UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2021
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: 001-35073

Gevo, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**87-0747704**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
345 Inverness Drive South, Building C, Suite 310, Englewood, CO	**80112**
(Address of Principal Executive Offices)	(Zip Code)

(303) 858-8358
(Registrant's telephone number, including area code)

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

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock, par value $0.01 per share	GEVO	Nasdaq Capital Market

Securities registered pursuant to Section 12(g) of the Act:
None

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

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

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, a 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. (Check one):

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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

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

The aggregate market value of common equity held by non-affiliates of the registrant was approximately $1.4 billion as of June 30, 2021, the last trading day of the registrant's most recently completed second fiscal quarter, based on the closing price of the common stock as reported on the Nasdaq Capital Market on June 30, 2021. Shares of common stock held by each officer, director and holder of 10% or more of the outstanding common stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of January 31, 2022, the number of outstanding shares of the registrant's common stock, par value $0.01 per share, was 201,988,662.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this Annual Report on Form 10-K incorporates certain information by reference from the registrant's proxy statement for the 2022 annual meeting of stockholders to be filed no later than 120 days after the end of the registrant's fiscal year ended December 31, 2021.

GEVO, INC.
FORM 10-K—ANNUAL REPORT
For the Fiscal Year Ended December 31, 2021
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Forward-Looking Statements

This report contains forward-looking statements within the meaning of Section 21 E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”). When used in this Annual Report on Form 10-K (this “Report”), the words “expect,” “believe,” “anticipate,” “estimate,” “intend,” “plan” and similar expressions are intended to identify forward-looking statements. These statements relate to future events or our future financial or operational performance and involve known and unknown risks, uncertainties and other factors that could cause our actual results, levels of activity, performance or achievements to differ materially from those expressed or implied by these forward-looking statements. These statements reflect our current views with respect to future events and are based on assumptions and subject to risks and uncertainties. These forward-looking statements include, among other things, statements about: the impact of the novel coronavirus ("COVID-19") pandemic on our business, our financial condition, our results of operation and liquidity, our ability to finance and construct our Net-Zero Projects (as defined below), our ability to produce our products at our facility in Luverne, Minnesota (the “Luverne Facility”) or elsewhere, our ability to meet production, financial and operational guidance, our strategy to pursue low-carbon or "net-zero" carbon renewable fuels for sale into California and elsewhere, our ability to replace our fossil-based energy sources with renewable energy sources at our current and future production facilities, our ability and plans to construct greenfield commercial hydrocarbon facilities to produce renewable hydrocarbons, our ability to raise additional funds to finance our business, our ability to perform under our existing offtake agreements and other supply agreements we may enter into in the future, our ability to successfully construct and operate our renewable natural gas ("RNG") project in Iowa, our ability to produce renewable hydrocarbon products at a commercial level and at a profit, achievement of advances in our technology platform, the availability of suitable and cost-competitive feedstocks, our ability to gain market acceptance for our products, the expected cost-competitiveness and relative performance attributes of our products, our strategy to pursue ethanol-to-sustainable aviation fuel ("SAF"), additional competition and changes in economic conditions and the future price and volatility of petroleum and products derived from petroleum. Important factors could cause actual results to differ materially from those indicated or implied by forward-looking statements such as those contained in documents we have filed with the U.S. Securities and Exchange Commission (the “SEC”), including this Report in Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” Item 1A. “Risk Factors” and subsequent reports on Form 10-Q. All forward-looking statements in this Report are qualified entirely by the cautionary statements included in this Report and such other filings. These risks and uncertainties or other important factors could cause actual results to differ materially from results expressed or implied by forward-looking statements contained in this Report. These forward-looking statements speak only as of the date of this Report. We undertake no intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, and readers should not rely on the forward-looking statements as representing the Company’s views as of any date subsequent to the date of the filing of this Report.

Unless the context requires otherwise, in this Report the terms “Gevo,” “we,” “us,” “our” and “Company” refer to Gevo, Inc. and its wholly owned, direct and indirect subsidiaries.

Risk Factors Summary

Our business is subject to a number of risks and uncertainties, many of which are beyond our control, including those described in Part I, Item 1A. Risk Factors of this annual report. These risks include, but are not limited to, the following:

- We have a history of net losses, and we may not achieve or maintain profitability.
- We will require substantial additional financings to achieve our goals, and a failure to obtain this capital when needed or on acceptable terms could force us to delay, limit, reduce or terminate our development and commercialization efforts.
- Our business is capital-intensive in nature and we rely on external financing to fund our growth strategy, including the development and construction of our Net-Zero Projects and other similar growth projects. Limitations on access to external financing could adversely affect our operating results.
- Our proposed growth projects may not be completed or, if completed, may not perform as expected. Our project development activities may consume a significant portion of our management's focus, and if not successful, reduce our profitability.
- We may be unable to successfully perform under current or future supply and distribution agreements to provide our products, which could harm our commercial prospects.
- Our supply agreements, including our take-or-pay purchase agreements, are subject to significant conditions precedent and, as a result, the revenues that we expect from such contracts may never be realized.
- We may be unable to produce planned quantities of our products and any such production may be costlier than we anticipate.
- Fluctuations in the price of corn and other feedstocks may affect our cost structure.
- Fluctuations in the price and availability of energy to power our production facilities may harm our performance.
- Fluctuations in petroleum prices and customer demand patterns may reduce demand for renewable fuels and bio-based chemicals.
- Any decline in the value of carbon credits associated with our products could have a material adverse effect on our results of operations cash flow and financial condition.
- We may not be successful in the commercialization of alcohol-to-SAF projects utilizing Axens technology.
- We may not be successful in the development of individual steps in the production of commercial quantities of renewable hydrocarbon products from plant feedstocks in a timely or economic manner, or at all.
- The technological and logistical challenges associated with producing, marketing, selling and distributing isobutanol, renewable hydrocarbon products and ethanol are complex, and we may not be able to resolve any difficulties that arise in a timely or cost-effective manner, or at all.
- Our actual costs may be greater than expected in developing our growth projects, causing us to realize significantly lower profits or greater losses on our projects.
- Our facilities and processes may fail to produce products at the volumes, rates and costs we expect.
- We may be unable to produce renewable hydrocarbon products in accordance with customer specifications.
- We lack significant experience operating commercial-scale facilities and may encounter substantial difficulties operating commercial plants or expanding our business.
- We may have difficulties gaining market acceptance and successfully marketing our renewable hydrocarbon products to customers, including chemical producers, fuel distributors and refiners.
- Even if we are successful in consistently producing our products on a commercial scale, we may not be successful in negotiating additional fuel supply agreements or pricing terms to support the growth of our business.
- Our isobutanol may be less compatible with existing refining and transportation infrastructure than we believe, which may hinder our ability to market our isobutanol on a large scale.
- If we engage in acquisitions, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.
- If we engage in joint ventures, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.
- If we lose key personnel, including key management personnel, or are unable to attract and retain additional personnel, it could delay our product development programs and harm our research and development efforts, make it more difficult to pursue partnerships or develop our own products or otherwise have a material adverse effect on our business.
- We may face substantial competition from companies with greater resources and financial strength, which could adversely affect our performance and growth.
- Our future success will depend on our ability to maintain a competitive position with respect to technological advances.
- Business interruptions, including those related to COVID-19, may have an adverse impact on our business and our financial results.
- Our business and operations would suffer in the event of information technology system failures or a cyber-attack.

- We may engage in hedging transactions, which could adversely impact our business.
- Ethical, legal and social concerns about genetically engineered products and processes, and similar concerns about feedstocks grown on land that could be used for food production, could limit or prevent the use of our products, processes and technologies and limit our revenues.
- As our products have not previously been used as a commercial fuel in significant amounts, their use subjects us to product liability risks.
- We may not be able to use some or all of our net operating loss carry-forwards to offset future income.
- Competitiveness of our products for fuel use depends in part on government economic incentives for renewable energy projects or other related policies that could change.
- Our ability to compete may be adversely affected if we are unsuccessful in defending against any claims by competitors or others that we are infringing upon their intellectual property rights.
- Our ability to compete may be adversely affected if we do not adequately protect our proprietary technologies or if we lose some of our intellectual property rights through costly litigation or administrative proceedings.
- If our biocatalysts, or the genes that code for our biocatalysts, are stolen, misappropriated or reverse engineered, others could use these biocatalysts or genes to produce competing products.
- We may not be able to enforce our intellectual property rights throughout the world.
- Confidentiality agreements with employees and others may not adequately prevent disclosures of trade secrets and other proprietary information.
- We have received funding from U.S. government agencies, which could negatively affect our intellectual property rights.
- The U.S. renewable fuels industry is highly dependent upon certain federal and state legislation and regulation and any changes in legislation or regulation could have a material adverse effect on our results of operations, cash flows and financial condition.
- We may face substantial delays in obtaining regulatory approvals for use of our renewable premium gasoline product, which could substantially hinder our ability to commercialize our renewable premium gasoline product in the U.S.
- Our isobutanol product may encounter physical or regulatory issues that could limit its usefulness as a gasoline blendstock.
- We may be required to obtain additional regulatory approvals for use of our iDGs as animal feed, which could delay our ability to sell iDGs increasing our net cost of production and harming our operating results.
- Reductions or changes to existing regulations and policies may present technical, regulatory and economic barriers, all of which may significantly reduce demand for renewable fuels or our ability to supply our products.
- We use hazardous materials in our business and we must comply with environmental laws and regulations. Any claims relating to improper handling, storage or disposal of these materials or noncompliance with applicable laws and regulations could be time consuming and costly and could adversely affect our business and results of operations.
- Our international activities may increase our exposure to potential liability under anti-corruption, trade protection, tax and other laws and regulations.
- The market price of our common stock may be adversely affected by the future issuance and sale of additional shares of our common stock or by our announcement that such issuances and sales may occur.
- Future issuances of our common stock or instruments convertible or exercisable into our common stock may materially and adversely affect the price of our common stock and cause dilution to our existing stockholders.
- Our stock price may be volatile, and your investment in our securities could suffer a decline in value.
- The estimates and assumptions on which our financial projections are based may prove to be inaccurate.
- Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.
- We do not anticipate paying cash dividends, and accordingly, stockholders must rely on stock appreciation for any return on their investment.
- If securities or industry analysts do not publish research or reports about our business, or publish negative reports about our business, our stock price and trading volume could decline. The trading market for our common stock will be influenced by the research and reports that securities or industry analysts publish about us or our business.
- We are subject to anti-takeover provisions in our certificate of incorporation, our bylaws and under Delaware law that could delay or prevent an acquisition of the Company, even if the acquisition would be beneficial to our stockholders.
- Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

