years		Fair Value	
Corporate bonds	$	20,756	$	292	$	—	$	21,048
Asset-backed securities		238		1,806		47,892		49,936
U.S. government and agency securities		8,929		—		2,507		11,436
Foreign government and agency securities		341		—		—		341
Total marketable securities	$	30,264	$	2,098	$	50,399	$	82,761

Derivative Asset and Liabilities

The Company entered into foreign currency derivative contracts with financial institutions to reduce foreign exchange risk related to certain marketable securities denominated in foreign currency. Foreign currency derivative contracts are marked-to-market at the end of each reporting period with gains and losses recognized as other income (expenses). The Company recognized a net gain of $0.3 million and $0.8 million during the three months ended March 31, 2024 and 2023, respectively, on the fair value adjustment of the foreign currency derivative contracts. The notional amount of foreign currency derivative contracts as of March 31, 2024 and December 31, 2023 was $29.5 million and $14.7 million, respectively.

6. Property, Plant and Equipment

Property, plant, and equipment consisted of the following:

(in thousands)	March 31, 2024		December 31, 2023	
Land	$	11,341	$	11,356
Land improvements and infrastructure		62,174		62,930
Manufacturing equipment and pilot plant		114,491		116,754
Computer equipment and software		1,719		1,629
Lab equipment		3,599		3,468
Furniture, fixtures, and machinery		1,104		1,094
Total		194,428		197,231
Less accumulated depreciation and amortization		(10,351)		(8,136)
Construction in process		54,107		54,023
Total property, plant, and equipment, net	$	238,184	$	243,118

The depreciation and amortization expense totaled $2.3 million and $0.3 million during the three months ended March 31, 2024 and 2023, respectively.

The Company capitalized $0.2 million of interest cost into property, plant and equipment related to Origin 1 during the three months ended March 31, 2023 and there was no interest capitalized during the three months ended March 31, 2024. Interest and stock-based compensation capitalization ceased during the fourth quarter of 2023 as Origin 1 was completed.

7. Notes Payable

The Company maintains eight separate offtake supply agreements (the “Offtake Agreements”). Two of the eight Offtake Agreements are with the same customer and pertain to supply of product from Origin 1 and Origin 2, respectively.

Legacy Origin received a $5.0 million prepayment from a customer for product from Origin 1 pursuant to one of these Offtake Agreements, which Legacy Origin entered into in November 2016. The prepayment was to be credited against the purchase of products over the term of the Offtake Agreement. The prepayment was secured by a promissory note (the “Promissory Note”) to be repaid in cash in the event that the prepayment could not be credited against the purchase of product, for example, if Origin 1 was never constructed. The Promissory Note was collateralized substantially by Origin 1 and other assets of Origin Materials Canada Pioneer Limited. In May 2019, Legacy Origin and the customer amended the Offtake Agreement and Promissory Note. The amendment added accrued interest of $0.2 million to the principal balance of the prepayment and provided for the prepayment amount to be repaid in three annual installments rather than being applied against the purchase of product from Origin 1. On August 1, 2022, the Company and the customer further amended and restated the Promissory Note with an aggregate principal amount of $5.2 million, which is the sum of the original principal with accrued interest prior to the amendment. As a result of the amendment, the repayment dates were revised and to allow the customer to offset amounts owed for the purchase of product from the Company’s Origin 1 facility against amounts due under the Promissory Note. The repayment in the amount of $2.7 million is due on September 1, 2024, $1.9 million is due on September 1, 2025, and $1.8 million is due on September 1, 2026 (inclusive of accrued but unpaid interest of 3.5% per annum). At March 31, 2024, the total note principal outstanding was $5.2 million, of which $3.5 million was included in notes payable, long-term, and $1.7 million in notes payable, short-term, and unpaid accrued interest of $0.9 million was recorded in other liabilities, current. At December 31, 2023, the total note principal outstanding was $5.2 million, of which $3.5 million was included in notes payable, long-term, and $1.7 million in notes payable, short-term, and unpaid accrued interest of $0.8 million was recorded in other liabilities, current. In addition, the amendment reflected the customer’s exercise of its option to enter into a new Offtake Agreement to buy a specified annual amount of product from Origin 2 for an initial term of up to 10 years.

Legacy Origin received a $5.0 million prepayment from a customer for product from Origin 1 pursuant to an Offtake Agreement entered into in November 2016. The agreement was amended in 2019 and added the accrued interest of $0.1 million to the principal balance. As a result, the aggregate principal amount became $5.1 million. The prepayment was to be credited against the purchase of products from Origin 1 over the term of the Offtake Agreement, specifically, by applying a credit to product purchases each month over the first five years of operation of Origin 1 up to $7.5 million, which is equal to 150% of the prepayment amount. If product purchases are not sufficient to recover the advances, the application of the credit to purchases as payment of the advances would continue until fully repaid. The prepayment is secured by an agreement that was to be repaid in cash in the event the prepayment cannot be credited against the purchase of product, for example, if Origin 1 were never constructed. The agreement is collateralized substantially by Origin 1 and other assets of Origin Material Canada Pioneer Limited. If repaid in cash, the agreement bears an annual interest rate of the three-month Secured Overnight Financing Rate (“SOFR”) plus 0.25% (5.60% at March 31, 2024) and matures five years from the commercial operation date of Origin 1, which is defined by the plant's actual production of a certain volume of product as well as its capacity to produce a certain annual volume of product. In February 2024, Legacy Origin and the customer amended the agreement to provide for repayment with interest accrual in three installments consisting of approximately $2.2 million on March 1, 2024, $1.6 million on September 1, 2024, and $2.1 million on March 1, 2025 instead of applying a credit to product purchases under the Offtake Agreement. As a result, the amounts outstanding under the agreement were reclassified from other liabilities, long-term to notes payable, short-term and other liabilities, current and we paid the $2.2 million due on March 1, 2024. The remaining outstanding principal of $3.6 million at March 31, 2024 was recorded in notes payable, short-term and less than $0.1 million accrued interest outstanding was recorded in other liabilities, short-term. At December 31, 2023, the total amount outstanding of $5.1 million and accrued interest outstanding of $0.6 million was recorded in other liabilities, long-term.

8. Other Liabilities, Long-term

In September 2019, Legacy Origin entered into a $5.0 million prepayment agreement with a counterparty for the purchase of products from Origin 1. The prepayment is to be made in two equal installments: the first $2.5 million was paid in October 2019 and the remaining $2.5 million is due within 30 days of the customer confirming that a sample from Origin 1 meets the customer’s specifications. The Company and customer agreed to work in good faith to execute an Offtake Agreement, the agreed terms of which are set forth in the prepayment agreement, whereby 100% of the prepayment will be applied against future purchases. The prepayment agreement provides the customer a capacity reservation of up to a specified annual volume of product from Origin 1 for a term of ten years, pursuant to the terms of an Offtake Agreement. At March 31, 2024 and December 31, 2023, the total amount outstanding on this agreement was $2.5 million. On February 5, 2024, the parties entered into a memorandum of understanding by which they agreed that the counterparty would be released from its obligation to pay the remaining $2.5 million of the prepayment and that Legacy Origin would refund the first $2.5 million within a certain period after reporting in its Quarterly Report on Form 10-Q that its cash and cash equivalents has fallen below a specified threshold.

9. Earnout Liability

As additional consideration for the Merger, within ten business days after the occurrence of a “Triggering Event,” as defined below, the Company shall issue or cause to be issued to each Legacy Origin stockholder a certain number of shares of the Company Class A Common Stock. The number of such shares is equal to the product of (i) the number of shares of Company Common Stock, Company Series A Preferred Stock, Company Series B Preferred Stock, Company Series C Preferred Stock, and the net number of shares of Company Capital Stock that would be issuable in respect of “Vested Company Options” in the event such options were exercised (on a net exercise basis with respect to only the applicable exercise price, immediately prior to the “Closing” and settled in the applicable number of shares of Company Common Stock, rounded down to the nearest whole share) held by such Legacy Origin stockholder as of immediately prior to the “Effective Time”; and (ii) the “Earnout Exchange Ratio” (such issued shares of Artius Class A Common Stock, collectively, the “Earnout Shares”), where “Vested Company Options,” “Closing,” “Effective Time,” and “Earnout Exchange Ratio” have the meanings set forth in the Merger Agreement. The Company cannot be required to issue more than 25,000,000 Earnout Shares in the aggregate. A Triggering Event is defined as the following:

(a) the volume weighted average price of Common Stock (“VWAP”) equaling on exceeding $15.00 for ten consecutive trading days during the three year period following the Closing date of June 25, 2021, ending June 25, 2024;

(b) the VWAP equaling or exceeding $20.00 for ten consecutive trading days during the four year period following the Closing date, ending June 25, 2025; or

(c) the VWAP equaling or exceeding $25.00 for ten consecutive trading days during the five year period following the Closing date, ending June 25, 2026.

A Sponsor Letter Agreement was delivered in connection with the Merger such that 4.5 million of the shares held by Sponsor (“Sponsor Vesting Shares”) shall be subject to forfeiture based on the same vesting requirements as the Earnout Shares. These shares shall not be transferred prior to the date in which they vest. Dividends and other distributions with respect to Sponsor Vesting Shares shall be set aside by the Company and shall be paid to the Sponsor upon the vesting of such Sponsor Vesting Shares.

The Company evaluated the earnout liability under ASC 815-40, *Derivatives and Hedging-Contracts in Entity’s Own Equity (“ASC 815-40”)*, and concluded they do not meet the criteria to be classified in stockholders’ equity. Specifically, there are contingent exercise provisions and settlement provisions that exist. Holders may receive differing amounts of shares depending on the company’s stock price or the price paid in a change of control. All remaining shares would be issuable (or the forfeiture provisions would lapse) upon any change of control involving the Company and all remaining shares would be issuable (or the forfeiture provisions would lapse) upon a bankruptcy or insolvency of the company. This means that settlement is not solely impacted by the share price of the Company (that is, the share price observed in or implied by a qualifying change-in-control event), but also by the occurrence of a qualifying change-in-control event. This causes the arrangement to not be indexed to the Company’s own shares and liability classification is appropriate. The Company records these instruments as liabilities on the condensed consolidated balance sheets at fair value, with subsequent changes in their respective fair values recognized in earnings at each reporting date. The earnout liability was fair valued using a Monte Carlo open-ended model. The inputs used for the model were a dividend yield of 0% and 0%, volatility of 102% and 108%, and interest rate of 4.44% and 4.04% at March 31, 2024 and December 31, 2023, respectively.

10. Canadian Government Research and Development Program Liability

In April 2019, the Company entered into a contribution agreement related to the research and development and construction associated with the operation of Origin 1 in which the Company will participate in a Canadian government research and development program (the “R&D Agreement”). Pursuant to the R&D Agreement, the Company will receive funding for eligible expenditures incurred through March 31, 2023 up to the lesser of approximately 18.48% of eligible costs and $23.0 million (in Canadian dollars).

The funding will be repaid over 15 years after completion of Origin 1, commencing no sooner than the third fiscal year of consecutive revenues from a commercial plant, but no later than March 2028. The maximum amount to be repaid by the Company under the R&D Agreement is 1.25 times the actual funding received, subject to the following repayment ceiling formula. Repayment of the funding will be reduced by 50% if the Company begins construction before December 31, 2024 of one or more commercial plants that operate in Canada, with costs exceeding $500.0 million (in Canadian dollars), and the plants being constructed and operational within 30 months of the final investment decision, as defined in the R&D Agreement. Once begun, repayments will be paid annually by April of each year through March 31, 2037. Payments will be determined by a formula of the funded amount based on the fiscal year gross business revenue, as defined in the R&D Agreement. The Company received $8.1 million and zero during the three months ended March 31, 2024 and 2023, respectively. Also, the Company recorded a liability for the amount received of $15.3 million and $7.3 million at March 31, 2024 and December 31, 2023, respectively, on the condensed consolidated balance sheets in Canadian government research and development program liability.

11. Common Stock Warrants

As of March 31, 2024 and December 31, 2023 there are 35,476,627 warrants outstanding.

As part of Artius's initial public offering, 24,149,960 Public Warrants were sold. The Public Warrants entitle the holder thereof to purchase one share of Common Stock at a price of $11.50 per share, subject to adjustments. The Public Warrants may be exercised only for a whole number of shares of Common Stock. No fractional shares will be issued upon exercise of the Public Warrants. The Public Warrants will expire on June 25, 2026 at 5:00p.m., New York City time, or earlier upon redemption or liquidation. The Public Warrants are listed on the Nasdaq under the symbol "ORGNW."

The Company may redeem the Public Warrants when exercisable, in whole and not in part, at a price of $0.01 per warrant, so long as the Company provides not less than 30 days' prior written notice of redemption to each warrant holder, and if, and only if, the reported last sale price of the Common Stock equals or exceeds $18.00 per share for any 20 trading days within a 30-trading day period ending on the third trading day prior to the date the Company sends the notice of redemption to the warrant holders.

Simultaneously with Artius's initial public offering, Artius consummated a private placement of 11,326,667 Private Placement Warrants with the Sponsor. The Private Placement Warrant is exercisable for one share of Class A Common Stock at a price of $11.50 per share, subject to adjustment. The Private Placement Warrant expires on June 25, 2026 or earlier upon redemption or liquidation. The Private Placement Warrants are identical to the Public Warrants, except that: (1) the Private Placement Warrants and the shares of Class A Common Stock issuable upon exercise of the Private Placement Warrants are not transferable, assignable or salable until the earliest to occur of: (i) 365 days after the date of the Closing; (ii) the first day after the date on which the closing price of the Public Shares (or any successor securities thereto) equals or exceeds $12.00 per share (as adjusted for stock splits, stock dividends, reorganizations, recapitalizations and the like) for any 20 trading days within any 30-trading day period commencing at least 150 days after the date of the Closing; or (iii) the date on which Artius completes a liquidation, merger, capital stock exchange, reorganization or other similar transaction that results in all of Artius's Public Shareholders having the right to exchange their Public Shares (or any successor securities thereto) for cash, securities or other property, subject to certain limited exceptions, (2) the Private Placement Warrants will be exercisable on a cashless basis and be non-redeemable, except if the reference value equals or exceeds $10.00 and is less than $18.00 (as described above), so long as they are held by the initial purchasers or their permitted transferees, and (3) the Private Placement Warrants and the Class A ordinary shares issuable upon exercise of the Private Placement Warrants will be entitled to registration rights. If the Private Placement Warrants are held by someone other than the initial purchasers or their permitted transferees, the Private Placement Warrants will be redeemable under all redemption scenarios by the Company and exercisable by such holders on the same basis as the Public Warrants.

The Company concluded the Public Warrants and Private Placement Warrants, or Common Stock Warrants, meet the definition of a derivative under ASC 815 and are recorded as liabilities. Upon consummation of the Merger, the fair value of the Common Stock Warrants was recorded on the condensed consolidated balance sheets. The fair value of the Common Stock Warrants was remeasured on the March 31, 2024 and December 31, 2023 condensed consolidated balance sheets at $0.7 million and $1.3 million, respectively. A gain of $0.6 million and $6.8 million during the three months ended March 31, 2024 and 2023, respectively, was recorded on the unaudited condensed consolidated statements of operations and comprehensive (loss) income.

12. Stockholders' Equity

Common Stock

Holders of the Common Stock are entitled to dividends when, as, and if, declared by the Board, subject to the rights of the holders of all classes of stock outstanding having priority rights to dividends. As of March 31, 2024, the Company had not declared any dividends. The holder of each share of Common Stock is entitled to one vote.

Employee Stock Purchase Plan

The Company maintains an Employee Stock Purchase Plan ("ESPP"). The ESPP permits participants to purchase shares of our Common Stock with the purchase price of the shares at a price determined by our Board, which shall not be less than 85% of the lower of the fair market value of our Common Stock on the first day of an offering or on the date of purchase.

Initially, following adoption of the ESPP, the maximum number of shares of our Common Stock that may be issued under the ESPP was 1,846,710. The ESPP contains an "evergreen" share reserve feature that automatically increases the number of shares of Common Stock reserved for issuance under the plan on January 1 of each year for a period of ten years commencing on January 1, 2022 and ending on (and including) January 1, 2031 in an amount equal to the lesser of (1) one percent (1%) of the fully-diluted shares of our Common Stock on December 31st of the preceding calendar year, (2) 3,693,420 of Common Stock, or (3) such lesser number of shares as determined by our Board. As of December 31, 2023, the number of shares available for issuance under the ESPP was 5,639,944. Our Board made the decision not to increase the number of shares of Common Stock reserved for issuance under the ESPP as of January 1, 2024 as no stock has been offered or issued to employees under the ESPP to date. Shares subject to purchase rights granted under the ESPP that terminate without having been exercised in full will not reduce the number of shares available for issuance under the ESPP.

Equity Incentive Plans

The Company maintains the following equity incentive plans: the 2010 Stock Incentive Plan, the 2020 Equity Incentive Plan, and the 2021 Equity Incentive Plan, each as amended (together, the "Stock Plans"). Upon closing of the Merger, awards under the 2010 Stock Incentive Plan and 2020 Equity Incentive Plan were converted at the Exchange Ratio, which has the meaning set forth in the Merger Agreement, and the 2021 Equity Incentive Plan was adopted and approved.

Origin may grant a wide variety of equity securities under the Stock Plans, including incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock awards, RSU awards, performance-based stock awards, and other awards. The Company has granted incentive stock options, RSU awards, and performance awards under the Stock Plans. Under the Stock Plans, options must be issued at exercise prices no less than the estimated fair value of the stock on the date of grant and are exercisable for a period not exceeding 10 years from the date of grant. Options granted to employees under the Stock Plans generally vest 25% one year from the vesting commencement date and 1/36th per month thereafter, although certain arrangements call for vesting over other periods. Options granted to non-employees under the Stock Plan vest over periods determined by the Board (generally immediate to four years). RSU awards granted to employees under the 2021 Equity Incentive Plan require a service period of three years and generally vest 33.3% annually over the three-year service period. Under the Stock Plans, the fair value of RSU awards and performance-based stock awards are determined to be the grant date closing stock price. For awards with performance-based conditions, compensation is recorded once there is sufficient objective evidence the performance conditions are considered probable of being met. The performance-based stock awards are subject to vesting based on a performance-based condition and a service-based condition. The performance-based stock awards will vest in a percentage of the target number of shares between 0% and 300%, depending on the extent the performance conditions are achieved.

Initially, following adoption of the 2021 Equity Incentive Plan, there were 18,467,109 shares of Common Stock reserved for issuance under the Stock Plans. The 2021 Equity Incentive Plan contains an "evergreen" share reserve feature that automatically increases the number of shares of Common Stock reserved for issuance under the plan on January 1 of each year for a period of ten years commencing on January 1, 2022 and ending on (and including) January 1, 2031 in an amount equal to five percent (5%) of the fully-diluted Common Stock on December 31 of the preceding year unless our Board acts prior to January 1 to increase the share reserve by a lesser amount. The number of shares added to the share reserve on January 1 of a given year is reduced automatically to the extent necessary to avoid causing the share reserve to exceed fifteen percent (15%) of the fully-diluted Common Stock on December 31 of the preceding year. As of December 31, 2023, the number of shares available for issuance under the 2021 Equity Incentive Plan was 28,761,816. On January 1, 2024, the number of shares of Common Stock reserved for issuance under the 2021 Equity Incentive Plan was automatically increased by 1,242,387 shares pursuant to the 2021 Plan's "evergreen" provision to a total of 30,004,203 shares. As of March 31, 2024, there were 10,229,786 shares available for grant.

The following tables summarize stock option activity under the Stock Plans:

	Outstanding Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (in years)	Aggregate intrinsic value (in thousands)
Balance as of December 31, 2023	5,478,010	$ 0.17	6.05	
Exercised	(585,760)	0.14		
Forfeited / canceled	(22,224)	0.14		
Expired	(7,363)	0.29		
Balance as of March 31, 2024	4,862,663	$ 0.18	5.74	
Vested and expected to vest at March 31, 2024	4,862,663	$ 0.18	5.74	$ 1,652
Vested and exercisable at March 31, 2024	3,116,514	$ 0.20	5.25	$ 994

As of March 31, 2024, there were 3,116,514 options exercisable. The total intrinsic value of the options exercised was $0.2 million and $0.8 million during the three months ended March 31, 2024 and 2023, respectively. The intrinsic value of options exercised during each fiscal year is calculated as the difference between the market value of the stock at the time of exercise and the exercise price of the stock option. As of March 31, 2024, the Company had stock-based compensation of $1.0 million, related to unvested stock options not yet recognized that is expected to be recognized over an estimated weighted average period of 0.7 years.

The following table summarizes the RSU award activity:

	Outstanding	Weighted-average grant date fair value
Unvested balance at December 31, 2023	10,927,261	$ 1.94
Granted - RSU awards	1,286,831	0.65
RSU awards vested and converted to shares	(212,633)	3.60
Forfeited - RSU awards	(948,255)	2.50
Unvested balance March 31, 2024	11,053,204	$ 1.72
Expected to vest	11,053,204	

The following table summarizes the performance-based stock ("PSU") award activity:

	Outstanding	Weighted-average grant date fair value
Unvested balance at December 31, 2023	2,118,843	$ 5.77
Forfeited - PSU awards	(323,950)	7.07
Unvested balance March 31, 2024	1,794,893	$ 5.52

The RSU awards entitle the holder upon vesting to be issued on a future date the number of shares of Common Stock that is equal to the number of restricted stock units subject to the RSU awards. The total fair value of shares vested was $0.1 million and $0.4 million during the three months ended March 31, 2024 and 2023, respectively. The number of RSU awards vested during three months ended March 31, 2024 totaled 212,633, of which the issuance of 64,451 common shares has been deferred at the election of the participant. The common shares for the deferred RSUs will be released sixty days following the participant's departure from the Company.

The Company issued 455,368 performance-based stock awards during 2023. During the three months ended March 31, 2024, the performance conditions for the performance-based stock awards from 2023 were probable of being met, therefore $27.6 thousand performance award stock compensation has been recorded. As of March 31, 2024, there were 554,534 unvested performance-based awards subject to certain performance criteria for vesting. The vesting period for RSU awards is generally three years. Total remaining compensation expense for RSU awards to be recognized under the 2021 Equity Incentive Plan is $15.4 million as of March 31, 2024, and will be amortized on a straight-line basis over an estimated weighted average period of 2.1 years. The maximum amount of stock-based compensation expense for the unvested performance-based stock awards, assuming maximum performance, is $9.2 million. Total remaining compensation expense for performance-based stock awards will be recognized over the requisite service periods once the performance-based conditions are deemed to be probable.

During the three months ended March 31, 2024 and 2023, stock compensation expense of $2.1 million and $1.4 million, respectively, was recognized in general and administrative expenses, and $0.6 million and $0.8 million, respectively, was recognized in research and development expenses in the unaudited condensed consolidated statements of operations and comprehensive (loss) income.

13. Income Taxes

The provision for income taxes is recorded at the end of each interim period based on the Company's best estimate of its effective income tax rate expected to be applicable for the full fiscal year, adjusted for any discrete items during the quarter. The Company has recorded an income tax provision during the three months ended March 31, 2024 and 2023 of $0.1 million and zero, respectively, related to foreign income taxes in Canada. Other than Canadian income taxes, there is no provision for income taxes because the U.S. Company has incurred operating losses since inception. The Company's effective income tax rate was 0.86% and 0.00% for the three months ended March 31, 2024 and 2023, respectively. The Company continues to maintain a full valuation allowance on its net deferred tax assets in the U.S.

14. Leases

The Company leases office space and research and development space in Sacramento, California and Sarnia, Ontario under non-cancelable lease agreements and leases various office equipment, and warehouse space. Certain operating leases contain options to extend the lease. The Company included the periods covered by these options as we are reasonably certain to exercise the options for all leases. For leases with the option to extend on a month-to-month basis after the defined extension periods, the Company is reasonably certain to extend for the same term as related leases. As such, lease terms for all leased assets located at the same locations have the same end dates. Rent deposits relating to leases are included within other long-term assets on the condensed consolidated balance sheets. Variable lease costs include operating expenses for the shared common area, and the amount is based on an annual estimate of the actual common area expenses from the preceding year and are payable monthly. Certain leases were extended during the period ended September 30, 2023. The lease modifications were not accounted for as a separate contract and we remeasured our lease liabilities and ROU assets on the modification date. Our operating leases have remaining lease terms of one to nine years.

15. Commitments and Contingencies

Commitments

In April 2023, the Company entered into an agreement for conversion of materials produced by Origin 1 into certain derivatives. Pursuant to the agreement, the Company agreed to purchase conversion services for a certain minimum quantity of product on a take-or-pay basis for a term of 5 years beginning in 2025 for an aggregate total cost of $33.0 million. Accordingly the Company is obligated to purchase not less than $5.0 million during 2025 and a minimum of $7.0 million each of 2026 through 2029. The Company made advance payments totaling $14.0 million to the counterparty through March 31, 2024, which is included in the foregoing aggregate total, and the agreement provides for the Company to be fully reimbursed for the advance payments in the form of a discount on conversion services over the term. The agreement gives the Company the right, but not the obligation, to purchase conversion services for an additional quantity of product in 2024 and stipulates a reduction in the take-or-pay commitment under certain circumstances including the counterparty's inability to meet the required product specification. The agreement automatically renews for an additional year unless either party gives advance notice of an intention not to renew. In addition, either party may terminate the agreement in the event of the other party's insolvency or breach of a material term. The Company recorded the advance payments in other long-term assets on the condensed consolidated balance sheets.

In February 2023, the Company entered into a nonexclusive patent license agreement for use in connection with production at a specific licensed facility. The license expires upon cessation of production at that facility. The Company made a nonrefundable $5.0 million deposit in 2022 toward securing the license and, as a result of signing the license agreement, made an additional nonrefundable payment of $7.9 million during 2023 and may make additional payments depending on the achievement of certain milestones. The total payment is included in other long-term assets on the condensed consolidated balance sheets. In connection with this license, the Company entered into a conditional offtake agreement under which the licensor will supply the Company with a certain amount of the same type of products to be produced at the licensed facility in order to accelerate market development for these products and related applications.

In July 2017, the Company entered into a nonexclusive patent license agreement for $0.1 million, which expires upon expiration of the last to expire of the licensed patents. Under this agreement, the Company will pay less than $0.1 million minimum royalty payments per year and, if the Company develops and sells certain products based on the licensed patents. Certain products that Origin is currently developing and anticipates selling are expected to utilize these patents.

In December 2016, the Company entered into a patent license agreement for $0.5 million, which expires upon expiration of the last to expire of the licensed patents. Under this agreement, if the Company develops and sells specific products based on the patents, the Company would pay a royalty up to a cumulative $0.5 million from Origin 1, whereby no further payments will be due for any production at Origin 1. If production of those products occurs at subsequent facilities, the Company will pay an upfront license fee royalty and a variable royalty based on production at that subsequent facility, capped at an aggregate $10.0 million per facility. Certain products that the Company is currently developing and anticipates selling are expected to utilize these patents. No payments have been made under this agreement through March 31, 2024.

In November 2016, the Company entered into a nonexclusive patent license agreement, which expires upon expiration of the patent. Under this agreement, if the Company produces products based on the patent, the Company will pay an annual royalty upon commencement of operations on Origin 1 which will not exceed $1.0 million cumulatively. The pipeline of Company products and sales are not currently expected to be subject to this patent. The annual royalty payments are less than $0.1 million. The Company terminated the license effective April 26, 2024.

In September 2011, the Company entered into a nonexclusive patent license agreement, which expires upon expiration of the patent. Under this agreement, if the Company develops and sells specific products based on the patent, the Company would pay a royalty up to $2.0 million per year and $10.0 million in the aggregate. Certain products that the Company is currently developing and anticipates selling are expected to utilize these patents. No payments have been made under this agreement through March 31, 2024.

In June 2011, the Company entered into a nonexclusive patent license agreement, which expires upon expiration of the licensed patent. Under this agreement, the Company pays less than $0.1 million royalty fee annually and if the Company develops and sells specific products based on the patent, 0.4% of net sales. The pipeline of Company products and sales are not currently expected to be subject to this patent.

We enter into supply and service arrangements in the normal course of business. Supply arrangements are primarily for fixed-price manufacture and supply. Service agreements are primarily for the development of manufacturing processes and certain studies. Commitments under service agreements are subject to cancellation at our discretion which may require payment of certain cancellation fees. The timing of completion of service arrangements is subject to variability in estimates of the time required to complete the work.

Contingencies

At times there may be claims and legal proceedings generally incidental to the normal course of business that are pending or threatened against the Company. For instance, in August 2023, a shareholder filed a putative securities class action complaint in the Eastern District of California against the Company and certain of its officers, alleging violations of the federal securities laws. An different shareholder filed a separate complaint in October 2023, alleging the same claims against the same defendants. Both cases allege a class period of February 23, 2023 to August 9, 2023, and seek as relief, among other things, unspecified damages and fees and costs. The two cases have since been consolidated into *In re Origin Materials, Inc. Sec. Litig.*, No. 2:23-cv-01816-WBS-JDP (E.D. Cal.). A lead plaintiff was appointed for the consolidated case on December 14, 2023 and filed an amended complaint on March 1, 2024. At this preliminary stage in the litigation, the Company cannot predict any particular outcome or financial impact thereof, if any.

16. Basic and Diluted Net (Loss) Income Per Share

The following table sets forth the computation of basic and diluted net (loss) income per share attributable to common stockholders, Basic net (loss) income per share is computed by dividing net (loss) income for the period by the weighted-average number of common shares outstanding during the period, which excludes Sponsor Vesting Shares which are legally outstanding, but subject to return to the Company. Diluted net (loss) income per share is computed by dividing net (loss) income for the period by the weighted-average common shares outstanding during the period, plus the dilutive effect of the stock options and RSU awards, as applicable pursuant to the treasury stock method. The following table sets forth the computation of basic and diluted net (loss) income per share:

(In thousands, except for share and per share amounts)	Three Months Ended March 31,	
	2024	**2023**
Numerator:		
Net income attributable to common stockholders—Basic	$ (13,913)	$ 9,769
Net income attributable to common stockholders—Diluted	$ (13,913)	$ 9,769
Denominator:		
Weighted-average common shares outstanding—Basic (1)	141,828,895	138,651,062
Stock options	—	3,803,307
RSU awards	—	—
Weighted-average common shares outstanding—Diluted (1)	141,828,895	142,454,369
Net income per share—Basic	$ (0.10)	$ 0.07
Net income per share—Diluted	$ (0.10)	$ 0.07

(1) Excludes weighted-average Sponsor Vesting Shares subject to return of 4,500,000 shares for the three months ended March 31, 2024 and 2023.

Diluted net (loss) income per share reflects the potential dilution of securities that could share in the earnings of an entity. The following potentially dilutive securities for common stock were outstanding and excluded from diluted net (loss) income per share as they are subject to performance or market conditions that were not achieved as follows:

	Three Months Ended March 31,	
	2024	2023
Options to purchase common stock	1,481,531	1,481,531
Performance-based stock awards	1,794,893	2,054,650
Earnout shares	25,000,000	25,000,000
Sponsor vesting shares	4,500,000	4,500,000

The following outstanding shares of potentially dilutive securities were excluded from the computation of diluted net (loss) income per share attributable to common stockholders for the periods presented because including them would have been antidilutive:

	Three Months Ended March 31,	
	2024	2023
Options to purchase common stock	3,381,132	—
Warrants to purchase common stock	35,476,627	35,476,627
RSU awards	11,053,204	—

Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

Origin Materials, Inc. (“the Company”, “Origin”, “we”, “us” and “our”) makes forward-looking statements in this Quarterly Report on Form 10-Q (this “Report”) and in documents incorporated herein by reference. All statements, other than statements of present or historical fact included in or incorporated by reference in this Report, regarding the Company’s future financial performance, as well as the Company’s strategy, future operations, financial position, estimated revenues, and losses, projected costs, prospects, plans and objectives of management are forward-looking statements. When used in this Report, the words “anticipate,” “believe,” “continue,” “could,” “estimate,” “expect,” “intends,” “may,” “might,” “plan,” “possible,” “potential,” “predict,” “project,” “should,” “will,” “would,” the negative of such terms and other similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain such identifying words. These forward-looking statements are based on management’s current expectations, assumptions, hopes, beliefs, intentions and strategies regarding future events and are based on currently available information as to the outcome and timing of future events. The Company cautions you that these forward-looking statements are subject to all of the risks and uncertainties, most of which are difficult to predict and many of which are beyond the control of the Company, incident to its business.

These forward-looking statements are based on information available as of the date of this Report, and current expectations, forecasts and assumptions, and involve a number of risks and uncertainties. Accordingly, forward-looking statements in this Report and in any document incorporated herein by reference should not be relied upon as representing the Company’s views as of any subsequent date, and the Company does not undertake any obligation to update forward-looking statements to reflect events or circumstances after the date they were made, whether as a result of new information, future events or otherwise, except as may be required under applicable securities laws.

As a result of a number of known and unknown risks and uncertainties, the Company’s actual results or performance may be materially different from those expressed or implied by these forward-looking statements. Some factors that could cause actual results to differ include:

- the effectiveness of the Company’s disclosure controls and procedures and internal control over financial reporting;
- the Company’s future financial and business performance, including financial projections and business metrics;
- changes in the Company’s strategy, future operations, financial position, estimated revenues and losses, projected costs, prospects and plans;
- the Company’s ability to scale in a cost-effective manner;
- the Company’s ability to raise capital, secure additional project financing and secure government incentives;
- the Company’s ability to complete construction of its plants in the expected timeframe and in a cost-effective manner;
- the Company’s ability to procure necessary capital equipment and to produce its products in commercial quantities;
- the impact of laws and regulations and liabilities thereunder, including any decline in the value of carbon credits;
- the Company’s ability to procure and store necessary raw materials, works in process, and finished goods;
- any increases or fluctuations in raw material costs;
- the Company’s ability to avoid, mitigate, and recover from business and supply chain disruptions
- the ability to maintain the listing of the Company’s common stock on the Nasdaq Capital Market (“Nasdaq”); and
- the impact of worldwide economic, political, industry, and market conditions, global health crises, geopolitical instability, global supply chain disruptions, increased inflationary pressure, labor market constraints, bank failures, and other macroeconomic factors.

Other risks and uncertainties set forth in this Report, including risk factors discussed in Item 1A under the heading, “Risk Factors”.

Overview

Origin is an innovative materials company with a mission to enable the world's transition to sustainable materials. We have pioneered a technology that has the potential to replace petroleum-based materials with decarbonized materials in a wide range of end products addressing a ~$1 trillion market including food and beverage packaging, clothing, textiles, plastics, car parts, carpeting, tires, adhesives, soil amendments, fuels, and more. We have also developed other products that can enhance sustainability, such as our 100% polyethylene terephthalate ("PET") circular caps and closures that can enable fully-recyclable PET beverage containers and reduce waste through light-weighting, while providing enhanced performance to a greater than $65 billion market, such as greater oxygen and CO2 barrier properties that can increase shelf-life. These products complement our biomass conversion technology.

Our biomass conversion technology can convert sustainable feedstocks such as sustainably harvested wood residues, agricultural waste, wood waste, and even corrugated cardboard into materials and products that are currently made from fossil feedstocks such as petroleum and natural gas. The ability of our technology to use sustainable feedstocks that are not used in food production differentiates our technology from other sustainable materials companies that are limited to feedstocks used in food production such as vegetable oils or high fructose corn syrup and other sugars.

We believe that products made using Origin's biomass conversion technology at commercial scales can compete directly with petroleum-derived products on both performance and price while being sustainable. Due to abundant and renewable wood supplies that have historically stable pricing, our cost of production when using these feedstocks is expected to be more stable than potential competing platforms that use other types of feedstocks. We believe that end products made at commercial scale using our biomass conversion technology and wood feedstocks will have a significant unit cost advantage over products made from other low carbon feedstocks.

We have developed a proprietary biomass conversion technology to convert biomass, or plant-based carbon, into the versatile "building block" chemicals CMF and hydrothermal carbon ("HTC"), which we collectively refer to as Furanic Intermediates, as well as oils and extractives and other co-products. At commercial scale, our biomass conversion technology with wood feedstocks is expected to be able to produce CMF and HTC with a negative carbon footprint. We believe these chemicals can replace petroleum-based inputs, lowering the carbon footprint of a wide range of materials without increasing cost or sacrificing performance.

The following discussion and analysis should be read in conjunction with our unaudited condensed consolidated financial statement and the related notes appearing elsewhere in this Report. This discussion may contain forward-looking statements based upon current expectations that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth in the sections titled "Cautionary Note Regarding Forward-Looking Statements" and "Risk Factors" as set forth elsewhere in this Report. Unless the context otherwise requires, references in this section to "Legacy Origin", "Origin", "the Company", "we", "us" and "our" refer to the business and operations of Legacy Origin and its consolidated subsidiaries prior to the Merger and to Origin Materials, Inc. and its consolidated subsidiaries, following the closing of the Merger.

Business Environment and Trends

Our business and financial performance depend on worldwide economic conditions. We face global macroeconomic challenges, particularly in light of increases and volatility in interest rates, uncertainty in markets, inflationary trends, navigating complex and evolving regulatory frameworks, and the dynamics of the global trade environment. In addition to any lingering economic impacts of the COVID-19 pandemic, we have observed market uncertainty, civil unrest, global sanctions resulting from geopolitical conflicts, bank failures, increasing inflationary pressures, supply constraints and labor shortages in the past few quarters. These market dynamics, which we expect will continue into the foreseeable future, have and may continue to impact our business and financial results, including costs and revenues.

We believe demand for our products, which our signed offtake agreements and capacity reservations have shown to be strong and broad based, is likely to continue to exceed supply for the foreseeable future. Our commercial strategy has, accordingly, evolved from demand generation to revenue generation and the development of higher margin products.