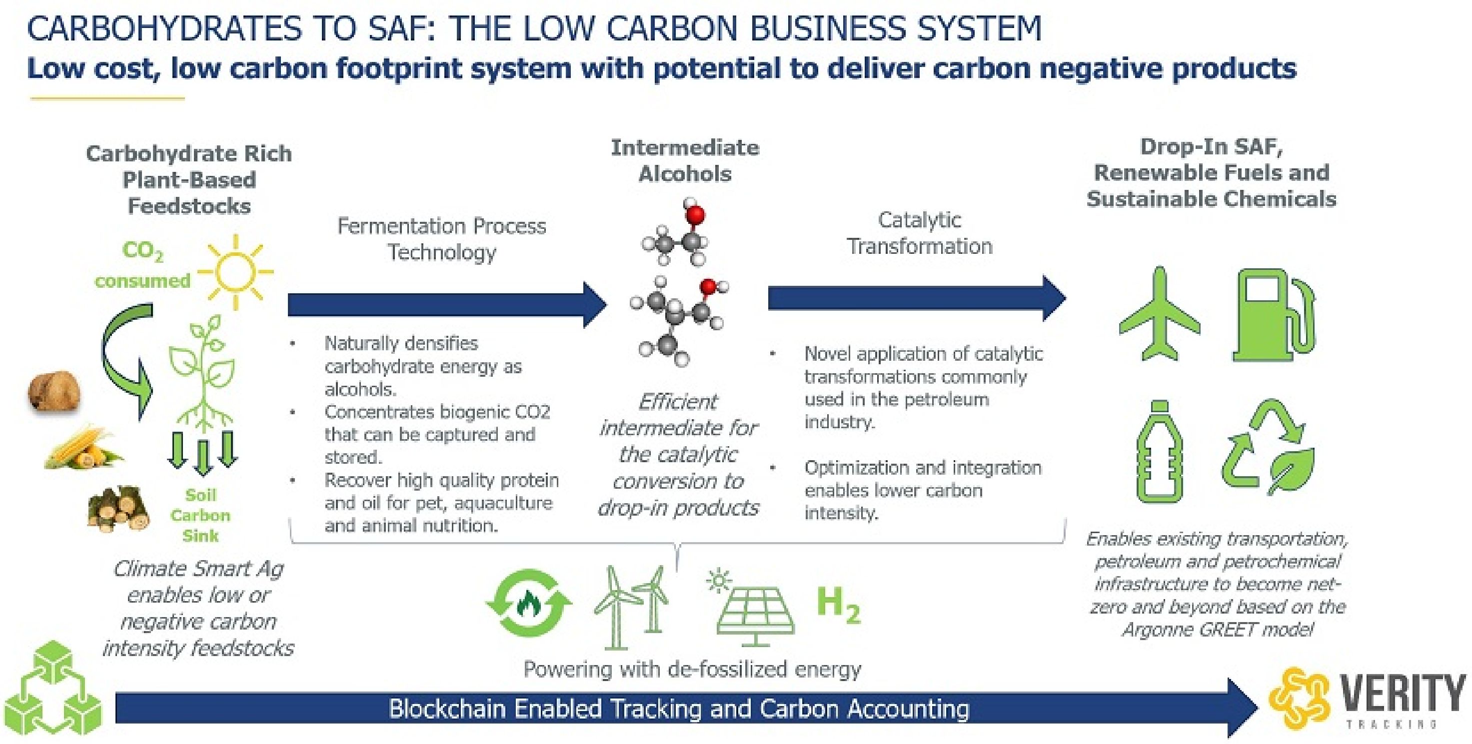
PART I

Items 1 and 2. Business and Properties.