We continue to see favorable tailwinds for our technology and business model. We are actively exploring several federal programs funded by the Inflation Reduction Act, including the Department of Energy's Advanced Industrial Facilities Deployment Program, or AIFD, and the Section 48C Advanced Manufacturing Tax Credit. These and other programs, many of which include climate and supply chain related directives, could provide positive momentum for us in securing additional funding for building plants and deploying our platform.

Product development progress remains strong. We continue to expand our IP position and engage in developmental activities with technical, strategic, and supply chain partners. We have demonstrated a significant performance milestone in our carbon black program, validating the suitability of our HTC-derived carbon black for automotive tires and mechanical rubber goods. Our carbon black blends were shown to meet or exceed fossil-based N660 performance for these applications and the results suggest they may be used more broadly, as well. With our first commercial plant, Origin 1, which commenced commercial-scale production in October 2023, we expect our ability to make production samples to increase, further bolstering our ability to advance product development objectives, including through funded joint development programs.

Key Factors and Trends Affecting Origin's Operating Results

We are in the early stages of generating revenue. We believe that our performance and future success depend on several factors that present significant opportunities for us but also pose risks and challenges, including those discussed below and under "Risk Factors" appearing elsewhere in this Report.

Basis of Presentation

We currently conduct our business through one operating segment and our historical results are reported under accounting principles generally accepted in the United States of America ("U.S. GAAP") and in U.S. Dollars. Upon commencement of commercial operations, we expect to expand our operations substantially, including in the United States and Canada, and as a result, we expect Origin's future results to be sensitive to foreign currency transaction and translation risks and other financial risks that are not reflected in Origin's historical financial statements. As a result, we expect that the financial results we report for periods after we begin commercial operations will not be comparable to the financial results included in this Report.

Components of Results of Operations

We are in the early stages of recognizing revenue and our historical results may not be indicative of our future results for reasons that may be difficult to anticipate. Accordingly, the drivers of our future financial results, as well as the components of such results, may not be comparable to our historical or projected results of operations.

Revenues

We evaluate financial performance and make resource allocation decisions based upon the results of our single operating and reportable segment. We generally procure, will produce, and sell product to be utilized in the manufacturing of finished products, for which we recognize revenue upon shipment. Our service contracts generally pay us at the commencement of the agreement and then at additional intervals as outlined in each contract. We recognize revenue as we satisfy the related performance obligations.

Cost of Revenues

Cost of revenues for product sales consists primarily of cost associated with the purchase of finished goods. Cost of revenues for service agreements is based on the actual cost incurred, which mainly consists of the direct cost from vendors and overhead costs such as payroll and benefit related to our employees who provide the services to customers.

Research and Development Expenses

To date, our research and development expenses have consisted primarily of development of CMF, HTC, levulinic acid, furfural, and oils and extractives, and the conversion of those chemical building blocks into products familiar to and desired by our customers, such as carbon black, furandicarboxylic acid ("FDCA"), polyethylene furanoate ("PEF"), paraxylene ("PX"), polyethylene terephthalate ("PET"), and PETF, which is a PET co-polyester incorporating FDCA and offering performance advantages over traditional PET plastic. Our research and development expenses also include personnel-related costs like stock-based compensation and professional fees, investments associated with the operations of the Origin 1 plant and planning and project development of the Origin 2 plant, including the material and supplies to support product development and process engineering efforts.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel-related costs, including stock-based compensation and professional fees, including, the costs of accounting, audit, legal, regulatory and tax compliance.

Gain in Fair Value of Common Stock Warrants Liability

The gain in fair value of common stock warrants liability consists of the change in fair value of the Warrants (the Public Warrants together with the Private Placement Warrants, the "Common Stock Warrants" or "Warrants"). We expect to incur incremental income (expenses) for the fair value adjustments for the outstanding common stock warrants liability at the end of each reporting period or through the exercise of the warrants.

Gain in Fair Value of Earnout Liability

The gain in fair value of earnout liability consists of the change in fair value of the future contingent equity shares related to the Merger. We recognize incremental income (expense) for the fair value adjustments of the outstanding liability at the end of each reporting period.

Other Income (Expenses)

Our other income (expenses) consists of income from governmental grant programs, interest expenses for notes payable and other liabilities, interest income on marketable securities, realized gain or loss on marketable securities, investment fee, and income or expenses related to changes in the fair value of derivative assets and liabilities. We expect to incur incremental income (expenses) for the fair value adjustments of these assets and liabilities at the end of each reporting period.

Income Tax Expenses

Our income tax expenses consist of an estimate for U.S. federal, state, and foreign income taxes based on enacted rates, as adjusted for allowable credits, deductions, uncertain tax positions, changes in deferred tax assets and liabilities, and changes in the tax law. We maintain a valuation allowance against the full value of our U.S. federal and state, net deferred tax assets and certain foreign net deferred tax assets because we believe the recoverability of the tax assets is not more likely than not. We have released the valuation allowance previously recorded against some of the foreign net deferred tax assets as we believe it is more likely than not they will be recovered.

Results of Operations

Comparison of the Three Months Ended March 31, 2024 and 2023

The following table summarizes the Company's results of operations with respect to the items set forth in such table for the three months ended March 31, 2024 and 2023 together with the change in such items in dollars and as a percentage.

(in thousands)	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023	Variance $	Variance %
Revenues:				
Products	$ 6,822	$ 979	$ 5,843	597 %
Services	3	725	(722)	(100)%
Total revenues	6,825	1,704	5,121	301 %
Cost of revenues (exclusive of depreciation and amortization shown separately below)	6,687	960	5,727	597 %
Operating expenses				
Research and development	5,819	5,075	744	15 %
General and administrative	10,005	7,656	2,349	31 %
Depreciation and amortization	2,311	288	2,023	702 %
Total operating expenses	18,135	13,019	5,116	39 %
Loss from operations	(17,997)	(12,275)	(5,722)	47 %
Other income (expenses)				
Interest income	1,864	3,014	(1,150)	(38)%
Interest expense	(117)	—	(117)	N/A
Gain in fair value of derivatives	296	760	(464)	(61)%
Gain in fair value of common stock warrants liability	649	6,766	(6,117)	(90)%
Gain in fair value of earnout liability	1,518	12,872	(11,354)	(88)%
Other expenses, net	(8)	(1,368)	1,360	(99)%
Total other income, net	4,202	22,044	(17,842)	(81)%
(Loss) income before income tax expenses	$ (13,795)	$ 9,769	$ (23,564)	(241)%

Revenues

Revenues increased $5.1 million, or 301%, during the three months ended March 31, 2024 compared to the same period in 2023. The increase in revenue is primarily attributable to our supply chain activation program.

Cost of Revenues

Cost of revenues increased $5.7 million, or 597%, during the three months ended March 31, 2024 compared to the same period in 2023. The increase is primarily attributable to the purchases associated with the Company's supply chain activation program.

Research and Development Expenses

Research and development expenses increased $0.7 million, or 15%, during the three months ended March 31, 2024 compared to the same period in 2023. The increase is mainly comprised of $0.6 million increase in payroll expense and $0.5 million increase in insurance and facilities, partially offset by $0.2 million decrease in stock-based compensation and $0.2 million decrease in travel and entertainment expenses.

General and Administrative Expenses

General and administrative expenses increased $2.3 million, or 31%, during the three months ended March 31, 2024 compared to the same period in 2023. The increase is primarily driven by $0.9 million increase in payroll expense, $0.7 million increase in stock-based compensation, $0.4 million increase in professional fees, and $0.4 million increase in maintenance and repairs related to Origin 1, partially offset by $0.2 million decrease in insurance and facilities.

Depreciation and Amortization Expenses

Depreciation and amortization expenses increased $2.0 million, or 702%, during the three months ended March 31, 2024 compared to the same period in 2023. The increase is mainly driven by the completion of Origin 1 during the fourth quarter of 2023 when Origin 1 went into production.

Interest Income

Interest income decreased $1.1 million, or 38%, during the three months ended March 31, 2024 compared to the same period in 2023. The decrease is mainly driven by the decline of the marketable securities balances.

Gain in Fair Value of Derivatives, Common Stock Warrants Liability, and Earnout Liability

The Company recognized an aggregate gain related to the gain in fair values of derivative, common stock warrant liability, and earnout liability of $2.5 million during the three months ended March 31, 2024 compared to an aggregate gain of $20.4 million during the same period in 2023. The aggregate gain related to the change in fair values decreased $17.9 million. The decrease in the gain related to the change in fair value of earnout liability of $11.4 million is the result of the revaluation of the earnout liability with the fair value of such liability decreasing less in the three months ended March 31, 2024 as compared to the same period in 2023. The $6.1 million decrease in the gain related to the change in fair value of common stock warrant liability is the result of smaller decrease in the fair value of the common stock warrants n the three months ended March 31, 2024 as compared to the same period in 2023. The movement in these instruments' fair values are driven by the value of the Company's stock price. The decrease of $0.5 million in the gain from change in fair value of derivative liabilities was associated with our foreign currency exchange purchases or sales.

Other Expenses, Net

Other expenses, net decreased $1.4 million, or 99%, during the three months ended March 31, 2024 compared to the same period in 2023. The changes are mainly driven by the realized gains and losses on marketable securities.

Non-GAAP Measures

To provide investors with additional information in connection with our results as determined in accordance with U.S. GAAP, we disclose Adjusted Earnings before Interest, Taxes, Depreciation, and Amortization ("Adjusted EBITDA") as a non-GAAP measure. Adjusted EBITDA is a key metric used by management and our board of directors (the "Board") to assess our financial performance. Adjusted EBITDA is also frequently used by analysts, investors, and other interested parties to evaluate companies in our industry, when considered alongside other U.S. GAAP measures. We use Adjusted EBITDA to supplement U.S. GAAP measures of performance to evaluate the effectiveness of our business strategies, make budgeting decisions and compare our performance against that of other companies using similar measures. This measure is not a financial measure calculated in accordance with U.S. GAAP, and it should not be considered as a substitute for net income, operating income, or any other measure calculated in accordance with U.S. GAAP, and may not be comparable to similarly titled measures reported by other companies.

Adjusted EBITDA

We believe that the presentation of Adjusted EBITDA is appropriate to provide additional information to investors about our operating profitability adjusted for certain non-cash items, non-routine items that we do not expect to continue at the same level in the future, as well as other items that are not core to our operations. Further, we believe Adjusted EBITDA provides a meaningful measure of operating profitability because we use it for evaluating our business performance, making budgeting decisions, and comparing our performance against that of other peer companies using similar measures.

We define Adjusted EBITDA as net income or loss adjusted for certain non-cash and non-recurring items, including (i) stock-based compensation expense, (ii) depreciation and amortization, (iii) interest income, (iv) interest expense, (v) change in fair value of derivative, (vi) change in fair value of common stock warrants liability, (vii) change in fair value of earnout liability, (viii) other expenses, net and (ix) income tax expenses.

	Three months ended March 31,	
(in thousands)	2024	2023
Net (loss) income	$ (13,913)	$ 9,769
Stock-based compensation	2,781	2,246
Depreciation and amortization	2,311	288
Interest income	(1,864)	(3,014)
Interest expense	117	—
Gain in fair value of derivatives	(296)	(760)
Gain in fair value of common stock warrants liability	(649)	(6,766)
Gain in fair value of earnout liability	(1,518)	(12,872)
Other expenses, net	8	1,368
Income tax expenses	118	—
Adjusted EBITDA	$ (12,905)	$ (9,741)

Liquidity and Capital Resources

Sources of Liquidity

Since inception, we have financed our operations principally from the sales and issuances of common stock, and governmental grant programs. Origin had $146.6 million in cash, cash equivalents, and marketable securities as of March 31, 2024, and the Company believes that this balance will be able to fund its planned operations for at least the twelve months following the date of issuance of the Form 10-Q. Our cash equivalents are invested primarily in U.S. Treasury money market funds and our marketable securities are primarily U.S. government and agency securities, corporate bonds, asset-backed securities, foreign government and agency securities, and municipal bonds.

We began generating revenue from our business operations in 2023. Our ability to successfully develop the products, commence commercial operations and expand the business will depend on many factors, including our ability to meet the working capital needs, the availability of equity or debt financing and, over time, our ability to generate cash flows from operations.

We will require a significant amount of cash for capital expenditures as we invest in the operation of Origin 1 and development of the Origin 2 plant, and additional research and development. In addition to our cash on hand, we anticipate that we will need substantial additional project financing, including from strategic partners, and government incentives to meet our financial projections, execute our growth strategy and expand our manufacturing capability. We anticipate that we will also enter into additional strategic partnerships to finance the construction of our Origin 2 plant. Our ability to obtain financing for the construction of future plants may depend in part on our ability to first enter into customer agreements sufficient to demonstrate adequate demand to justify the construction of such plants. We may also raise additional capital through equity offerings or debt financings, as well as through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties. Our future capital requirements will depend on many factors, including actual construction costs of the Origin 2 plant and the operation cost of Origin 1, changes in the costs in our supply chain, expanded operating activities and our ability to secure customers. If our financial projections are inaccurate, we may need to seek additional equity or debt financing from outside sources, which may not be available on acceptable terms, if at all. If we are unable to raise additional capital when required, our business, financial condition and results of operations would be harmed.

We expect to continue to incur operating losses in the near term as our operating and capital expenses are needed to support the growth of the business. We expect that our general and administrative expenses will continue to increase as we develop our PET cap and closure business, increase our spending on strategic partnerships, increase our sales and marketing activities, produce materials and operate as a public company.

Indebtedness

As of March 31, 2024 and December 31, 2023, we had $15.3 million and $7.3 million of indebtedness under a Canadian government program, respectively, of which $8.1 million and zero was received during the three months ended March 31, 2024 and 2023, respectively. Additionally, as of March 31, 2024, we had liability balances consisting of $3.5 million notes payable, long-term, $5.3 million notes payable, short-term, $0.9 million unpaid accrued interest recorded in other liabilities, current, and a $2.5 million customer prepayment recorded in other liabilities, long-term. As of December 31, 2023, we had liability balances consisting of $3.5 million notes payable, long-term, $1.7 million notes payable, short-term, $0.8 million unpaid accrued interest recorded in other liabilities, current, $5.7 million other liabilities, long-term with unpaid accrued interest and a $2.5 million customer prepayment recorded in other liabilities, long-term.

In November 2016, Legacy Origin received a $5.0 million prepayment from a legacy stockholder for product from Origin 1 pursuant to an "Offtake Agreement," a type of agreement that generally provided for binding take-or-pay commitments to purchase certain annual volumes of product from our planned manufacturing facilities at specified prices, subject to satisfaction of certain conditions precedent. The prepayment was to be credited against the purchase of products over the term of the agreement. The prepayment was secured by a promissory note to be repaid in cash in the event that the prepayment could not be credited against the purchase of product, for example, if Origin 1 were never constructed. The promissory note was collateralized substantially by Origin 1 and other assets of Origin Materials Canada Pioneer Limited. In May 2019, Legacy Origin and the legacy stockholder amended the Offtake Agreement and promissory note. The amendment added accrued interest of $0.2 million to the principal balance of the prepayment and provided for the prepayment amount to be repaid in three annual installments rather than being applied against the purchase of product from Origin 1. On August 1, 2022, Legacy Origin and the legacy stockholder amended the note to provide for repayment in three installments consisting of both principal and interest of $2.7 million on September 1, 2024, $1.9 million on September 1, 2025, and $1.8 million on September 1, 2026 and to allow the legacy stockholder to offset amounts owed for the purchase of product from Legacy Origin's Origin 1 facility against amounts due under the note. At March 31, 2024 the outstanding note principal balance was $5.2 million of which $3.5 million was included in notes payable, long-term and $1.7 million was included in notes payable, short-term and the outstanding accrued interest of $0.9 million was included in other liabilities, current. At December 31, 2023, the outstanding note principal balance was $5.2 million of which $3.5 million was included in notes payable, long-term and $1.7 million was included in notes payable, short-term and the outstanding accrued interest of $0.8 million was included in other liabilities, current.

In November 2016, Legacy Origin received a $5.0 million prepayment from a legacy stockholder for product from Origin 1 pursuant to an Offtake Agreement. The prepayment was to be credited against the purchase of products from Origin 1 over the term of the Offtake Agreement, specifically by applying a credit to product purchases each month over the first five years of operation of Origin 1 up to 150% of the prepayment amount—i.e., $7.5 million. The application of the credit to purchases would continue until the foregoing amount was fully repaid. The prepayment is secured by a note to be repaid in cash in the event the prepayment cannot be credited against the purchase of product, for example, if Origin 1 were never constructed. The note is collateralized substantially by Origin 1 and other assets of Origin Materials Canada Pioneer Limited. If repaid in cash, the note bears an annual interest rate of the three-month Secured Overnight Financing Rate ("SOFR") plus 0.25% (5.60% at March 31, 2024) and matures five years from the commercial operation date of Origin 1. In February 2024, Legacy Origin and the customer amended the agreement to provide for repayment with interest accrual in three installments consisting of approximately $2.2 million on March 1, 2024, $1.6 million on September 1, 2024, and $2.1 million on March 1, 2025 instead of applying a credit to product purchases under the Offtake Agreement. Accordingly, we paid the $2.2 million due on March 1, 2024. The remaining outstanding principal of $3.6 million at March 31, 2024 was recorded in notes payable, short-term and less than $0.1 million accrued interest outstanding was recorded in other liabilities, short-term. At December 31, 2023, the total amount outstanding was $5.1 million and accrued interest outstanding was $0.6 million recorded in other liabilities, long-term.

Prepayments

In September 2019, Legacy Origin entered into a $5.0 million prepayment agreement with a counterparty for the purchase of products from Origin 2. The prepayment is to be made in two equal installments: the first $2.5 million was in October 2019 and the remaining $2.5 million is due within 30 days of the customer confirming that a sample from Origin 1 meets the customer's specifications. Origin and the customer agreed to work in good faith to execute an Offtake Agreement, the agreed terms of which are set forth in the prepayment agreement, whereby 100% of the prepayment will be applied against future purchases. The prepayment agreement provides the customer a capacity reservation of up to a specified annual volume of product from Origin 1 for a term of ten years, pursuant to the terms of an Offtake Agreement. At both March 31, 2024 and December 31, 2023, the total amount outstanding on this agreement was $2.5 million, which was recorded in other liabilities, long-term. On February 5, 2024, the parties entered into a memorandum of understanding by which they agreed that the counterparty would be released from its obligation to pay the remaining $2.5 million of the prepayment and that Legacy Origin would refund the first $2.5 million within a certain period after reporting in its Quarterly Report on Form 10-Q that its cash on hand has crossed a specified threshold.

Cash Flows for the Three Months Ended March 31, 2024 Compared to the Three Months Ended March 31, 2023

The following table shows a summary of cash flows for the three months ended March 31, 2024 and 2023:

(in thousands)	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
Net cash used in operating activities	$ (16,735)	$ (19,067)
Net cash provided by (used in) investing activities	9,335	(1,830)
Net cash provided by financing activities	6,648	33
Effects of foreign exchange rate changes on the balance of cash and cash equivalents, and restricted cash held in foreign currencies	1,023	(40)
Net increase (decrease) in cash and cash equivalents, and restricted cash	$ 271	$ (20,904)

Cash Used in Operating Activities

Net cash used in operating activities for the three months ended March 31, 2024 was $16.7 million. Non-cash income recognized for the $1.5 million change in the fair value of earnout liability were deducted from net loss of $13.9 million, in addition to the $2.4 million increase in other long-term assets and the $2.0 million decrease in accrued expenses. These adjustments were partially offset by non-cash charges of $2.8 million for stock-based compensation and $2.3 million for depreciation and amortization.