Company Overview

Gevo, Inc. (Nasdaq: GEVO), a Delaware corporation founded in 2005, is a growth-oriented company with the mission of solving greenhouse gas emissions for those sectors of the transportation industry that are not amenable to electrification or hydrogen. We believe that the market size for hydrocarbon fuels will continue to remain significant in the long-term even with the rapid adoption of electric vehicles and hydrogen technologies. We also believe that we can achieve at least 1 billion gallons of hydrocarbon production and sales by 2030.

We are focused on transforming renewable energy into energy-dense liquid hydrocarbons that can be used as renewable fuels, such as SAF, with the potential to achieve a “net-zero” greenhouse gas ("GHG") footprint. We believe that this addresses the global need of reducing GHG emissions with "drop in" sustainable alternatives to petroleum fuels. We use the Argonne National Laboratory’s GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) model (the "GREET Model") to measure, predict and verify GHG emissions across the life-cycle of our products. The "net-zero" concept means that we expect to produce fuels that consume as much carbon dioxide in their manufacture as they produce when burned.



Our primary market focus, given current demand and growing customer interest, is SAF. We believe that we also have commercial opportunities for other renewable hydrocarbon products, such as hydrocarbons for gasoline blendstocks and diesel fuel; ingredients for the chemical industry, such as ethylene and butenes; plastics and materials; and other chemicals. The global fuel consumption by commercial airlines was an all-time high of 95 billion gallons in 2019. However, due to the COVID-19 pandemic, fuel consumption dropped to only 52 billion gallons in 2020 and reached 57 billion gallons in 2021. The airline industry is looking for at least 10% of its fuel needs to be sustainable by 2030 (with the potential for up to 30% at the high end).

We believe that there is a growing and significant market demand for SAF based on a number of factors, including:

- The International Air Transport Association ("IATA") 77th Annual General Meeting approved a resolution for the global air transport industry to achieve net-zero carbon emissions by 2050. IATA has 288 airline members, including Alaska Airlines, American Airlines, Delta Air Lines, FedEx Express, United Airlines and UPS Airlines.
- Starting in March 1, 2020, Delta Air Lines committed spending $1 billion over the next 10 years on its journey to mitigate all emissions from its global business going forward. Delta will invest in driving innovation, advancing clean air travel technologies, accelerating the reduction of carbon emissions and waste and establishing new projects to mitigate the balance of emissions.

We believe we have the technology and know-how to convert various carbohydrate feeds through a fermentation process into alcohols and then transform the alcohols into renewable fuels and materials. While we expect our first major capital deployments to focus on the production of SAF, we recognize that there are opportunities to operate in several different markets and we will pursue those opportunities when appropriate based on customer interest, access to capital, and expected investment returns.

Our production processes use carbohydrates as a feedstock. Carbohydrates are plant matter that result from photosynthesis. Photosynthesis is the natural process by which carbon dioxide is captured from the air by plants. The carbon in carbohydrates is therefore renewable because it is already in the atmosphere. The carbohydrates are fermented to produce alcohol intermediate products (e.g., ethanol or isobutanol). The alcohol-based intermediates are then chemically processed to make renewable hydrocarbons. To achieve net-zero carbon intensity ("CI") across the whole life-cycle of the products, we believe it is required that:

- carbohydrates with a low CI score are used as raw materials;
- the energy (electricity and heat source) used in production must be de-fossilized; and
- the products cannot contain fossil-based carbon.

We believe sustainably grown corn (i.e., corn that is grown with precision agricultural techniques and low-till or no till cultivation to conserve nutrients, prevent water runoff and erosion) is a good feedstock because:

- it produces a significant amount of protein and vegetable oil for nutritional products on a per acre basis while also producing an abundance of low CI carbohydrates that can be captured and used as a feedstock for fuels and chemicals;
- the protein and oil that are produced are easily separated as co-products and are sold, which serves to offset the cost of the corn;
- we believe that the carbon footprint of growing corn can be negative, according to calculations completed with the GREET Model, when a full suite of climate-smart agricultural practices are employed on appropriate acres of cropland.

We believe that utilizing sustainable agriculture practices to help solve GHG problems is a breakthrough that addresses the problem of GHGs without compromising sustainability or food supply. Also, when using a product such as corn as the carbohydrate source, the majority of the protein produced in the corn can be separated during processing and supplied as a nutritional product to the food chain. We believe it will be possible to create an incentive structure that rewards farmers to lower the CI score of their agricultural products and creates a cycle of continuous improvement to their overall sustainability footprint.