Net cash used in operating activities for the three months ended March 31, 2023 was $19.1 million. Non-cash income recognized for the $12.9 million change in the fair value of earnout liability and $6.8 million change in fair value of common stock warrants liability were deducted from net income of $9.8 million, in addition to the $7.9 million increase in other long-term assets and the $3.6 million increase in accounts and other receivables. These adjustments were partially offset by the addition for non-cash charges of $2.2 million for stock-based compensation.

Cash Provided by (Used In) Investing Activities

Net cash provided by investing activities was $9.3 million for the three months ended March 31, 2024, compared to net cash used in investing activities of $1.8 million over the same period in 2023. The change was primarily related to the decrease in purchases of property, plant and equipment of $39.0 million and decrease in net purchases of marketable securities of $25.8 million which was offset by the change in maturities of marketable securities of $53.7 million.

Cash Provided by Financing Activities

Net cash provided by financing activities was $6.6 million for the three months ended March 31, 2024, compared to net cash provided by investing activities of $33.0 thousand over the same period in 2023. The change was primarily related to the proceeds from Canadian Government Research and Development Program of $8.1 million which was offset by the payment of $2.2 million on the short-term note payable in the three months ended March 31, 2024.

Material Cash Requirements from Known Contractual and Other Obligations

Our material cash requirements from known contractual and other obligations as of March 31, 2024, consisted of:

- The operating cost of Origin 1 and project development cost of Origin 2, plus the ongoing operating loss of the Company is expected to be funded through a combination of Company cash and marketable securities in addition to substantial project financing and government incentives. We also expect to secure funding for plant construction under potential collaborations, strategic alliances or marketing, distribution or licensing arrangements or debt financings, which have not yet been secured.
- Operating lease liabilities that are included in our consolidated balance sheets consists of future non-cancelable minimum rental payments under operating leases for our office space, research and development space, and leases of various office equipment, warehouse space, and temporary fencing. Operating lease liabilities of $0.3 million is short term and the remaining $4.1 million is related to long-term.
- In the near-term, the Company is anticipated to make payments related to the repayment agreement associated with the notes payable. The repayment in the amount of $2.7 million is due on September 1, 2024, $1.9 million is due on September 1, 2025, and $1.8 million is due on September 1, 2026 (inclusive of accrued but unpaid interest). However, the prepayment could be used to credit against the purchase of products over the term of the Offtake Agreement. For additional information regarding this repayment, see Note 7 - Notes Payable to the unaudited condensed consolidated financial statements in this Report.
- Additionally, the Company amended the agreement with another customer in February 2024 to provide for repayment in three installments. The Company paid the first installment and the remaining repayment amount including both principal and accrued interest of $1.6 million is due on September 1, 2024, and $2.1 million is due on March 1, 2025. Unlike the repayment agreement above, this prepayment cannot be used to credit against the purchase of products. For additional information regarding this repayment, see Note 7 - Notes Payable to the unaudited condensed consolidated financial statements in this Report.
- Furthermore, the Company has a prepayment agreement with a counterparty with $2.5 million due within 30 days of the customer confirming that a sample from Origin 1 meets the customer's specifications. On February 5, 2024, the parties to the prepayment agreement entered into a memorandum of understanding by which they agreed that the counterparty would be released from its obligation to pay the remaining $2.5 million of the prepayment and that Legacy Origin would refund the first $2.5 million within a certain period after reporting in its Quarterly Report on Form 10-Q that its cash on hand has crossed a specified threshold. For additional information regarding this repayment, see Note 8 - Other Liabilities, Long-term to the unaudited condensed consolidated financial statements in this Report.

Critical Accounting Policies and Estimates

Our financial statements have been prepared in accordance with U.S. GAAP. In the preparation of these condensed consolidated financial statements, we are required to use judgment in making estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities as of the date of the financial statements, as well as the reported expenses incurred during the reporting periods. On an ongoing basis, we evaluate our estimates and assumptions. Our actual results may differ from these estimates under different assumptions or conditions.

We consider an accounting judgment, estimate or assumption to be critical when (1) the estimate or assumption is complex in nature or requires a high degree of judgment and (2) the use of different judgments, estimates and assumptions could have a material impact on the consolidated financial statements. Our significant accounting policies are described in Note 2 to our unaudited condensed consolidated financial statements included elsewhere in this Report. Our critical accounting policies and estimates were described in Part II, Item 7, Critical Accounting Policies and Estimates in our Annual Report on Form 10-K for the year ended December 31, 2023, which was filed with the SEC on March 4, 2024. Accordingly, these are the policies and estimates we believe are the most critical to aid in fully understanding and evaluating our consolidated financial condition and results of operations:

- The estimates used in the determination of the fair value of the earnout liability
- The revenue recognition from contracts with customers

Recent Accounting Pronouncements

See Note 3 to the unaudited condensed consolidated financial statements in this Report for more information about recent accounting pronouncements, the timing of their adoption, and our assessment, to the extent we have made one, of their potential impact on our financial condition and results of operations and cash flows.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Not applicable.

Item 4. Controls and Procedures

Limitations on Effectiveness of Controls and Procedures

In designing and evaluating our “disclosure controls and procedures,” as such term is defined in Rule 13a-15(e) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and “internal controls over financial reporting,” as such term is defined in Rule 13a-15(f) under the Exchange Act, our management, including our Co-Chief Executive Officers and Chief Financial Officer, believe that our disclosure controls and procedures and our internal control over financial reporting are designed to provide reasonable assurance of achieving their objectives and are effective at the reasonable assurance level. Our management does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent all errors and all instances of fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control deficiencies and instances of fraud, if any, have been detected. The design of any system of controls also is based partly on certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Evaluation of Disclosure Controls and Procedures

Our management, under the direction of our Co-Chief Executive Officers and Chief Financial Officer, has evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of the period covered by this Quarterly Report on Form 10-Q. Based on this evaluation, our management, including our Co-Chief Executive Officers and Chief Financial Officer, has concluded that, as of March 31, 2024, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control Over Financial Reporting

There has been no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act), during the three months ended March 31, 2024 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. — OTHER INFORMATION

Item 1. Legal Proceedings

For a description of our legal proceedings, please see the description set forth in Note 15 "Commitments and Contingencies" in the notes to the condensed consolidated unaudited financial statements included in Item 1 of Part I of this Form 10-Q, which is incorporated herein by reference.

Item 1A. Risk Factors

The following risk factors summary and other information included in this Report should be carefully considered. The summary risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties not currently known to us or that we currently deem less significant may also affect our business operations or financial results. If any of the following risks actually occur, our stock price, business, operating results and financial condition could be materially adversely affected. For more information, see below for more detailed descriptions of each risk factor.

- We are an early stage company with a history of losses and our future profitability is uncertain.
- We may not manage growth effectively.
- Our business plan assumes we can secure substantial additional project financing and government incentives, which may be unavailable on favorable terms, if at all.
- Construction of additional plants beyond Origin 1, and of manufacturing lines for our PET caps and closures, may not be completed in a cost-effective manner or at all. Any delays in or failure to finance and complete the construction of additional plants, or of manufacturing lines, could severely impact the implementation of our biomass conversion and/or PET caps and closures technologies.
- We plan to rely on a limited number of plants and manufacturing lines to meet customer demand for our future intermediate chemical sales, and PET caps and closures sales, respectively.
- We have not yet produced any of our products in large commercial quantities.
- We rely on a limited number of customers for a significant portion of our near-term revenue.
- Our industry is highly competitive, and we may lose market share to producers of products that can be substituted for our products, which may have an adverse effect on our results of operations and financial condition.
- Increases or fluctuations in the costs of our raw materials may affect our cost structure.
- We are dependent on third-party suppliers and service providers, some of which are sole source suppliers, who may fail to deliver raw materials or equipment or fail to supply needed services at all or according to schedules, prices, quality and volumes that are acceptable to us, or we may be unable to manage these supplies effectively.
- We have entered into and may in the future enter into collaborations, strategic alliances, or licensing arrangements, which expose us and our intellectual property to competitive risks and limitations associated with third-party collaborations and that may not produce the benefits we anticipate.
- Compliance with extensive environmental, health and safety laws could require material expenditures, changes in our operations or site remediation.
- Our business relies on proprietary information and other intellectual property, and our failure to protect our intellectual property rights could harm our competitive advantages with respect to the use, manufacturing, sale or other commercialization of our processes, technologies and products, which may have an adverse effect on our results of operations and financial condition.
- We may face patent infringement and other intellectual property claims that could be costly to defend, result in injunctions and significant damage awards or other costs (including indemnification of third parties or costly licensing arrangements, if licenses are available at all) and limit our ability to use certain key technologies in the future or require development of non-infringing products or technologies, which may cause us to incur significant unexpected costs, prevent us from commercializing our products and otherwise harm our business.
- We rely on trade secrets to protect our technology, and our failure to maintain trade secret protection could limit our ability to compete.

- Our management has limited experience in operating a public company.
- We previously identified a material weakness in our internal control over financial reporting that we have concluded has been remediated. However, we may identify additional material weaknesses in the future or fail to maintain effective internal control over financial reporting, which may result in material misstatements of our consolidated financial statements or cause us to fail to meet our periodic reporting obligations.

The following risk factors apply to our business and operations. These risk factors are not exhaustive, and investors are encouraged to perform their own investigation with respect to our business, financial condition and prospects. We may face additional risks and uncertainties that are not presently known to us, or that we currently deem immaterial, which may also impair our business. The following discussion should be read in conjunction with the unaudited consolidated financial statements and notes to such consolidated financial statements included elsewhere in this Report and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section of this Report.

Risks Related to Our Business

We are an early stage company with a history of losses and our future profitability is uncertain.

We have had a history of net losses due to our primary focus on research and development, plant construction, capital expenditures and early-stage commercial activities. Substantially all of our net losses since inception have resulted from our plant construction, research and development, and general and administrative costs associated with our operations. We have only recently begun generating revenue, and we expect that our net losses from operations will continue for the foreseeable future. Based on our estimates and projections, which are subject to significant risks and uncertainties, we expect our commercial scale production to be limited for several years and challenges with the design, construction, funding, and labor and equipment supply for our plants may further delay this timeline. Even as we commercialize and begin to generate revenue, we may not become profitable for many years, if at all.

Our potential profitability is dependent upon many factors, including our ability to effectively operate our current plants, complete development of future plants, maintain an adequate supply chain, anticipate and react to demand for our products, manufacture our products on a commercial scale, secure additional customer commitments, and otherwise execute our growth plan. The rate at which we incur losses may be higher in future periods as we:

- develop our PET cap and closure business;
- increase our spending on strategic partnerships;
- increase production at our Origin 1 plant;
- increase our sales and marketing activities; and
- decide to expand our commercial production capabilities and incur costs associated with developing our plants.

Because we will incur the costs and expenses from these efforts before receiving meaningful revenue, our losses in future periods could be significant. We may find that these efforts are more expensive than we currently estimate or that these efforts may not result in revenues, which would further increase our losses.

We may not manage growth effectively.

Our failure to manage growth effectively could harm our business, results of operations and financial condition. We anticipate that a period of expansion may be required to address potential growth. This expansion will place a significant strain on our management, operational and financial resources. To manage the growth of our operations and personnel, we must establish appropriate and scalable operational and financial systems, procedures and controls and establish and maintain a qualified finance, administrative and operations staff. We may be unable to hire, train, retain and manage the necessary personnel or to identify, manage and exploit potential strategic relationships and market opportunities.

Our business plan assumes we can secure substantial additional project financing and/or government incentives, which may be unavailable on favorable terms, if at all.

We expect to need substantial additional project financing and/or government incentives in order to execute our growth strategy and expand our manufacturing capability to advance our biomass conversion and PET caps and closures technology. We have not yet secured such project financing and government incentives, and they may not be available on commercially reasonable terms, if at all. In particular, our ability to obtain financing for the construction of future plants and manufacturing lines may depend, in part, on our ability to first enter into customer agreements sufficient to demonstrate sufficient demand to justify the construction of such plants and/or manufacturing lines. If we are unable to obtain such financing and/or government incentives, or secure sufficient customer agreements, on commercially reasonable terms, or at all, we will not be able to execute our growth strategy.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of those securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making acquisitions or capital expenditures or declaring dividends. Debt financing could also have significant negative consequences for our business, results of operations and financial condition, including, among others, increasing our vulnerability to adverse economic and industry conditions, limiting our ability to obtain additional financing, requiring the dedication of a substantial portion of our cash flow from operations to service our indebtedness, thereby reducing the amount of our cash flow available for other purposes, limiting our flexibility in planning for, or reacting to, changes in our business, and placing us at a possible competitive disadvantage compared to less leveraged competitors or competitors that may have better access to capital resources.

If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or products, grant licenses on terms that may not be favorable to us, or make other concessions. If we are unable to raise additional funds through equity or debt financings or other arrangements when needed, we may be required to delay, limit, reduce or terminate our commercialization, research and development efforts or grant rights to third parties to market and/or develop products that we would otherwise prefer to market and develop ourselves.

If we seek government grants, incentives or subsidies, their terms may be limiting or restrict certain of our planned operations, thereby requiring us to alter our operating plans and materially impacting our financial projections and projected results of operations. Government grants may also be terminated, modified or recovered under certain conditions without our consent.

Our outstanding secured and unsecured indebtedness, ability to incur additional debt and the provisions in the agreements governing our current debt, and certain other agreements, could harm our business, financial condition, results of operations and prospects.

Our debt service and similar obligations could have important consequences to us for the foreseeable future, including that our ability to obtain additional financing for capital expenditures, working capital or other general corporate purposes may be impaired and we may be or become substantially more leveraged than some of our competitors, which could place us at a relative competitive disadvantage and make us more vulnerable to changes in market conditions and governmental regulations.

We are required to maintain compliance with covenants under our debt and similar agreements. There are and will be operating or financial restrictions and covenants in certain of our debt and similar agreements, including the promissory notes and prepayment agreements we are party to, as well as certain other agreements to which we are or may become a party. These limit, among other things, our ability to incur certain additional debt, create certain liens or other encumbrances and sell assets. These covenants could limit our ability to engage in activities that may be in our best long-term interests. Our failure to comply with certain covenants in these agreements could result in an event of default under the various debt and similar agreements, allowing lenders to accelerate the maturity for the debt under these agreements and to foreclose upon any collateral securing the debt. Under such circumstances, we might not have sufficient funds or other resources to satisfy all of our obligations.

We are exposed to credit risk in our activities related to potential nonperformance by customers.

In the normal course of our business, we provide payment terms to certain of our customers. As a result, our business could be adversely affected if our customers' financial condition deteriorates and they are unable to repay us. This risk may increase if there is a general economic downturn affecting a large number of our customers or if our customers fail to manage their business effectively or adequately disclose their financial condition to us. The Company manages the risk of customer default through a combination of due diligence, contractual terms, and a diversified customer base. The number of customers, as well as our ability to discontinue service, contributes to reduce credit risk with respect to accounts receivable. Despite such mitigation efforts, customer defaults may occur.

Risks Related to Our Operations and Industry

Construction of additional plants beyond Origin 1 and of manufacturing lines for production of our PET caps and closures may not be timely completed or completed in a cost-effective manner or at all. Any delays in or failure to finance and complete the construction of additional plants and manufacturing lines could severely impact the implementation of our biomass conversion and PET caps and closures technologies.

Our ability to implement our biomass conversion technology platform and to satisfy our customer demand and contractual obligations depend, in part, on our ability to secure financing for and complete construction of several commercial scale plants and, in part, on our ability to secure debt financing for and procure several manufacturing lines to produce our PET caps and closures. In particular, except for Origin 2, subject to finalization of economic incentives, we have not selected a site for any of our future planned biomass conversion plants or many of our planned PET caps and closures manufacturing lines. We may have difficulty finding sites with appropriate infrastructure and access to raw materials and skilled labor. With respect to these future plants, we also do not have agreements with engineering, procurement or construction firms, or with all of the firms we expect to rely on for our PET caps and closures supply chain. Consequently, we cannot predict on what terms such firms may agree to design and construct our future plants and manufacturing lines. If we are unable to construct these plants and procure and set up our manufacturing lines within the planned timeframes, timeframes that are relevant to some of our customers' carbon reduction goals, or in a cost-effective manner, or at all due to a variety of factors, including, but not limited to, a failure to acquire or lease property on which to build and operate our plants and manufacturing lines, a stoppage of construction as a result of epidemics, disruptions caused by the recent global sanctions imposed against Russia following its military intervention in Ukraine, a major supplier of certain metals such as nickel used in materials of construction, unexpected construction problems, permitting and other regulatory issues, severe weather, inflationary pressures, labor disputes, or issues with subcontractors or vendors, including payment disputes, which we have previously experienced, our business, financial condition, results of operations and prospects could be severely impacted, we may lose customers and customer demand, and we could face litigation.

The construction and commissioning of any new project is dependent on a number of contingencies some of which are beyond our control. There is a risk that significant unanticipated costs or delays could arise due to, among other things, errors or omissions, unanticipated or concealed project site conditions, including subsurface conditions and changes to such conditions, unforeseen technical issues or increases in plant and equipment costs, insufficiency of water supply and other utility infrastructure, inadequate contractual arrangements, or design changes and associated or additional technical development work related, for example, to new or different process steps or product streams, or changes in the scale of equipment or operations. Should these or other significant unanticipated costs or delays arise, this could have a material adverse impact on our business, financial performance and operations. No assurance can be given that construction will be completed on time or at all, or as to whether we will have sufficient funds available to complete construction.

We plan to rely on a limited number of plants to meet customer demand for our future intermediate chemical sales and a limited number of manufacturing lines to meet near-term customer demand for our PET caps and closures.

Our operating plan assumes that we will rely on a limited number of plants and manufacturing lines to meet customer demand and that these plants and manufacturing lines will supply most of our products until additional facilities can be brought online. Adverse changes or developments affecting these facilities could impair our ability to produce our products. Any shutdown or period of reduced production at these facilities, which may be caused by regulatory noncompliance or other issues, as well as other factors beyond our control, such as severe weather conditions, natural disaster, fire, power interruption, work stoppage, disease outbreaks or pandemics (such as COVID-19), equipment failure or delay in supply delivery, would, among other things, significantly disrupt our ability to recognize revenue, execute our expansion plans, and meet our contractual obligations and customer demand. In addition, our facilities' equipment may be costly to replace or repair, and our equipment supply chains may be disrupted in connection with pandemics, trade wars and sanctions (such as those imposed against Russia following its military intervention in Ukraine), bankruptcy or insolvency of suppliers, or other factors. If any material amount of our equipment is damaged, we could be unable to predict when, if at all, we could replace or repair such equipment or find suitable alternative equipment, which could adversely affect our business, financial condition, results of operations and prospects. Performance guarantees may not be sufficient to cover damages or losses, or the guarantors under such guarantees may not have the ability to pay. We may be unable to obtain appropriate types or amounts of insurance, and any insurance coverage we have may be insufficient to cover all of our potential losses or continue to be available to us on acceptable terms, or at all.

We may be delayed in procuring or be unable to procure necessary capital equipment.

While much of the equipment we use to produce our products is currently widely available, we rely on outside companies to continue to manufacture the equipment necessary to produce our products. In addition, some equipment we use to produce our products requires significant lead time to manufacture. If our suppliers of manufacturing equipment are unable or unwilling to provide us, or if we experience significant delays in obtaining the necessary manufacturing equipment, or parts necessary to repair and maintain that equipment, our business, we may be unable to make our products and our results of operations and financial condition could be adversely affected. The repair, maintenance, or construction of our manufacturing equipment may also require a substantial portion of certain materials and supplies relative to the overall global supply of such materials and supplies. If we are unable to secure an adequate supply of such materials and supplies on commercially reasonable terms, or at all, such repair, maintenance, or construction may be delayed or terminated.

We have not yet produced any of our products in large commercial quantities.

We have no experience in producing large quantities of our products. While we have succeeded in producing small amounts of our intermediate chemicals in our pilot plants and Origin 1 plant, as well as relatively small amounts of our PET caps and closures, for customer evaluation, we have only recently commenced commercial-scale production of chemical intermediates and have not yet commenced commercial-scale production of our PET caps and closures. There are significant technological and logistical challenges associated with producing, marketing, selling and distributing products in the specialty chemicals and caps and closures industries, including our products, and we may not be able to resolve all of the difficulties that may arise in a timely or cost-effective manner, or at all. While we believe that we understand the engineering and process characteristics necessary to successfully build and operate additional planned facilities and scale up to larger and/or additional facilities, we may be unable to cost-effectively manage such construction and operation at a scale or quality consistent with customer demand in a timely or economical manner or at all.

Any decline in the value of carbon credits associated with our products could harm our results of operations, cash flow and financial condition.

The value of our products may be dependent on the value of carbon credits, programs relating to low-carbon materials and products standards, and other similar regulatory regimes or the implicit value of decarbonized materials. The value of these credits fluctuates based on market and regulatory forces outside of our control. There is a risk that the supply of low-carbon alternative materials and products outstrips demand, resulting in the value of carbon credits declining. Any such declines could mean that the economic benefits from our customers' efforts to decarbonize their operations might not be realized. Any decline in the value of carbon credits associated with our products could harm our results of operations, cash flow and financial condition.

We rely on a limited number of customers for a significant portion of our near-term revenue.

We currently have commercial agreements with a limited number of customers from which we expect to derive a significant portion of near-term revenue. The loss of one or more of our significant customers, a substantial reduction in their orders, their failure to exercise customer options to enter into new offtake agreements or purchase commitments or to purchase product, their unwillingness to extend contractual deadlines if we fail to meet production, product, or specification requirements, their inability to perform under their contracts or a significant deterioration in their financial condition could harm our business, results of operations and financial condition. If we fail to perform under the terms of these agreements, the customers could seek to terminate these agreements and/or pursue damages against us, which could harm our business.

Our products may not achieve market success.

We currently have a relatively small number of binding customer commitments for commercial quantities of our products. Some prospective customers are currently evaluating and testing our products prior to making large-scale purchase decisions. Other products we expect to develop have not yet started customer evaluation and testing. The successful commercialization of our products is dependent on our customers' ability to commercialize the end-products that utilize our products, which may gain market acceptance slowly, if at all. Furthermore, the technology for our products is new, and the economic and physical performance, and ultimate carbon footprint, recyclability, circularity, or other expected sustainability benefits, of these products is uncertain. The market for carbon-negative products, and for PET caps and closures, still is nascent and subject to significant risks and uncertainties.

Market acceptance of our products will depend on numerous factors, many of which are outside of our control, including, among others:

- public acceptance of such products;
- our ability to produce products of consistent quality that offer functionality comparable or superior to existing or new products;
- our ability to produce products fit for their intended purpose;
- our ability to produce new products or customizations of existing products to match changes in public demand;
- our ability to timely obtain necessary regulatory approvals for our products;
- the speed at which potential customers qualify our products for use in their products;
- the pricing of our products compared to competitive and alternative products, including petroleum-based plastics or incumbent HDPE and polypropylene caps and closures;
- the strategic reaction of companies that market competitive products;
- our reliance on third parties who support or control distribution channels; and
- general market conditions, including fluctuating demand for our products.

Our industry is highly competitive, and we may lose market share to producers of products that can be substituted for our products, which may have an adverse effect on our results of operations and financial condition.

The specialty chemicals and caps and closures industries are highly competitive, and we face significant competition from large established producers of fossil-based materials, recycled fossil-based materials, incumbent HDPE and polypropylene caps and closures, and a variety of current and future producers of low-carbon, biodegradable, or renewable resource-based materials. Many of our current competitors have longer operating histories, greater name recognition, larger customer bases and significantly greater financial, sales and marketing, manufacturing, distribution, technical and other resources than us. Our competitors may be able to adapt more quickly to new or emerging technologies, changes in customer requirements and changes in laws and regulations. In addition, current and potential competitors have established or may establish financial or strategic relationships among themselves or with existing or potential customers or other third parties. Accordingly, new competitors or alliances among competitors could emerge and rapidly acquire significant market share.

Our competitors may also improve their relative competitive position by successfully introducing new products or products that can be substituted for our products, improving their manufacturing processes, or expanding their capacity or manufacturing capabilities. Further, if our competitors are able to compete at advantageous cost positions, this could make it increasingly difficult for us to compete in markets for less-differentiated applications. If we are unable to keep pace with our competitors' product and manufacturing process innovations or cost position, it could harm our results of operations, financial condition and cash flows.

Our commercial success may be influenced by the price of petroleum relative to the price of non-fossil feedstocks, and the price of incumbent HDPE or polypropylene, and of caps and closures made from these materials, relative to the price of PET, and of caps and closures made from this material.

Our commercial success may be influenced by the cost of our biomass-derived products relative to petroleum-based products, and by the cost of HDPE or polypropylene relative to PET, as well as the relative price of caps and closures made from these materials. The cost of petroleum-based products is in part based on the price of petroleum, which is subject to historically fluctuating prices. Our production plans assume use of biomass feedstocks such as timber and forest residues, which historically have experienced low volatility relative to petroleum. If the price of bio-based feedstocks increases, the price of petroleum decreases, or we use bio-based feedstocks such as sugars or starches that may have higher volatility or cost than timber and forest residues, our products may be less competitive relative to petroleum-based products. A material decrease in the cost of conventional petroleum-based products may require a reduction in the prices of our products for them to remain attractive in the marketplace and may negatively impact our revenues. Similar negative impacts could result from changes in the relative prices of HDPE, polypropylene, and PET, and of caps and closures made from these materials. Cheaper HDPE or polypropylene relative to PET could drive our customers to shift purchases away from our all-PET caps and closures and toward caps and closures made from HDPE or polypropylene, which they currently use in large numbers.

Increases or fluctuations in the costs of our raw materials may affect our cost structure.

The price of raw materials may be impacted by external factors, including uncertainties associated with war, terrorist attacks, weather and natural disasters, health epidemics or pandemics (such as COVID-19), civil unrest, the effects of climate change or political instability, plant or production disruptions, strikes or other labor unrest, inflationary pressures, breakdown or degradation of transportation infrastructure used in the delivery of raw materials or changes in laws or regulations in any of the countries in which we have has significant suppliers.

Our biomass conversion technology is designed to use biomass such as local timber and forest residues as raw materials. The cost of these raw materials is generally influenced by supply and demand factors, and our operating plans include assumptions that the timber and forest residues we intend to use as feedstock will be available at prices similar to historic levels with low volatility. Similarly, our PET caps and closures are designed to use PET, including recycled PET, as a raw material. As we continue to expand our production, we will increase our demand for timber and forest residues to produce our chemical intermediates, and of PET to produce our PET caps and closures, which may alter the anticipated stability in the costs of our raw materials and potentially drive an increase in the cost of such raw materials.

Our results of operations will be directly affected by the cost of raw materials and other inputs, like the amount and cost of steam in the manufacturing process. The cost of raw materials and energy, such as to produce the steam required during feedstock processing, comprises a significant amount of our total cost of goods sold and, as a result, movements in the cost of raw materials, and in the cost of other inputs, will impact our profitability. Because a significant portion of our cost of goods sold is represented by these raw materials, our gross profit margins could be adversely affected by changes in the cost of these raw materials if we are unable to pass the increases on to our customers.

If our raw material prices experience volatility, there can be no assurance that we can continue to recover raw material costs or retain customers in the future. As a result of our pricing actions, customers may become more likely to consider competitors' products, some of which may be available at a lower cost. Significant loss of customers could adversely impact our results of operations, financial condition and cash flows.

We are dependent on third-party suppliers and service providers, some of which are sole source suppliers, who may fail to deliver raw materials or equipment or fail to supply needed services at all or according to schedules, prices, quality and volumes that are acceptable to us, or we may be unable to manage these supplies effectively.

Parts of our supply chain currently are dependent on a limited number, and in some cases a single, third-party supplier or service provider for key inputs, equipment, and services including for conversion of our chemical intermediates produced by our Origin 1 plant into downstream derivatives and applications and for production of our PET caps and closures. We have not yet secured agreements with our preferred (or the only) supplier of some of these inputs, equipment, and services, and we may be unable to do so on a time frame or terms we find acceptable, or at all. Our reliance on few or single suppliers in a limited number of locations risks multiple supply chain vulnerabilities. The military conflict in Ukraine can exacerbate the risks to our supply chain to the extent our suppliers depend on raw materials, components, or parts from Russia or Ukraine including, for example, certain metals used in materials of construction.

Finding substitute suppliers and service providers, to the extent they exist, may be expensive, time-consuming, or impossible and could interrupt or delay the supply of our products causing us to lose revenue and potentially harm our customer relationships or reputation and expose us to contractual remedies under our supply agreements. To the extent we do not have firm commitments from our third-party suppliers or service providers for a specific time period or capacity, quantity, and/or pricing, our suppliers may allocate capacity to their other customers, which could make that capacity unavailable to us when needed or at reasonable prices and prevent us from delivering our products on time or at all. For instance, if we are unable to timely obtain conversion services for some of our intermediates, those intermediates may need to be stored for extended periods and could degrade or become unusable, forcing us to dispose of the intermediates and/or replace them at additional cost. Any of these occurrences could adversely affect our supply chain and cause serious harm to our business.

Our biomass conversion processes are designed to use biomass such as local timber and forest residues as our preferred raw materials. And our caps and closures are intended to use PET, including recycled PET, as raw materials. However, we may be unable to secure agreements with local suppliers for the necessary amount of raw materials in certain circumstances. Additionally, if our suppliers do not accurately forecast and effectively allocate sufficient materials to us or if they are not willing to allocate sufficient supplies to us, it may reduce our access to raw materials needed for our manufacturing and require us to search for new suppliers. The unavailability of any raw materials could result in production delays, idle manufacturing facilities, product design changes and loss of access to important residues supporting our production, as well as impact our capacity to fulfill our obligations under our offtake agreements. In addition, unexpected changes in business conditions, materials pricing, labor issues, wars, trade policies, natural disasters, epidemics or pandemics, trade and shipping disruptions, and other factors beyond our or our suppliers' control could also affect these suppliers' ability to deliver components to us or to remain solvent and operational.

Additionally, we may be unsuccessful in our continuous efforts to negotiate with existing suppliers to obtain cost reductions and avoid unfavorable changes to terms, or source less expensive suppliers for certain materials, especially in light of the overall increases in supply and shipment pricing. Any of these occurrences may harm our business, prospects, financial condition and operating results.

If we are required to obtain alternate sources for raw materials, for example because a supplier is unwilling or unable to execute or perform under raw material supply agreements, if a supplier terminates its agreements with us, if a supplier is unable to meet increased demand as our commercial scale production expands, if we are unable to renew its contracts or if we are unable to obtain new long-term supply agreements to meet changing demand, we may not be able to obtain these raw materials in sufficient quantities, on economic terms, or in a timely manner, and we may not be able to enter into long-term supply agreements on terms as favorable to us, if at all. A lack of availability of raw materials could limit our production capabilities, require us to use alternate raw materials such as non-timber feedstocks that may be more expensive or have inferior carbon reduction or other performance characteristics, and prevent us from fulfilling customer orders, and therefore harm our results of operations and financial condition.

As the scale of our manufacturing increases, we will also need to accurately forecast, purchase, warehouse and transport raw materials at high volumes to our manufacturing facilities internationally. If we are unable to accurately match the timing and quantities of raw material purchases to our actual needs or successfully implement inventory management and warehousing systems, we may incur unexpected production disruption, storage, transportation and write-off costs, which may harm our business and operating results.

Maintenance, expansion and refurbishment of our facilities, the construction of new facilities and production lines, and the development and implementation of new manufacturing processes involve significant risks.

Our facilities may require regular or periodic maintenance, upgrading, expansion, refurbishment or improvement. Any unexpected operational or mechanical failure, including failure associated with breakdowns and forced outages, could reduce our facilities' production capacity below expected levels, which would reduce our production capabilities and ultimately our revenues. Unanticipated capital expenditures associated with maintaining, upgrading, expanding, repairing, refurbishing, or improving our facilities may also reduce our profitability. Our facilities may also be subject to unanticipated damage as a result of natural disasters, terrorist attacks or other events.

If we make any major modifications to our facilities, such modifications likely would result in substantial additional capital expenditures and could prolong the time necessary to bring the facility online. We may also choose to refurbish or upgrade our facilities based on our assessment that such activity will provide adequate financial returns. However, such activities require time for development and capital expenditures before commencement of commercial operations, and key assumptions underpinning a decision to make such an investment may prove incorrect, including assumptions regarding construction costs and timing, which could harm our business, financial condition, results of operations and cash flows.

The development of new manufacturing facilities entails a number of risks and assumptions, including the ability to begin production within the cost and timeframe estimated and to attract a sufficient number of skilled workers to meet the needs of the new facility. For example, the anticipated costs of constructing Phase 1 of Origin 2 are far higher than initially estimated and timelines may be delayed due to higher material costs, supply chain issues, inflation and labor shortages. Additionally, our assessment of the projected benefits associated with the construction of new manufacturing facilities, including production lines for our PET caps and closures, is subject to a number of estimates and assumptions, which in turn are subject to significant economic, competitive and other uncertainties that are beyond our control. If we experience delays or increased costs, our estimates and assumptions are incorrect, or other unforeseen events occur, our business, ability to supply customers, financial condition, results of operations and cash flows could be adversely impacted.

Finally, we may not be successful or efficient in developing or implementing new production processes. Innovation in production processes involves significant expense and carries inherent risks. Such risks may include difficulties in designing, developing, implementing, and scaling up new process technologies, development and production timing delays, lower than anticipated manufacturing yields, product defects, and inability to consistently meet customers' product specifications, performance and carbon intensity, or cost requirements, among others. Errors, defects in materials, operating permit and license delays, customer product returns, interruption in our supply of materials or resources, and disruptions at our facilities due to accidents, maintenance issues, or unsafe working conditions, all could affect the timing, efficiency, or success of our production processes. Such production issues can lead to increased costs and may affect our ability to meet product demand, which could adversely impact our business and results from operations.

We may not be successful in finding future strategic partners for continuing development of our manufacturing facilities and feedstock opportunities, or tolling and downstream conversion of our products.

We may seek to develop additional strategic partnerships to develop our manufacturing facilities, increase feedstock supply due to manufacturing constraints or capital costs required to develop our products and plants. We may not be successful in our efforts to establish such strategic partnerships or other alternative arrangements for our products, technology, or plants because our research and development pipeline may be insufficient, our products or plant designs or manufacturing processes may be deemed to be at too early of a stage of development for collaborative effort, or third parties may not view our products or plants as having the requisite potential to demonstrate commercial success. In particular, if we are unable to develop strategic partnerships to fund our construction of Origin 2, we may be delayed in the completion of Origin 2 or may never be able to complete construction of Origin 2, which may adversely impact our operation and financial results.

If we are unable to reach agreements with suitable collaborators on a timely basis, on acceptable terms, or at all, we may have to curtail the development of our products, delay commercialization or development of manufacturing facilities, reduce the scope of any sales or marketing activities or increase expenditures and undertake development or commercialization activities at our own expense. If we elect to fund development or commercialization activities on our own, we may need to obtain additional expertise and additional capital, which may not be available to us on acceptable terms or at all. If we fail to enter into collaborations and do not have sufficient funds or expertise to undertake the necessary development and commercialization activities, we may not be able to develop additional products or plants, and our business, financial condition, results of operations and prospects may be materially and adversely affected.

We may rely heavily on future collaborative and supply chain partners.

We have entered into, and may enter into, strategic partnerships to develop and commercialize our current and future research and development programs with other companies to accomplish one or more of the following:

- obtain capital, equipment, and facilities;
- obtain funding for research and development programs, product development programs, and commercialization activities;
- obtain expertise in relevant markets;
- obtain access to raw materials;
- obtain sales and marketing services or support;
- obtain conversion services and other supply chain support; and/or
- obtain access to intellectual property and ensure freedom to operate.

We may not be successful in establishing or maintaining suitable partnerships, and we may not be able to negotiate collaboration agreements having terms satisfactory to us, or at all. Failure to make or maintain these arrangements or a delay or failure in a collaborative partner's performance under any such arrangements could harm our business and financial condition.

In addition, global supply chain disruptions have caused, and may continue to cause, delays in the shipment of goods, particularly those made in Asian countries. We have incurred, and may continue to incur, additional costs to expedite deliveries of such goods or to obtain substitute goods that are available to us sooner. Continued supply chain disruptions and our efforts to mitigate them may adversely impact our financial condition, results of operations, and cash flows.

We have entered into and may in the future enter into collaborations, strategic alliances, or licensing arrangements, which expose us and our intellectual property to competitive risks and limitations associated with third-party collaborations and that may not produce the benefits we anticipate.

We have entered, and may in the future enter, into license and collaboration arrangements for the development and production of some of our materials and products. In the future, we may enter into additional license and collaboration arrangements. Any collaboration we enter into is subject to numerous risks. Such risks may include, among others, collaborators' significant discretion to determine the effort and resources they will apply to the collaboration, to delay or elect not to continue development of a product or process under the collaboration, or to develop, independently or with third parties, products or processes that compete directly or indirectly with our products or manufacturing processes. A collaborator's development, sales, or marketing activities or other operations may not comply with applicable laws resulting in civil or criminal proceedings.

In addition, we could grant exclusive rights to our collaborators that would prevent us from collaborating with others. Collaborators may not properly maintain or defend our intellectual property rights or may use our intellectual property or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential liability. Our collaborators may own or co-own intellectual property covering products that result from our collaboration with them, depriving us of the exclusive right to develop or commercialize such intellectual property. Disputes may arise with respect to the ownership of any intellectual property developed pursuant to our collaborations.