Market Traction and Financeable Customer Contracts

We have a growing portfolio of long-term sales agreements for our products. As of the date of this report, we have entered into multiple long-term sales agreements that we believe are financeable (i.e., contracts contain terms that we believe are useful for helping to secure long-term debt in support of financing new production facilities). We currently have approximately 98 million gallons per year of hydrocarbon fuel products under these sales agreements. The following is a summary of our existing sales agreements that we believe are financeable:

- Kolmar. In December 2021, we entered into a long-term fuel supply agreement with Kolmar Americas, Inc. ("Kolmar") pursuant to which we agreed to supply renewable hydrocarbons to Kolmar. Kolmar will pay us through an allocation of profit from the resale of the renewable hydrocarbons. Under the agreement, we expect to deliver the renewable hydrocarbons to Kolmar from a new production facility that is currently in development, referred to as 'Net-Zero 2', at a location to be determined and mutually agreed upon by us and Kolmar.
- Trafigura. In August 2020, and as subsequently amended in October 2021, we entered into a long-term, take-or-pay purchase agreement with Trafigura Trading LLC ("Trafigura") pursuant to which we agreed to supply renewable hydrocarbons to Trafigura, subject to certain conditions. Performance under the agreement is subject to certain conditions, including acquiring a production facility to produce the renewable hydrocarbon products contemplated by the agreement and closing a financing transaction for sufficient funds to acquire or retrofit the production facility contemplated by the agreement.
- Delta Air Lines. In December 2019, and as subsequently amended in April 2020, we entered into a long-term, take-or-pay purchase agreement with Delta Air Lines, Inc. ("Delta") pursuant to which we agreed to sell and deliver 10 million gallons per year of SAF to Delta, subject to certain conditions and exceptions, including Delta's right to eliminate the take-or-pay requirements in certain circumstances.
- Air Total. In August 2019, we entered into a take-or-pay purchase agreement with Air Total International, S.A. ("Air Total") pursuant to which we agreed to supply SAF to Air Total under a three-year offtake agreement.
- HCS Group GmbH. In February 2019, we entered into a take-or-pay purchase agreement with HCS Holding GmbH ("HCS"), pursuant to which we agreed to supply renewable premium gasoline to HCS under a 10-year offtake agreement. HCS will initially purchase small quantities of renewable premium gasoline. The Net-Zero 1 Project is expected to produce the products for the HCS agreement.
- Scandinavian Airlines System. On February 16, 2021, we and Scandinavian Airlines System ("SAS") entered into Amendment No. 1 (the "Amendment") to the Fuel Sales Agreement, dated October 28, 2019, by and between us and SAS (as amended by the Amendment, the "SAS Agreement"), pursuant to which we agreed, subject to the terms and conditions set forth in the Agreement, to SAF to SAS. We expect to supply the SAF for the SAS agreement from our second Net-Zero Project.

Building Out Production Capacity to Meet Demand

We believe that we will be able to develop the marketplace, customers and production capacity to achieve at least 1 billion gallons of sales by 2030. Two approaches will be required to achieve this objective. The first approach, the development of greenfield sites (i.e., the development of a project on an undeveloped site), allows us to optimize production and the integration of technology. We expect that utilizing greenfield sites will have the potential to achieve lower CI scores over the long run, compared to other approaches. The second approach, leveraging installed alcohol production capacity, has the advantage that the fermentation capacity already exists via existing ethanol plants. Those existing ethanol plants would need to be decarbonized and hydrocarbon production capacity would need to be installed.

In early 2021, we announced the concept of "Net-Zero Projects" as a series of planned facilities to produce energy dense liquid hydrocarbons using renewable energy and our proprietary technology. The concept of a Net-Zero Project is to convert renewable energy (photosynthetic, wind, renewable natural gas, biogas) from a variety of sources into energy dense liquid hydrocarbons that when burned in traditional engines, have the potential to achieve net-zero GHG emissions across the whole life-cycle of the liquid fuel based on the GREET Model, the pre-eminent science-based life-cycle analysis model. The GREET Model takes into account emissions and impacts "cradle to cradle" for renewable resource-based fuels including inputs and generation of raw materials, agriculture practices, chemicals used in production processes of both feedstocks and products, energy sources used in production and transportation and the end use of the products, which for fuel products is usually burning to release energy.

Using sustainably grown corn or low CI corn as an input at a Net-Zero Project would comprise the following steps: (i) process the corn kernels to produce protein, oil and carbohydrate; (ii) ferment the carbohydrate into an alcohol; and (iii) convert the alcohol to SAF and other renewable hydrocarbon products. The combination of renewable carbon obtained from the carbohydrates, plus the reduction/elimination of fossil-based energy creates the advantage in driving the CI score to achieve net-zero. In addition to those practices, there is potential to sequester renewable carbon in the soil during corn production, and from capturing the CO_2 from the production process, which should cause the CI scores to become negative across the while life-cycle of the product as measured by the GREET Model.

Greenfield Projects

In January 2021, we announced our initial greenfield Net-Zero Project ("Net-Zero 1 Project") that is currently planned to be constructed at Lake Preston, South Dakota. The Net-Zero 1 Project is expected to produce approximately 45 to 60 million gallons of hydrocarbons, with the majority of the hydrocarbons produced being SAF. The plant is expected to be powered by wind-based electricity and biogas produced from an on-site wastewater treatment plant. The products expected to be produced at the Net-Zero 1 Project include: animal feed and protein products, corn oil, SAF, naptha (gasoline) and/or diesel fuel. The co-products produced at the Net-Zero 1 Project and destined for the food chain, on a tonnage basis, are greater than that for renewable fuels.

In addition to the Lake Preston, South Dakota site, we have identified several other greenfield sites that are attractive from the standpoint of fundamental economics, access to sustainable feedstocks, deployment of renewable energy and transportation of finished product to market. We believe any of these sites could be utilized for a future greenfield Net-Zero Project or for the Net-Zero 1 Project. We believe that our first greenfield production facility will be operational in 2025.

Leveraging Existing Alcohol Production Capacity

Based upon what we have learned as we develop and engineer our Net-Zero 1 Project, we believe that it should be possible, practical and financially attractive to convert existing ethanol plants to allow for the production of SAF and other renewable hydrocarbon products. In order to accomplish this conversion, two critical things are required: (i) the energy for the converted plant needs to be de-fossilized to achieve the CI scores required for the market; and (ii) a hydrocarbon production plant needs to be built at the existing ethanol plant.

With the large number of existing ethanol plants, we have identified various opportunities for alcohol-to-SAF conversions and we are actively in discussions with multiple plants. Additionally, we signed a memorandum of understanding in October 2021 with Archer-Daniels-Midland Company with the intent of potentially converting 900 MGPY of their ethanol production plants to about 500 MGPY of hydrocarbon fuel products.

Renewable Natural Gas

We are developing RNG and biogas projects to generate incremental profit and to create a long-term option to potentially supply RNG to our Net-Zero Projects as part of our long-term strategy to decarbonize SAF and other hydrocarbon fuels.

In 2019, we began developing RNG projects. Animal manure can be digested anaerobically to produce RNG. RNG has value in markets such as California as well as in our hydrocarbon production process by helping us achieve carbon negative GHG emissions on our renewable hydrocarbon products. The end products resulting from such a decarbonization process have lower CI scores and increased market value, in addition to having a more positive impact on the environment. We developed our initial RNG project, Gevo NW Iowa RNG, LLC ("Gevo RNG"), to generate RNG captured from dairy cow manure which will be supplied by three dairies located in Northwest Iowa totaling over 20,000 milking cows. When fully operational, the Gevo RNG project is expected to generate approximately 355,000 MMBtu of RNG per year. We financed the construction of the Gevo RNG project in April 2021 with the $68,155,000 of Solid Waste Facility Revenue Bonds (Gevo NW Iowa RNG, LLC Renewable Natural Gas Project), Series 2021 (Green Bonds) (the "2021 Bonds") issued by the Iowa Finance Authority in a public offering for the benefit of Gevo RNG and we commenced construction in April 2021. In January 2022, we announced that we began the process of bringing the Gevo RNG project online.

In January 2022, Gevo RNG began to start-up operations. The start-up process is expected to take a few months and reach a steady state operation in the second quarter of 2022 which will allow time for Gevo to apply for credits under the federal Renewable Fuel Standard Program (“RFS”) and the Low Carbon Fuel Standard (“LCFS”) in California, including verification of carbon intensity levels and other requirements. Depending on the timing of the qualification and approval processes for obtaining credits under RFS and LCFS, Gevo expects to generate biogas revenue starting in the second quarter of 2022 and sales of credits under RFS and LCFS in late second quarter of 2022 and the fourth quarter of 2022, respectively.

Competitive Advantages

We believe that our vertically integrated set of technologies and business system (including our extensive portfolio of patents, technologies and processes) creates competitive advantage through (i) access to multiple opportunities to drive the CI score of our products down, and (ii) opportunities to address needs in the chemicals, food, feed, plastics and materials markets.

Carbohydrates as Feedstocks

Carbohydrate feedstocks dwarf all other potential renewable carbon feedstock sources by several orders of magnitude on a worldwide basis. In the Midwest region of the United States, corn is an ideal feedstock for multiple reasons. On a per acre basis, field corn (not food corn) is one of the most productive crops to produce protein and oil, as well as carbohydrates. The non-carbohydrate co-products from the field corn kernel represent the majority of the nutritional value of the kernel and could be delivered into the food chain. By selling the protein, oil and animal feed into the food chain markets, it would offset a portion of the cost of acquiring the corn. We believe about 50% of the cost of corn can be offset by manufacturing valuable products for the food chain. The remaining carbohydrates are used as a feedstock for fermentation.