Disputes between us and a collaborator may delay or terminate the development or commercialization of our products or result in costly litigation or arbitration that diverts management attention and resources. Termination of a collaboration may also result in a need for additional capital to pursue further development of the applicable current or future products.

We may seek to enter into additional collaborations, joint ventures, licenses and other similar arrangements for the development of our products, due to capital costs required to develop the product or potential manufacturing constraints. We may not be successful in our efforts to establish such collaborations for our products because our products may be deemed to be at too early of a stage of development for collaborative effort or third parties may not view our products as having the requisite potential to demonstrate a significant commercial opportunity. In addition, we face significant competition in seeking appropriate strategic partners, and the negotiation process can be time consuming and complex. Further, any future collaboration agreements may restrict us from entering into additional agreements with potential collaborators. We cannot be certain that, following a strategic transaction or license, we will achieve an economic benefit that justifies such transaction. Even if we are successful in our efforts to establish such collaborations, the terms that we agree upon may not be favorable to us, and we may not be able to maintain such collaborations.

In addition, any potential future collaborations may be terminable by our strategic partners, and we may not be able to adequately protect our rights under these agreements. Furthermore, strategic partners may negotiate for certain rights to control decisions regarding the development of our products, and may not conduct those activities in the same manner as we do. Any termination of collaborations we enter into in the future, or any delay in the development of products under such collaborations, could delay the manufacturing and sales of our products, which could have a material adverse effect on our business, financial condition and results of operations.

We may become subject to product liability claims that may not be covered by insurance and could require us to pay substantial sums.

We are subject to an inherent risk of, and adverse publicity associated with, product liability and other liability claims, whether or not such claims are valid. In addition, our customers are subject to product liability claims, and could seek contribution from us. A successful product liability claim or series of claims against us could adversely impact the specialty chemicals or caps and closures industries, our reputation or our financial condition or results of operations. Product liability insurance may not be available to us on commercially acceptable terms, or at all. Even if such insurance is available, product liability or other claims may exceed our insurance coverage limits. A successful product liability claim that exceeds our insurance coverage limits, for which we are not otherwise indemnified, could require us to pay substantial sums and could harm our business, financial condition or results of operations.

Climate change may impact the availability of our facilities and, in addition, we may incur substantial costs to comply with climate change legislation and related regulatory initiatives.

Changing weather patterns and the increase in frequency of severe storms such as hurricanes and tornadoes could cause disruptions or the complete loss of our facilities or delay the construction of future facilities. In addition, climate change concerns, and changes in the regulation of such concerns, including greenhouse gas emissions, could also subject us to additional costs and restrictions, including increased energy and raw materials costs which could negatively impact our financial condition and results of operations. Climate change may also negatively impact our labor force by, for example, reducing the hours during which construction or other outdoor work can be performed safely in extreme hit or under conditions of poor air quality. In addition, climate change may negatively impact the availability of our feedstock, for example, by increasing the prevalence of certain pests harmful to the growth or quality of the biomass we use in our processes. The effects of climate change can not only adversely impact our operations, but also that of our suppliers and customers, and can lead to increased regulations and changes in consumer preferences, which could adversely affect our business, results of operations and financial condition.

Unfavorable global economic conditions could adversely affect our business, financial condition and results of operations.

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets, including inflation and supply disruption. A domestic or global financial crisis can cause extreme volatility and disruptions in the capital and credit markets. A severe or prolonged economic downturn, which could result from an event like the COVID-19 pandemic or the global sanctions imposed against Russia following its military intervention in Ukraine, or inflation in fuel costs resulting from regional instability due to the military conflict in Israel and Gaza, could result in a variety of risks to our business, including our inability to purchase necessary supplies on acceptable terms, if at all, and our inability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy could strain our suppliers, possibly resulting in supply disruption, or cause delays in payments for our services by third-party payers or our collaborators. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

Our operating results may fluctuate significantly as a result of a variety of factors, many of which are outside of our control.

We are subject to, among other things, the following factors that may negatively affect our operating results:

- the announcement or introduction of new products by our competitors;
- our ability to upgrade and develop our systems and infrastructure to accommodate growth;
- our ability to attract and retain key personnel in a timely and cost-effective manner;
- our ability to attract new customers and retain existing customers;
- technical difficulties;
- the amount and timing of operating costs and capital expenditures relating to the expansion of our business, operations and infrastructure;
- our ability to identify and enter into relationships with appropriate and qualified third-party providers of necessary testing and manufacturing services;
- regulation by federal, state or local governments; and
- general economic conditions, as well as economic conditions specific to the caps and closures industry, and the chemicals, plastics, carbon products, and fuels industries, and other industries related to compostable or biodegradable substitutes for non-biodegradable plastics, as well as changes to commodity prices to which prices in some of our contracts are indexed.

As a result of our limited operating history and the nature of the markets in which we compete, it is difficult for us to forecast our revenues or earnings accurately. We have based our anticipated future expense levels largely on our investment plans and estimates of future events, although certain of our expense levels will, to a large extent, become fixed. As a strategic response to changes in the competitive environment, we may from time to time make certain decisions concerning expenditures, pricing, service or marketing that could harm our business, results of operations and financial condition. Due to the foregoing factors, our revenues and operating results are difficult to forecast.

Changes in tax laws or tax rulings could materially affect our financial position, results of operations, and cash flows.

The tax regimes we are subject to or operate under, including income and non-income taxes, are unsettled and may be subject to significant change. Changes in tax laws, regulations, or rulings, or changes in interpretations of existing laws and regulations, could materially affect our financial position and results of operations. For example, the 2017 Tax Cuts and Jobs Act (the “Tax Act”) made broad and complex changes to the U.S. tax code. Future guidance from the IRS with respect to the Tax Act may affect us, and certain aspects of the Tax Act could be repealed or modified in future legislation. The Coronavirus Aid, Relief, and Economic Security Act (the “CARES Act”) has already modified certain provisions of the Tax Act. More recently, the Inflation Reduction Act of 2022 (the “IRA”) includes provisions that will impact the U.S. federal income taxation of corporations, including imposing a minimum tax on the book income of certain large corporations and an excise tax on certain corporate stock repurchases that would be imposed on the corporation repurchasing such stock. In addition, it is uncertain if and to what extent various states will conform to the Tax Act, the CARES Act, the IRA, or any newly enacted federal tax legislation. The issuance of additional regulatory or accounting guidance related to the Tax Act could materially affect our tax obligations and effective tax rate in the period issued. In addition, many countries in Europe and a number of other countries and organizations, have recently proposed or recommended changes to existing tax laws or have enacted new laws that could significantly increase our tax obligations in the countries where we do business or require it to change the manner in which we operate our business.

The Organization for Economic Cooperation and Development has been working on a Base Erosion and Profit Shifting Project, and issued a report in 2015, an interim report in 2018, and is expected to continue to issue guidelines and proposals that may change various aspects of the existing framework under which our tax obligations are determined in many of the countries in which we do business. Similarly, the European Commission and several countries have issued proposals that would change various aspects of the current tax framework under which we are taxed. These proposals include changes to the existing framework to calculate income tax, as well as proposals to change or impose new types of non-income taxes, including taxes based on a percentage of revenue.

As we expand the scale of our international business activities, these types of changes to the taxation of our activities could increase our worldwide effective tax rate, increase the amount of taxes imposed on our business, and harm our financial position. Such changes may also apply retroactively to our historical operations and result in taxes greater than the amounts estimated and recorded in our financial statements.

Unanticipated changes in effective tax rates or adverse outcomes resulting from examination of our income or other tax returns could adversely affect our operating results and financial condition.

We are subject to taxation in Canada and the United States with increasingly complex tax laws, the application of which can be uncertain. The amount of taxes we pay in these jurisdictions could increase substantially as a result of changes in the applicable tax principles, including increased tax rates, new tax laws or revised interpretations of existing tax laws and precedents, which could have an adverse impact on our liquidity and results of operations. In addition, the authorities in several jurisdictions could review our tax returns and impose additional tax, interest and penalties, which could have an impact on us and on our results of operations. We have previously participated in government programs with the Canadian federal government and Canadian provincial governments that provide investment tax credits based upon qualifying research and development expenditures. If Canadian taxation authorities successfully challenge such expenses or the correctness of such income tax credits claimed, our historical operating results could be adversely affected. As a public company, we will no longer be eligible for refundable tax credits under the Canadian federal Scientific Research and Experimental Development Program (“SR&ED”) credits.

Our future effective tax rates could be subject to volatility or adversely affected by a number of factors.

Our future effective tax rates could be subject to volatility or adversely affected by a number of factors, including:

- changes in the valuation of our deferred tax assets and liabilities;
- expected timing and amount of the release of any tax valuation allowances;
- tax effects of stock-based compensation;
- costs related to intercompany restructurings;
- changes in tax laws, regulations or interpretations thereof; or
- future earnings being lower than anticipated in countries where we have lower statutory tax rates and higher than anticipated earnings in countries where we have higher statutory tax rates.

We may conduct activities in other jurisdictions through our subsidiaries pursuant to transfer pricing arrangements and may in the future conduct operations in other jurisdictions pursuant to similar arrangements. If two or more affiliated companies are located in different countries, the tax laws or regulations of each country generally will require that transfer prices be the same as those between unrelated companies dealing at arms’ length. While we intend to operate in compliance with applicable transfer pricing laws, our transfer pricing procedures are not binding on applicable tax authorities. If tax authorities in any of these countries were to successfully challenge our transfer prices as not reflecting arm’s length transactions, they could require us to adjust our transfer prices and thereby reallocate our income to reflect these revised transfer prices, which could result in a higher tax liability to us.

Our ability to use net operating loss carryforwards and other tax attributes may be limited in connection with the Merger or other ownership changes.

We have incurred losses during our history. To the extent that we continue to generate taxable losses, unused losses will carry forward to offset future taxable income, if any, until such unused losses expire, if at all.

Under the Tax Act, as modified by the CARES Act, U.S. federal NOL carryforwards generated in taxable periods beginning after December 31, 2017, may be carried forward indefinitely, but the deductibility of such net operating loss carryforwards in taxable years beginning after December 31, 2020, is limited to 80% of taxable income. In addition, our NOL carryforwards are subject to review and possible adjustment by the IRS, and state tax authorities. Under Sections 382 and 383 of the Code, our federal net operating loss carryforwards and other tax attributes may become subject to an annual limitation in the event of certain cumulative changes in the ownership of our stock. An "ownership change" pursuant to Section 382 of the Code generally occurs if one or more stockholders or groups of stockholders who own at least 5% of a company's stock increase their ownership (as measured by value) by more than 50 percentage points over their lowest ownership percentage within a rolling three-year period. Our ability to utilize our NOL carryforwards and other tax attributes to offset future taxable income or tax liabilities may be limited as a result of ownership changes, including potential changes in connection with the Merger or other transactions. Similar rules may apply under state tax laws. We have recorded a valuation allowance related to the majority of our NOL carryforwards and other deferred tax assets due to the uncertainty of the ultimate realization of the future benefits of those assets.

Risks Related to Government Regulation

Compliance with extensive environmental, health and safety laws could require material expenditures, changes in our operations or site remediation.

We use hazardous materials in our production process, and our operations also produce hazardous waste. The manufacture, transportation and sale of our products can present potentially significant health and safety concerns and are also under increased public and governmental scrutiny. Our products are also used in a variety of applications that have specific regulatory requirements such as those relating to products that have contact with food or are used for medical applications.

Accordingly, our operations are subject to environmental, health and safety laws and regulations at the international, national, state and local level in multiple jurisdictions. These laws and regulations govern, among other things, air emissions, wastewater discharges, solid and hazardous waste management and disposal, occupational health and safety, including dust and noise control, site remediation programs and chemical use and management. Many of these laws and regulations have become more stringent over time and the costs of compliance with these requirements may increase, including costs associated with any necessary capital investments. In addition, our manufacturing facilities will require operating permits that are subject to renewal and, in some circumstances, revocation. The necessary permits may not be issued or continue in effect, and renewals of any issued permits may contain significant new requirements or restrictions. The nature of the specialty chemicals industry exposes us to risks of liability due to the use, production, management, storage, transportation and sale of materials that are heavily regulated or hazardous and can cause contamination or personal injury or damage if released into the environment.

Compliance with environmental laws and regulations generally increases the costs of transportation and storage of raw materials and finished products, as well as the costs of storage and disposal of wastes. We may incur substantial costs, including fines, damages, criminal or civil sanctions and remediation costs, or experience interruptions in our operations for violations arising under environmental laws, regulations or permit requirements. In addition, the market for bioplastics, and for plastic products like our PET caps and closures generally, is heavily influenced by applicable federal, state and local government laws, regulations and policies as well as public perception. Changes in these laws, regulations and policies or how these laws, regulations and policies are implemented and enforced could cause the demand for our products to decline and deter investment in the research and development of such product. Concerns associated with bioplastics, including land usage, national security interests, deforestation, food crop usage, and other environmental concerns with bioplastics as well as plastic products generally, continue to receive legislative, industry and public attention. This attention could result in future legislation, regulation and/or administrative action that could adversely affect our business.

Furthermore, various petrochemical products, including plastics like PET used in our caps and closures products, have faced increased public scrutiny due to negative coverage of plastic waste in the environment, which has resulted in local, state, federal and foreign governments proposing and in some cases approving, restrictions or bans on the manufacture, consumption and disposal of certain petrochemical products. Although our biomass-derived chemical products and materials made from them are intended to replace petrochemical products, increased regulation on the use of such products or other products in the specialty chemicals industry, whatever their scope or form, could increase our costs of production, impact overall consumption of our products or result in misdirected negative publicity. Any inability to address these requirements and any regulatory or policy changes could harm our business, financial condition and results of operations.

We are subject to U.S. and foreign anti-corruption and anti-money laundering laws and regulations. We could face criminal liability and other serious consequences for violations, which would harm our business.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act and possibly other anti-bribery and anti-money laundering laws in countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit companies and their employees, agents, contractors and other collaborators from authorizing, promising, offering or providing, directly or indirectly, improper payments or anything else of value to recipients in the public or private sector. We can also be held liable for the corrupt or other illegal activities of our employees, agents, contractors and other collaborators, even if we do not explicitly authorize or have actual knowledge of such activities. Any violations of the laws and regulations described above may result in substantial civil and criminal fines and penalties, imprisonment, the loss of export or import privileges, debarment, tax reassessments, breach of contract and fraud litigation, reputational harm and other consequences.

Our operating plan may require us to source feedstock and supplies internationally, and foreign currency exchange rate fluctuations and changes to international trade agreements, tariffs, import and excise duties, taxes or other governmental rules and regulations could adversely affect our business, financial condition, results of operations and prospects.

Our expansion model is global and we expect to need to source feedstock and supplies from suppliers around the world. In particular, our biomass conversion chemical manufacturing process is designed to use local timber and forest residues as our primary raw materials, which must be sourced locally. For the Origin 1 plant, this means we will need to source feedstock, as well as other supplies, from Canadian suppliers or arrange for transport of such feedstock and supplies into Canada. Similarly, we expect to source PET, including recycled PET, from suppliers local to our caps and closures manufacturing lines, or to arrange for transport of PET to the site of those lines. The U.S. federal government or other governmental bodies may propose changes to international trade agreements, tariffs, taxes and other government rules and regulations, and may impose sanctions limiting trade with other countries. If foreign currency exchange rates fluctuate or any restrictions or significant increases in costs or tariffs or sanctions are imposed related to feedstock and supplies sourced to our plants as a result of amendments to existing trade agreements or otherwise, this may increase our supply and shipping costs, resulting in potential decreased margins. We may expand our operations to countries with unstable governments that are subject to instability, corruption, changes in rules and regulations and other potential uncertainties that could harm our business, financial condition, results of operations and prospects. The extent to which our margins could decrease in response to any future tariffs is uncertain. We continue to evaluate the impact of trade agreements, as well as foreign currency exchange rate fluctuations and other recent changes in foreign trade policy on our supply chain, costs, sales and profitability. In addition, pandemics such as COVID-19 may result in increased travel restrictions and the extended shutdown of certain businesses throughout the world, and prolonged closures in Canada, Europe, Asia and elsewhere may disrupt the operations of certain suppliers of feedstock and other supplies, which could, in turn, negatively impact our business, financial condition, results of operations and prospects.

Risks Related to Our Intellectual Property

Our business relies on proprietary information and other intellectual property, and our failure to protect our intellectual property rights could harm our competitive advantages with respect to the use, manufacturing, sale or other commercialization of our processes, technologies and products, which may have an adverse effect on our results of operations and financial condition.

We intend to make significant capital investments into the research and development of proprietary information and other intellectual property as we develop, improve and scale our processes, technologies and products, and failure to fund and make these investments, or underperformance of the technology funded by these investments, could severely impact our business, financial condition, results of operations and prospects.

If we fail to adequately protect our intellectual property rights, such failure could result in the reduction or loss of our competitive advantage. We may be unable to prevent third parties from using our proprietary information and other intellectual property without our authorization or from independently developing proprietary information and other intellectual property that is similar to ours, particularly in those countries where the laws do not protect our proprietary rights to the same degree as in the U.S or those countries where we do not have intellectual property rights protection. The use of our proprietary information and other intellectual property by others could reduce or eliminate competitive advantages that we have developed, potentially causing us to lose sales or actual or potential customers, or otherwise harm our business. We are, and may continue to be, involved in litigation and administrative actions to protect these rights, and such proceedings could be burdensome and costly, could result in counterclaims challenging our intellectual property (including validity or enforceability) or accusing us of infringement, and we may not prevail.

Our patent applications and issued patents may be practiced by third parties without our knowledge. Our competitors may also attempt to design around our patents or copy or otherwise obtain and use our proprietary information and other intellectual property. Moreover, our competitors may already hold or have applied for patents in the U.S. or abroad that, if enforced, could possibly prevail over our patent rights or otherwise limit our ability to manufacture, sell or otherwise commercialize one or more of our products in the U.S. or abroad. With respect to our pending patent applications, we may not be successful in securing issued patents, or the claims of such patents may be narrowed, any of which may limit our ability to protect inventions that these applications were intended to cover, which could harm our ability to prevent others from exploiting our technologies and commercializing products similar to our products. In addition, the expiration of a patent can result in increased competition with consequent erosion of profit margins.

The applicable governmental authorities may not approve our pending service mark and trademark applications. A failure to obtain trademark registrations in the U.S. and in other countries could limit our ability to obtain and retain our trademarks in those jurisdictions. Moreover, third parties may seek to oppose our applications or otherwise challenge the resulting registrations. In the event that our trademarks are not approved or are successfully challenged by third parties, we could be forced to rebrand our products, which could result in loss of brand recognition and could require us to devote significant resources to rebranding and advertising and marketing new brands. The failure of our patents, trademarks, trade secrets, or confidentiality agreements to protect our proprietary information and other intellectual property, including our processes, apparatuses, technology, trade secrets, trade names and proprietary manufacturing expertise, methods and compounds, could have a material adverse effect on our business and results of operations.

Some of our intellectual property has been or will be discovered, conceived or developed through research funded by the Canadian government and thus may be subject to federal regulations providing for certain rights for the Canadian government or imposing certain obligations on us, such as limitations on exploiting such intellectual property outside of Canada. Compliance with such regulations may limit our exclusive rights and ability to commercialize our products and technology outside of Canada.