We believe that in the U.S., carbohydrates produced from corn are the most sustainable and lowest cost renewable carbon sources that can be used as feedstock for alcohol to hydrocarbon processes to produce hydrocarbon fuels. In the future, we expect to evaluate the use of carbohydrates from sources other than corn (*e.g.*, of sugar cane, molasses or other cellulosic sugars derived from wood, agricultural residues and waste) as the cost to acquire those carbohydrates becomes competitive, and the sustainability profile (and related CI scores) become acceptable. We expect our future feedstocks to be chosen on the collective basis of (i) cost, (ii) carbon and/or sustainability footprint with associated value, (iii) positive contribution to food chain where possible, and (iv) availability of the feedstock at a practical scale.

Proprietary Carbohydrate Conversion Technologies

Three technologies are required to convert carbohydrates to SAF and other renewable hydrocarbons: (i) the fermentation process to convert carbohydrates to alcohols; (ii) the chemical processing technology to make the hydrocarbon fuel products; and (iii) the technology and know-how to mitigate the fossil based GHG emissions from the integrated fermentation and fuel production plants.

We have two ways of producing alcohols via fermentation from carbohydrates: (i) ethanol, which has two carbons, and (ii) isobutanol, which has four carbons. Ethanol can be a building block for SAF and diesel fuel. Isobutanol can be a building block for gasoline hydrocarbons, SAF and chemical products. Ethanol technology is well known and readily available. Isobutanol technology is relatively new and has yet to be scaled to the size of ethanol production, but it offers long-term potential in enabling lower CI scores and allowing for the production of chemical products, and high value gasoline hydrocarbons.

We believe that we possess proprietary know-how to integrate alcohol production and chemical processing to make SAF and other renewable hydrocarbons that should lower the CI score of our renewable hydrocarbon products.

Alcohols can be converted to hydrocarbon products with catalytic chemical processing techniques analogous to those used in the petrochemical industry. In September 2021, we signed an agreement with Axens North America, Inc. ("Axens") for their technology on this process since they have already scaled it up and they have licensed to many commercial production facilities. The agreement establishes a strategic alliance aimed at accelerating the commercialization of sustainable alcohol-to-SAF projects in the United States. As part of the alliance, Axens brings technologies with over 60 related patents, engineering packages, proprietary catalysts and certain proprietary equipment required to convert alcohols into SAF and they will provide certain process guarantees to us.

Integration of the production systems with various renewable or de-fossilized energy sources will be essential. Our Net-Zero plant concept depends upon a variety of decarbonization methods to ensure the operability of the plant while also reducing and eliminating the need for fossil-based energy. We have partnered with companies such as Juhl Energy to develop the technology suite for this decarbonization.

To prove out technologies, we operate two development scale plants. These development scale plants enable us to solve the practical issues involved with scale up of new technologies and testing of new unit operations. These plants include:

- South Hampton Facility: A demonstration facility in Silsbee, Texas that is operated in partnership with South Hampton Resources, Inc. (the "South Hampton Facility"). The South Hampton Facility has a capacity of approximately 100,000 gallons per year of renewable hydrocarbon products, including SAF and hydrocarbons for gasoline, which are converted from our renewable isobutanol.
- Luverne Facility: A wholly-owned development plant in Luverne, Minnesota, which has a current capacity of approximately 1.5 million gallons per year of isobutanol. We are currently planning to install a 1 million gallon per year alcohol-to-hydrocarbon process pilot unit that is expected to produce olefins and fuel products for market development and testing purposes. This pilot unit is being constructed by Praj Industries and is expected to be completed and delivered to the Luverne Facility in late 2022. The pilot unit will also be used in training of employees for Net-Zero 1 and other future projects. We are evaluating opportunities to add other technologies to our Luverne Facility as well.

Verity Tracking

It is critical that we can prove the CI of our products, ensuring that these values are accurate and auditable. The mission of Verity Tracking is to document CI and other sustainability attributes, and then apply Distributed Ledger Technology ("DLT") (commonly referred to as the blockchain) to create an immutable record of the products throughout the entire business system. Verity Tracking would start from calculating carbon intensity of feedstocks at the farm and field level. We plan to track these feedstocks through production at our plants where we intend to use a mix of renewable electricity, biogas, renewable hydrogen and other potentially decarbonized energy sources in production. The CI data would then be combined to deliver a comprehensive CI reduction in a finished renewable fuel. The resulting CI reduction value has potential to be quantified and traded in voluntary or compliance carbon markets while preventing double-counting. We believe that in the future, agricultural practices have the potential to sequester large quantities of CO_2 as soil organic carbon. Verity Tracking intends to document and account for that capture in conjunction with scientifically supported measurement techniques. The potential for Verity Tracking is broad and could be applicable to tracking the CI of various items, including, but not limited to, renewable fuels, food, feed and industrial products through the entire business system and value chain. We are working with Blocksize Capital on Verity Tracking and during September 2021, we executed a joint venture agreement with them for its creation. We are working on commercializing Verity Tracking with Blocksize Capital during 2022.