We may face patent infringement and other intellectual property claims that could be costly to defend, result in injunctions and significant damage awards or other costs (including indemnification of third parties or costly licensing arrangements, if licenses are available at all) and limit our ability to use certain key technologies in the future or require development of non-infringing products or technologies, which may cause us to incur significant unexpected costs, prevent us from commercializing our products and otherwise harm our business.

The various markets in which we plan to operate are subject to frequent and extensive litigation regarding patents, trade secrets and other intellectual property rights. Many of our competitors have a substantial amount of intellectual property. We cannot guarantee that our processes and products do not and will not infringe issued patents (whether present or future) or other intellectual property rights belonging to others.

From time to time, we may oppose third-party patents that we consider overbroad or otherwise invalid in order to maintain the necessary freedom to operate fully in our various business lines without the risk of being sued for patent infringement. If, however, the oppositions are unsuccessful, we could be liable for infringement or have to take other remedial or curative actions to continue our manufacturing and sales activities with respect to one or more products.

We may also be subject to legal proceedings and claims in the ordinary course of our business, including claims of alleged infringement or misappropriation of the patents, trademarks, trade secrets and other intellectual property rights of third parties by us or our licensees in connection with their use of our products. Intellectual property litigation is expensive and time-consuming, regardless of the merits of any claim, and could divert our management's attention from operating our business.

If we were to discover that our processes, technologies or products infringe or misappropriate the valid intellectual property rights of others, we might need to obtain licenses from these parties or substantially re-engineer our processes, technologies or products in order to avoid infringement. We may not be able to obtain the necessary licenses on acceptable terms, or at all, or be able to re-engineer our processes, technologies or products successfully. Moreover, if we or our licensees are sued for infringement or misappropriation and lose, we could be required to pay substantial damages, indemnify our licensees and/or be enjoined from using or selling the infringing processes, technologies or products. If we incur significant costs to litigate infringement or misappropriation claims or to obtain licenses, or if our inability to obtain required licenses prevents us from using or selling our processes, technologies or products, it could have a material adverse effect on our business and results of operations.

We rely on trade secrets to protect our technology, and our failure to maintain trade secret protection could limit our ability to compete.

We rely on trade secrets to protect some of our technology and proprietary information, especially where we believe patent protection is not appropriate or obtainable. We have security measures in place to safeguard our trade secrets database and limit the access to a need-to-know basis. However, trade secrets can be difficult to protect. The misappropriation or other compromise of our trade secrets may lead to a reduction or loss of our competitive advantages resulting from such trade secrets. Further, litigating a claim that a third party had misappropriated our trade secrets would be expensive and time consuming, and the outcome would be unpredictable. Moreover, if our competitors independently develop similar knowledge, methods and know-how, it will be difficult for us to enforce our rights and our business could be harmed.

Our confidentiality agreements could be breached or may not provide meaningful protection for our trade secrets or proprietary manufacturing expertise. Adequate remedies may not be available in the event of an unauthorized use or disclosure of our trade secrets and manufacturing expertise. Violations by others of our confidentiality agreements and the loss of employees who have specialized knowledge and expertise could harm our competitive position resulting from the exclusive nature of such knowledge and expertise and cause our sales and operating results to decline as a result of increased competition. In addition, others may obtain knowledge of our trade secrets through independent development or other access by legal means.

Other Risks Related to Our Business

Our management has limited experience in operating a public company.

Our executive officers have limited experience in the management of a publicly traded company subject to significant regulatory oversight and reporting obligations under federal securities laws. We may not have adequate personnel with the appropriate level of knowledge, experience and training in the accounting policies, practices or internal control over financial reporting required of public companies in the United States. It is possible that we will be required to expand our employee base and hire additional employees to support our operations as a public company, which will increase our operating costs in future periods.

We are dependent on management and key personnel, and our business could suffer if we fail to retain our key personnel or attract additional highly skilled employees.

Our success depends on the specialized skills of our management team and key operating personnel. This may present particular challenges as we operate in a highly specialized industry sector, which may make replacement of our management team and key operating personnel difficult. A loss of our managers or key employees, or their failure to satisfactorily perform their responsibilities, could have an adverse effect on our business, financial condition, results of operations and prospects.

Our future success will depend on our ability to identify, hire, develop, motivate and retain highly qualified personnel for all areas of our organization, particularly research and development, engineering, operations, and sales. Trained and experienced personnel are in high demand and may be in short supply. Many of the companies that we compete with for experienced employees have greater resources than us and may be able to offer more attractive terms of employment. In addition, we invest significant time and expense in training employees, which increases their value to competitors that may seek to recruit them. We may not be able to attract, develop and maintain the skilled workforce necessary to operate our business, and labor expenses may increase as a result of a shortage in the supply of qualified personnel, which could negatively impact our business, financial condition, results of operations and prospects.

We previously identified a material weakness in our internal control over financial reporting that we have concluded has been remediated. However, we may identify additional material weaknesses in the future or fail to maintain effective internal control over financial reporting, which may result in material misstatements of our consolidated financial statements or cause us to fail to meet our periodic reporting obligations.

In connection with the audit of our consolidated financial statements for the fiscal years ended December 31, 2019 and December 31, 2020, during the course of preparing for the Merger, and during the second quarter 2021 and third quarter 2021 interim reviews, we identified a material weakness in our internal control over financial reporting. We implemented and continue to employ measures designed to improve our internal control over financial reporting, which remediated this material weakness in the fourth quarter of 2021. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of its annual or interim financial statements will not be prevented or detected on a timely basis.

If we are unable to successfully remediate any future material weaknesses in our internal control over financial reporting, or if we identify any additional material weaknesses, the accuracy and timing of our financial reporting may be adversely affected, we may be unable to maintain compliance with securities law requirements regarding timely filing of periodic reports in addition to applicable Nasdaq listing requirements, investors may lose confidence in our financial reporting and our stock price may decline as a result. We also could become subject to investigations by Nasdaq, the SEC or other regulatory authorities.

As a public company, we are also required, pursuant to Section 404 of the Sarbanes-Oxley Act, to furnish a report by management on, among other things, the effectiveness of its internal control over financial reporting for our annual reports on Form 10-K to be filed with the SEC. This assessment needs to include disclosure of any material weaknesses identified by management in our internal control over financial reporting. We are required to disclose changes made in our internal control over financial reporting on a quarterly basis. Failure to comply with the Sarbanes-Oxley Act could potentially subject us to sanctions or investigations by the SEC, the applicable stock exchange or other regulatory authorities, which would require additional financial and management resources. In order to evaluate the effectiveness of internal control over financial reporting, as required by Section 404 of the Sarbanes-Oxley Act, management has conducted an assessment, including testing, using the criteria in Internal Control – Integrated Framework, issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") using the 2013 framework. Our system of internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Because of its inherent limitations, internal control over financial reporting may not prevent or detect all misstatements.

We are subject to stringent and changing U.S. and foreign laws, regulations, rules, contractual obligations, policies and other obligations related to data privacy and security. Our actual or perceived failure to comply with such obligations could lead to regulatory investigations or actions; litigation; fines and penalties; disruptions of our business operations; reputational harm; loss of revenue or profits; loss of customers or sales; and other adverse business consequences.

In the ordinary course of business, we collect, receive, store, process, generate, use, transfer, disclose, make accessible, protect, secure, dispose of, transmit, and share (commonly known as processing) personal data and other sensitive information, including proprietary and confidential business data, trade secrets, and intellectual property. Our data processing activities subject us to various data privacy and security obligations, which can include laws, regulations, guidance, industry standards, external and internal privacy and security policies, contracts, and other obligations that govern the processing of personal data by us and on our behalf.

In the United States, federal, state, and local governments have enacted numerous data privacy and security laws, including data breach notification laws, personal data privacy laws, and consumer protection laws (e.g., Section 5 of the Federal Trade Commission Act), and other similar laws (e.g., wiretapping laws). For example, the California Consumer Privacy Act of 2018 ("CCPA") imposes obligations on businesses to which it applies, such as providing specific disclosures in privacy notices and affording California residents certain rights related to their personal data and applies to personal information of consumers, business representatives, and employees who are California residents. The CCPA provides for civil penalties of up to $7,500 per violation and allows private litigants affected by certain data breaches to recover significant statutory damages. In addition, the California Privacy Rights Act of 2020 ("CPRA"), effective January 1, 2023, expands the CCPA, including by establishing a new California Privacy Protection Agency to implement and enforce the CPRA and adding a new right for individuals to correct their personal information. Other states have also enacted data privacy laws, including Virginia and Colorado. In addition, data privacy and security laws have been proposed at the federal, state, and local levels in recent years, which could further complicate compliance efforts.

Outside the United States, an increasing number of laws, regulations, and industry standards apply to data privacy and security. For example, the European Union's General Data Protection Regulation ("EU GDPR") and the United Kingdom's GDPR ("UK GDPR") impose strict requirements for processing the personal data of individuals located in the European Economic Area ("EEA") and the UK, respectively. For example, under the EU GDPR, government regulators may impose temporary or definitive bans on data processing, as well as fines of up to €20 million or 4% of annual global revenue, whichever is greater. The GDPR also allows for private litigation related to processing of personal data brought by classes of data subjects or consumer protection organizations authorized at law to represent their interests. Additionally, in Canada, the Personal Information Protection and Electronic Documents Act ("PIPEDA") and various related provincial laws, as well as Canada's Anti-Spam Legislation ("CASL"), may apply to our operations. We also have customers in Asia, and may be subject to new and emerging data privacy regimes in Asia, such as China's Personal Information Protection Law and Japan's Act on the Protection of Personal Information.

In addition, certain jurisdictions have enacted data localization laws and cross-border personal data transfer laws, which could make it more difficult to transfer information across jurisdictions (such as transferring or receiving personal data that originates in Europe or other jurisdictions). Existing mechanisms that may facilitate cross-border personal data transfers may change or be invalidated.

We are also bound by contractual obligations related to data privacy and security, and our efforts to comply with such obligations may not be successful. We publish privacy policies, marketing materials and other statements, such as compliance with certain certifications or self-regulatory principles, regarding data privacy and security. If these policies, materials or statements are found to be deficient, lacking in transparency, deceptive, unfair, or misrepresentative of our practices, we may be subject to investigation, enforcement actions by regulators or other adverse consequences.

Obligations related to data privacy and security are quickly changing in an increasingly stringent fashion, creating some uncertainty as to the effective future legal framework. Additionally, these obligations may be subject to differing applications and interpretations, which may be inconsistent or in conflict among jurisdictions. Preparing for and complying with these obligations may require us to devote significant resources (including, without limitation, financial and time-related resources). These obligations may necessitate changes to our information technologies, systems, and practices and to those of any third parties that process personal data on our behalf.

Although we endeavor to comply with all applicable data privacy and security obligations, we may at times fail (or be perceived to have failed) to do so. Moreover, despite our efforts, our personnel or third parties upon whom we rely may fail to comply with such obligations, which could negatively impact our business operations and compliance posture. For example, any failure by a third-party processor to comply with applicable law, regulations, or contractual obligations could result in adverse effects, including inability to or interruptions in our ability to operate our business and proceedings against us by governmental entities or others.

If we fail, or are perceived to have failed, to address or comply with data privacy and security obligations, we could face significant consequences. These consequences may include, but are not limited to, government enforcement actions (e.g., investigations, fines, penalties, audits, inspections, and similar); litigation (including class-related claims); additional reporting requirements and/or oversight; bans on processing personal data; and orders to destroy or not use personal data.

Any of these events could have a material adverse effect on our reputation, business, or financial condition, including but not limited to: loss of customers; interruptions or stoppages in our business operations; inability to process personal data or to operate in certain jurisdictions; limited ability to develop or commercialize our products; expenditure of time and resources to defend any claim or inquiry; adverse publicity; or revision or restructuring of our operations.

If our information technology systems or data, or those of third parties upon which we rely, are or were compromised, we could experience adverse consequences resulting from such compromise, including but not limited to regulatory investigations or actions; litigation; fines and penalties; disruptions of our business operations; reputational harm; loss of revenue or profits; loss of customers; and other adverse consequences.

In the ordinary course of our business, we may process proprietary, confidential, and sensitive data, including personal data, intellectual property, and trade secrets (collectively, sensitive information).

Cyberattacks, malicious internet-based activity, and online and offline fraud are prevalent and continue to increase. These threats are becoming increasingly difficult to detect. These threats come from a variety of sources, including traditional computer “hackers,” threat actors, personnel (such as through theft or misuse), sophisticated nation-states, and nation-state-supported actors. Some actors now engage and are expected to continue to engage in cyber-attacks, including without limitation nation-state actors for geopolitical reasons and in conjunction with military conflicts and defense activities. During times of war and other major conflicts, we and the third parties upon which we rely may be vulnerable to a heightened risk of these attacks, including retaliatory cyber-attacks, that could materially disrupt our systems and operations, supply chain, and ability to produce, sell and distribute our products.

We and the third parties upon which we rely may be subject to a variety of evolving threats, including but not limited to social-engineering attacks (including through phishing attacks), malicious code (such as viruses and worms), malware (including as a result of advanced persistent threat intrusions), denial-of-service attacks (such as credential stuffing), credential harvesting, personnel misconduct or error, ransomware attacks, supply-chain attacks, software bugs, server malfunctions, software or hardware failures, loss of data or other information technology assets, adware, telecommunications failures, earthquakes, fires, floods, and other similar threats.

Ransomware attacks, including those perpetrated by organized criminal threat actors, nation-states, and nation-state-supported actors, are becoming increasingly prevalent and severe – particularly for companies like ours that are engaged in manufacturing – and can lead to significant interruptions in our operations, loss of data and income, reputational harm, and diversion of funds. Extortion payments may alleviate the negative impact of a ransomware attack, but we may be unwilling or unable to make such payments due to, for example, applicable laws or regulations prohibiting such payments. Additionally, remote work has become more common and has increased risks to our information technology systems and data, as more of our employees utilize network connections, computers and devices outside our premises or network, including working at home, while in transit and in public locations. Future or past business transactions (such as acquisitions or integrations) could also expose us to additional cybersecurity risks and vulnerabilities, as our systems could be negatively affected by vulnerabilities present in acquired or integrated entities’ systems and technologies. A security incident or other interruption could result in unauthorized, unlawful, or accidental acquisition, modification, destruction, loss, alteration, encryption, disclosure of, or access to our sensitive information. A security incident or other interruption could disrupt our ability (and that of third parties upon whom we rely) to provide our products. Furthermore, we may discover security issues that were not found during due diligence of such acquired or integrated entities, and it may be difficult to integrate companies into our information technology environment and security program.

We rely upon third-party service providers and technologies to operate critical business systems to process sensitive information in a variety of contexts, including, without limitation, third-party providers of cloud-based infrastructure, encryption and authentication technology, employee email, content delivery to customers, manufacturing processing, process orders and invoices, payments, inventory management and other functions. We also depend on these systems to respond to customer inquiries, support our overall internal control process, maintain property, plant and equipment records, and pay amounts due to vendors and other creditors. Our ability to monitor these third parties’ information security practices is limited, and these third parties may not have adequate information security measures in place. While we may be entitled to damages if our third-party service providers fail to satisfy their privacy or security-related obligations to us, any award may be insufficient to cover our damages, or we may be unable to recover such award. In addition, supply-chain attacks have increased in frequency and severity, and we cannot guarantee that third parties’ infrastructure in our supply chain or our third-party partners’ supply chains have not been compromised. We may share or receive sensitive information with or from third parties.

We may expend significant resources or modify our business activities in an effort to protect against security incidents. Certain data privacy and security obligations may require us to implement and maintain specific security measures, industry-standard or reasonable security measures to protect our information technology systems and sensitive information.

While we have implemented security measures designed to protect against security incidents, there can be no assurance that these measures will be effective. We take steps to detect and remediate vulnerabilities, but we may not be able to detect and remediate all vulnerabilities because the threats and techniques used to exploit such vulnerabilities change frequently and are often sophisticated in nature. Therefore, such vulnerabilities could be exploited but may not be detected until after a security incident has occurred. These vulnerabilities pose material risks to our business.

Despite our efforts to identify and remediate vulnerabilities, if any, in our information technology systems, our efforts may not be successful. Further, we may experience delays in developing and deploying remedial measures designed to address any such identified vulnerabilities. Applicable data privacy and security obligations may require us to notify relevant stakeholders of security incidents. Such disclosures are costly, and the disclosures or the failure to comply with such requirements could lead to adverse consequences.

If we (or third parties upon whom we rely) experience a security incident or are perceived to have experienced a security incident, we may experience adverse consequences. These consequences may include: government enforcement actions (for example, investigations, fines, penalties, audits, and inspections); additional reporting requirements and/or oversight; restrictions on processing data (including personal data); litigation (including class claims); indemnification obligations; negative publicity; reputational harm; monetary fund diversions; interruptions in our operations (including availability of data); financial loss; and other similar harms. Security incidents and attendant consequences may negatively impact our ability to grow and operate our business. Our contracts may not contain limitations of liability, and even where they do, there can be no assurance that limitations of liability in our contracts are sufficient to protect us from liabilities, damages, or claims related to our data privacy and security obligations. We cannot be sure that our insurance coverage will be adequate or sufficient to protect us from or to mitigate liabilities arising out of our data privacy and security practices, that such coverage will continue to be available on commercially reasonable terms or at all, or that such coverage will pay future claims. In addition to experiencing a security incident, third parties may gather, collect, or infer sensitive information about us from public sources, data brokers, or other means that reveals competitively sensitive details about our organization and could be used to undermine our competitive advantage or market position.

Risks Related to Ownership of Our Shares

Our Certificate of Incorporation provides, subject to limited exceptions, that the Delaware Court of Chancery is the sole and exclusive forum for certain stockholder litigation matters, which could limit our stockholders' ability to obtain a chosen judicial forum for disputes with us or our directors, officers, employees or stockholders.

Our Certificate of Incorporation requires, to the fullest extent permitted by law, that derivative actions brought in our name, actions against directors, officers and employees for breach of fiduciary duty and other similar actions may be brought in the Delaware Court of Chancery or, if that court lacks subject matter jurisdiction, another federal or state court situated in the State of Delaware. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and consented to the forum provisions in our Certificate of Incorporation. In addition, our Certificate of Incorporation provides that the federal district courts of the United States shall be the exclusive forum for the resolution of any complaint asserting a cause of action under the Securities Act.

This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum of its choosing for disputes with us or any of our directors, officers, other employees or stockholders, which may discourage lawsuits with respect to such claims. Alternatively, if a court were to find the choice of forum provision contained in our Certificate of Incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business, operating results and financial condition.

Our charter documents and Delaware law could prevent a takeover that stockholders consider favorable and could also reduce the market price of our stock.

Our Certificate of Incorporation and Bylaws contain provisions that could delay or prevent a change in control of us. These provisions could also make it more difficult for stockholders to elect directors and take other corporate actions. These provisions include:

- initially providing for a classified Board with staggered, three-year terms;
- authorizing our Board to issue Preferred Stock with voting or other rights or preferences that could discourage a takeover attempt or delay changes in control;
- prohibiting cumulative voting in the election of directors;
- providing that vacancies on our Board may generally be filled only by a majority of directors then in office, even though less than a quorum;
- prohibiting the adoption, amendment or repeal of the Bylaws or the repeal of the provisions of our Certificate of Incorporation regarding the election and removal of directors without the required approval of at least two-thirds of the shares entitled to vote at an election of directors;

- prohibiting stockholder action by written consent;
- limiting the persons who may call special meetings of stockholders; and
- requiring advance notification of stockholder nominations and proposals.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our Board, which is responsible for appointing the members of our management. In addition, the provisions of Section 203 of the General Corporation Law of the State of Delaware ("DGCL") will govern us. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time without the consent of our Board. These and other provisions in our Certificate of Incorporation and our Bylaws under Delaware law could discourage potential takeover attempts, reduce the price investors might be willing to pay in the future for shares of our Common Stock and result in the market price of our Common Stock being lower than it would be without these provisions.

Claims for indemnification by our directors and officers may reduce our available funds to satisfy successful third-party claims against us and may reduce the amount of money available to us.

Our Certificate of Incorporation and Bylaws provide that we will indemnify our directors and officers, in each case to the fullest extent permitted by Delaware law.

In addition, as permitted by Section 145 of the DGCL, the Bylaws and its indemnification agreements that we entered into with our directors and officers provide that:

- we will indemnify our directors and officers for serving us in those capacities or for serving other business enterprises at our request, to the fullest extent permitted by Delaware law. Delaware law provides that a corporation may indemnify such person if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the registrant and, with respect to any criminal proceeding, had no reasonable cause to believe such person's conduct was unlawful;
- we may, in our discretion, indemnify employees and agents in those circumstances where indemnification is permitted by applicable law;
- we will be required to advance expenses, as incurred, to our directors and officers in connection with defending a proceeding, except that such directors or officers shall undertake to repay such advances if it is ultimately determined that such person is not entitled to indemnification;
- we will not be obligated pursuant to our Bylaws to indemnify a person with respect to proceedings initiated by that person against us or our other indemnities, except with respect to proceedings authorized by our Board or brought to enforce a right to indemnification;
- the rights conferred in the Bylaws are not exclusive, and we are authorized to enter into indemnification agreements with our directors, officers, employees and agents and to obtain insurance to indemnify such persons; and
- we may not retroactively amend our Bylaw provisions to reduce our indemnification obligations to directors, officers, employees and agents.

We do not intend to pay dividends for the foreseeable future.

We have has never declared or paid any cash dividends on our capital stock and do not intend to pay any cash dividends in the foreseeable future. We expect to retain future earnings, if any, to fund the development and growth of our business. Any future determination to pay dividends on our capital stock will be at the discretion of our Board. In addition, our loan agreements contain restrictions on our ability to pay dividends.

The market price and trading volume of our Common Stock has been and may be volatile and could decline significantly.

The stock markets, including Nasdaq on which we have listed the shares of our Common Stock under the symbol "ORGN," have from time to time experienced significant price and volume fluctuations. Even if an active, liquid and orderly trading market is sustained for our Common Stock, the market price of our Common Stock has been and may be volatile and could decline significantly. Our Common Stock experienced such a decline in August 2023. In addition, the trading volume in our Common Stock may fluctuate and cause significant price variations to occur. If the market price of our Common Stock declines significantly, you may be unable to resell your shares at or above the market price of our Common Stock at which you purchased our Common Stock. We cannot assure you that the market price of Common Stock will not fluctuate widely or decline significantly in the future in response to a number of factors, including, among others, the following:

- the realization of any of the risk factors presented in this Report;
- actual or anticipated differences in our estimates, or in the estimates of analysts, for our revenues, results of operations, level of indebtedness, liquidity or financial condition;
- additions and departures of key personnel;
- failure to comply with the requirements of Nasdaq;
- failure to comply with the Sarbanes-Oxley Act or other laws or regulations;
- future issuances, sales, resales or repurchases or anticipated issuances, sales, resales or repurchases, of our securities;
- publication of research reports about us;
- the performance and market valuations of other similar companies;
- commencement of, or involvement in, litigation involving us;
- broad disruptions in the financial markets, including sudden disruptions in the credit markets;
- speculation in the press or investment community;
- actual, potential or perceived control, accounting or reporting problems;
- changes in accounting principles, policies and guidelines; and
- other events or factors, including those resulting from infectious diseases, health epidemics and pandemics, natural disasters, war, acts of terrorism or responses to these events.

In the past, securities class-action litigation has often been instituted against companies following periods of volatility in the market price of their shares. This type of litigation could result in substantial costs and divert our management's attention and resources, which could have a material adverse effect on us.

In addition, litigation, including securities class action litigation, has often followed announcements of significant business transactions, such as the sale of a company or announcement of any other strategic transaction, or the announcement of negative events, such as negative earnings results. We are, and may in the future be, the target of this type of litigation. These events may also result in investigations by the Securities and Exchange Commission.

Our quarterly operating results may fluctuate significantly and could fall below the expectations of securities analysts and investors due to seasonality and other factors, some of which are beyond our control, resulting in a decline in our stock price.

Our quarterly operating results may fluctuate significantly because of several factors, including:

- labor availability and costs for hourly and management personnel;
- profitability of our products;
- changes in interest rates;
- impairment of long-lived assets;

- macroeconomic conditions, such as inflation and increasing interest rates, which may increase the risk of a potential recession;
- negative publicity relating to products we serve;
- changes in consumer preferences and competitive conditions;
- expansion to new markets; and
- fluctuations in commodity prices.

If securities or industry analysts do not publish or cease publishing research or reports about us, our business, or our market, or if they change their recommendations regarding our Common Stock adversely, then the price and trading volume of our Common Stock could decline.

The trading market for our Common Stock will be influenced by the research and reports that industry or securities analysts may publish about us, our business, our market, or our competitors. Accordingly, we must maintain confidence among current and future analysts, ratings agencies and other parties in our long-term financial viability and business prospects. Maintaining such confidence may be particularly complicated by certain factors including those that are largely outside of our control, such as limited operating history, market unfamiliarity, any delays in scaling manufacturing to meet demand and our eventual production and sales performance compared with the market expectations. If any of the analysts who may cover us change their recommendation regarding our Common Stock adversely, or provide more favorable relative recommendations about our competitors, the price of our Common Stock would likely decline. If any analyst who may cover us were to cease coverage of us, which occurred in November 2023 and may occur again in the future, or if any analyst fails to regularly publish reports on us, we could lose in the financial markets, which could cause our stock price or trading volume to decline.

Future issuances of debt securities and equity securities may adversely affect us, including the market price of our Common Stock and may be dilutive to existing stockholders.

In the future, we may incur debt or issue equity ranking senior to our Common Stock. Those securities will generally have priority upon liquidation. Such securities also may be governed by an indenture or other instrument containing covenants restricting its operating flexibility. Additionally, any convertible or exchangeable securities that we issue in the future may have rights, preferences and privileges more favorable than those of our Common Stock. Because our decision to issue debt or equity in the future will depend on market conditions and other factors beyond our control, we cannot predict or estimate the amount, timing, nature or success of our future capital raising efforts. As a result, future capital raising efforts may reduce the market price of our Common Stock and be dilutive to existing stockholders.

We have failed, and may continue to fail, to meet the listing standards of Nasdaq, and as a result our common stock may become delisted, which could have a material adverse effect on the liquidity of our common stock.

Our Common Stock and the public warrants that were issued in connection with Artius' initial public offering (the "Public Warrants") are currently listed on Nasdaq. If we fail to continue to satisfy the continued listing requirements of Nasdaq, such as the corporate governance or public float requirements, or the minimum closing bid price requirement, Nasdaq will take steps to delist our common stock. The per share price of our common stock has declined below the minimum bid price threshold required for continued listing. On January 4, 2023, we received a deficiency letter from the Listing Qualifications Department of the Nasdaq (the "Nasdaq Staff"), notifying us that, for the last 30 consecutive business days, the closing bid price for our Class A common stock had closed below the minimum $1.00 per share required for continued listing on the Nasdaq pursuant to Nasdaq Listing Rule 5550(a)(2) ("Rule 5550(a)(2)").

If we do not regain compliance with Rule 5550(a)(2) by July 2, 2024, we may be afforded a second 180 calendar day period to regain compliance. To qualify, we would be required to meet the continued listing requirement for market value of publicly held shares and all other initial listing standards for the Nasdaq Capital Market, except for the minimum bid price requirement. In addition, we would be required to notify Nasdaq of our intent to cure the deficiency during the second compliance period.

There are many factors that may adversely affect our minimum bid price. Many of these factors are outside of our control. As a result, we may not be able to sustain compliance with Rule 5550(a)(2) in the long term. Any potential delisting of our common stock from the Nasdaq would likely result in decreased liquidity and increased volatility for our common stock and would adversely affect our ability to raise additional capital or to enter into strategic transactions, in addition to adversely impacting the perception of our financial condition and could cause reputational harm to investors and parties conducting business with us. Any potential delisting of our common stock from the Nasdaq would also make it more difficult for our stockholders to sell our common stock.

If Nasdaq delists our securities from trading on its exchange for failure to meet the listing standards, we and our stockholders could face significant material adverse consequences including:

- a limited availability of market quotations for our securities;
- a determination that our Common Stock is a "penny stock" which will require brokers trading in our Common Stock to adhere to more stringent rules and possibly result in a reduced level of trading activity in the secondary trading market for our securities; or
- a decreased ability to issue additional securities or obtain additional financing in the future.

Additionally, if our securities are not listed on, or become delisted from, Nasdaq for any reason, and are quoted on the OTC Bulletin Board, an inter-dealer automated quotation system for equity securities that is not a national securities exchange, the liquidity and price of our securities may be more limited than if we were quoted or listed on Nasdaq or another national securities exchange. You may be unable to sell your securities unless a market can be established or sustained.

In the event of a delisting, we expect we would take actions to restore our compliance with Nasdaq Marketplace Rules, but we can provide no assurances that the listing of our common stock would be restored, that our common stock will remain above the Nasdaq minimum bid price requirement or that we otherwise will remain in compliance with the Nasdaq Marketplace Rules.

The National Securities Markets Improvement Act of 1996, which is a federal statute, prevents or preempts the states from regulating the sale of certain securities, which are referred to as "covered securities." Because Common Stock and Public Warrants are listed on Nasdaq, they are covered securities. Although the states are preempted from regulating the sale of our securities, the federal statute does allow the states to investigate companies if there is a suspicion of fraud, and, if there is a finding of fraudulent activity, then the states can regulate or bar the sale of covered securities in a particular case. While we are not aware of a state, other than the State of Idaho, having used these powers to prohibit or restrict the sale of securities issued by blank check companies, certain state securities regulators view blank check companies unfavorably and might use these powers, or threaten to use these powers, to hinder the sale of securities of blank check companies in their states. Further, if we were no longer listed on Nasdaq, our securities would not be covered securities and we would be subject to regulation in each state in which we offer our securities.

Sales of a substantial number of shares of our common stock by our existing stockholders could cause the price of our common stock to decline.

At any time, sales of a substantial number of shares of our common stock in the public market could occur, or there could be a perception in the market that the holders of a large number of shares of common stock intend to sell shares, and any such event could reduce the market price of our common stock. Substantially all of the shares of our common stock outstanding and shares issued upon the exercise of stock options outstanding under our equity incentive plans, subject to applicable securities law restrictions and excluding shares of restricted stock that will remain unvested, may be able to be sold in the public market. We are unable to predict the effect that sales may have on the prevailing market price of Common Stock and Public Warrants.

To the extent our Warrants are exercised, additional shares of Common Stock will be issued, which will result in dilution to the holders of Common Stock and increase the number of shares eligible for resale in the public market. Sales, or the potential sales, of substantial numbers of shares in the public market by the selling securityholders could increase the volatility of the market price of Common Stock or adversely affect the market price of Common Stock.

There is no guarantee that the Warrants will be in the money at the time they become exercisable, and they may expire worthless.

The exercise price for our Warrants is $11.50 per share of Common Stock. There is no guarantee that the Warrants will be in the money following the time they become exercisable and prior to their expiration, and as such, the Warrants may expire worthless. Our Warrants became exercisable on July 25, 2021.

We may amend the terms of the Warrants in a manner that may be adverse to holders with the approval by the holders of at least 50% of the then-outstanding Public Warrants. As a result, the exercise price of your Warrants could be increased, the exercise period could be shortened and the number of shares of our Common Stock purchasable upon exercise of a Warrant could be decreased, all without your approval.

Our Warrants are issued in registered form under the Warrant Agreement between the warrant agent and us. The Warrant Agreement provides that the terms of the Warrants may be amended without the consent of any holder to cure any ambiguity or correct any defective provision, but requires the approval by the holders of at least 50% of the then-outstanding Public Warrants to make any change that adversely affects the interests of the registered holders of Public Warrants. Accordingly, we may amend the terms of the Public Warrants in a manner adverse to a holder if holders of at least 50% of the then-outstanding Public Warrants approve of such amendment. Although our ability to amend the terms of the Public Warrants with the consent of at least 50% of the then-outstanding Public Warrants is unlimited, examples of such amendments could be amendments to, among other things, increase the exercise price of the Warrants, convert the Warrants into cash or stock (at a ratio different than initially provided), shorten the exercise period or decrease the number of shares of our Common Stock purchasable upon exercise of a Warrant.

We may redeem unexpired Warrants prior to their exercise at a time that is disadvantageous to warrant holders, thereby making such Warrants worthless.

We have the ability to redeem outstanding Warrants at any time after they become exercisable and prior to their expiration, at a price of $0.01 per Warrant, provided that the last reported sales price of our Common Stock equals or exceeds $18.00 per share (as adjusted for stock splits, stock dividends, reorganizations, recapitalizations and the like) for any 20 trading days within a 30 trading-day period ending on the third trading day prior to the date on which we give proper notice of such redemption and provided certain other conditions are met. If and when the Warrants become redeemable by us, we may exercise our redemption right even if we are unable to register or qualify the underlying securities for sale under all applicable state securities laws. Redemption of the outstanding Warrants could force you (a) to exercise your Warrants and pay the exercise price therefor at a time when it may be disadvantageous for you to do so, (b) to sell your Warrants at the then-current market price when you might otherwise wish to hold your Warrants or (c) to accept the nominal redemption price which, at the time the outstanding Warrants are called for redemption, is likely to be substantially less than the market value of your Warrants.

In addition, we may redeem your Warrants after they become exercisable for a number of shares of Common Stock determined based on the redemption date and the fair market value of our Common Stock. Any such redemption may have similar consequences to a cash redemption described above. In addition, such redemption may occur at a time when the Warrants are "out-of-the-money," in which case, you would lose any potential embedded value from a subsequent increase in the value of our Common Stock had your Warrants remained outstanding.

We may issue additional shares of Common Stock or other equity securities without shareholder approval, which would dilute shareholders' ownership interests and may depress the market price of the Common Stock.

As of March 31, 2024 we have Warrants outstanding to purchase an aggregate of 35,476,627 shares of Common Stock. Pursuant to the Merger Agreement, we may issue up to 25,000,000 shares of our Common Stock as Earnout Shares. In addition, pursuant to the 2021 EIP Plan and the ESPP, we may issue an aggregate of up to 35,644,147 shares of Common Stock, which amount is subject to increase from time to time. We may also issue additional shares of Common Stock or other equity securities of equal or senior rank in the future in connection with, among other things, future acquisitions or repayment of outstanding indebtedness, without stockholder approval, in a number of circumstances. The issuance of additional shares or other equity securities of equal or senior rank would have the following effects:

- existing stockholders' proportionate ownership interest in us will decrease;
- the amount of cash available per share, including for payment of dividends in the future, may decrease;
- the relative voting strength of each previously outstanding share of Common Stock may be diminished; and
- the market price of the Common Stock may decline.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

None.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Joshua Lee, General Counsel, terminated the pre-arranged stock trading plan on March 13, 2024. The terminated plan provided for the sale of up to 30,253 shares of the Company's common stock between November 10, 2023 and December 31, 2024. This trading plan was terminated during an open trading window and was intended to satisfy the affirmative defense of Rule 10b5-1(c) under the Securities Exchange Act of 1934, as amended, and the Company's policies regarding transactions in the Company's securities.

Item 6. Exhibits

			Incorporated by Reference		
Exhibit No.	**Description**	**Form**	**File No.**	**Exhibit**	**Filing Date**
3.1	Amended and Restated Certificate of Incorporation of the Company.	8-K	001-39378	3.3	July 1, 2021
3.2	Bylaws of the Company.	8-K	001-39378	3.2	June 29, 2021
31.1*	Certification of Co-Principal Executive Officer pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended.				
31.2*	Certification of Co-Principal Executive Officer pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended.				
31.3*	Certification of Principal Financial Officer pursuant to Rules 13a-14(a) and 15d-14(a) promulgated under the Securities Exchange Act of 1934, as amended.				
32.1*+	Certification of Co-Principal Executive Officers and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.				
101.INS*	Inline XBRL Instance Document				
101.SCH*	Inline XBRL Taxonomy Extension Schema Document				
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF*	Inline XBRL Taxonomy Extension Definitions Linkbase Document				
101.LAB*	Inline XBRL Taxonomy Extension Label Linkbase Document				
101.PRE*	Inline XBRL Taxonomy Extension Label Linkbase Document				
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)				

* Filed herewith.

\+ Furnished herewith and not deemed to be "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and shall not be deemed to be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

	ORIGIN MATERIALS, INC.
Date: May 14, 2024	By: /s/ John Bissell John Bissell Co-Chief Executive Officer
Date: May 14, 2024	By: /s/ Rich Riley Rich Riley Co-Chief Executive Officer
Date: May 14, 2024	By: /s/ Matt Plavan Matt Plavan Chief Financial Officer

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, John Bissell, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Origin Materials, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 14, 2024

By: /s/ John Bissell
John Bissell
Co-Chief Executive Officer
(Co-Principal Executive Officer)

Exhibit 31.2

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Rich Riley, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Origin Materials, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 14, 2024

By: /s/ Rich Riley
Rich Riley
Co-Chief Executive Officer
(Co-Principal Executive Officer)

Exhibit 31.3

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Matt Plavan, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Origin Materials, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 14, 2024

By: /s/ Matt Plavan
Matt Plavan
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. § 1350), John Bissell, Co-Chief Executive Officer of Origin Materials, Inc. (the "Company"), Rich Riley, Co-Chief Executive Officer of the Company, and Matt Plavan, Chief Financial Officer of the Company, each hereby certifies that, to the best of their knowledge:

1. The Company's Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2024, to which this Certification is attached as Exhibit 32.1 (the "Report"), fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 14, 2024

By: /s/ John Bissell
John Bissell
Co-Chief Executive Officer
(Co-Principal Executive Officer)

By: /s/ Rich Riley
Rich Riley
Co-Chief Executive Officer
(Co-Principal Executive Officer)

By: /s/Matt Plavan
Matt Plavan
Chief Financial Officer
(Principal Financial Officer)

This certification accompanies the Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Origin Materials, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.