Our Facilities and Projects

Development Scale Facilities

As described above, we currently operate two development scale plants: (i) the South Hampton Facility and (ii) the Luverne Facility. The Luverne Facility was originally constructed in 1998 and is located on approximately 55 acres of land, which contains approximately 50,000 square feet of building space.

Facilities in the Start-Up Process

We developed Gevo's initial RNG project, Gevo RNG, to generate RNG captured from dairy cow manure which will be supplied by three dairies located in Northwest Iowa totaling over 20,000 milking cows. When fully operational, the Gevo RNG project is expected to generate approximately 355,000 MMBtu of RNG per year. The RNG is expected to be sold into the California market under dispensing agreements bp has in place with Clean Energy Fuels Corp., the largest fueling infrastructure in the U.S. for RNG. We commenced construction of this RNG facility in April 2021 and expect to begin producing RNG in 2022.

We have four leases for land and fuel supply agreements related to the Gevo RNG project. Under these contracts, we lease land from dairy farmers on which we are building a gas upgrading unit, three anaerobic digesters, related equipment and pipelines. These leases expire at various dates between 2031 and 2050.

Development Properties

In December 2020, we secured an option to purchase approximately 240 acres of land in Lake Preston, South Dakota (the "Lake Preston Site") as one of the potential sites for the Net-Zero 1 Project. We intend to make a decision on whether to purchase the Lake Preston Site in late 2022.

Headquarters

Our corporate headquarters and research and development laboratories are located in Englewood, Colorado and is leased. Our lease terminates in January 2029 and the leased space is approximately 19,241 square feet. We believe that the facility will be adequate for our needs for the immediate future and that, should it be needed, additional space can be leased to accommodate any future growth.

Competition

We face competitors in each market that we focus on, some of which are limited to individual markets, and some of which will compete with us across all of our target markets. Many of our competitors have greater financial resources, more comprehensive product lines, broader market presence, longer standing relationships with customers, longer operating histories, greater production capabilities, stronger brand recognition and greater marketing resources than we do which could make it difficult for us to compete.

Our renewable hydrocarbons, including SAF, hydrocarbons for gasoline blendstocks and isobutanol for gasoline blendstocks, compete with the incumbent petroleum-based fuels industry, as well as renewable fuels companies. The incumbent petroleum-based fuels industry makes the vast majority of the world’s gasoline, jet and diesel fuels and blendstocks. The petroleum-based fuels industry is mature and includes a substantial base of infrastructure for the production and distribution of petroleum-derived products. However, the industry faces challenges from its dependence on petroleum. High and volatile oil prices should provide an opportunity for renewable producers relying on biobased feedstocks like corn, which in recent years have had lower price volatility than oil, to compete.

Renewable fuels companies may provide substantial competition in the hydrocarbon fuels markets. These renewable fuel competitors are numerous and include both large established companies and numerous startups. Government tax incentives for renewable fuel producers and regulations such as the RFS program and LCFS program help provide opportunities for renewable fuels producers to compete. However, we have the advantage of being able to target conversion of alcohols into specific high-value molecules such as SAF, other renewable hydrocarbons and various chemical products.

Intellectual Property and Technologies

We seek protection for our intellectual property under patent, copyright, trademark and trade secret laws.

Since the Company was founded, we have submitted hundreds of patent applications in the U.S. and in various foreign jurisdictions. These patent applications are directed to our technologies and specific methods and products that support our business. We continue to file new patent applications, for which terms extend up to 20 years from the filing date in the U.S. We expect to continue to develop and build our intellectual property portfolio to address unmet technology and market needs going forward.

We have filed and prosecuted, and intend to continue to file and prosecute, patent applications and maintain trade secrets, as is consistent with our business plan, in an ongoing effort to protect our intellectual property.

We have a strong proprietary technology position. Our technology pathway converts carbohydrates to alcohols via a fermentation process. The alcohols are then converted to hydrocarbon fuels using a catalytic chemical process. By using renewable energy across the production process, in combination with sustainable feedstocks, like low carbon non-food corn, the GHG emissions can be substantially reduced or eliminated as measured across the whole of the life-cycle. The processes used to convert carbohydrates to drop in hydrocarbons using isobutanol as the intermediate alcohol is protected by a global patent portfolio with more than 500 patents, as well as proprietary processes and know-how. Certain production technology to convert ethanol to hydrocarbons has been exclusively licensed to Gevo in the United States by Axens, and incorporates more than 60 patents, as well as proprietary production technology and know-how. Additionally, we have more than 10 patents and patent applications covering the ethanol to hydrocarbons routes.

We have a proprietary fermentation yeast biocatalyst that has been designed to consume carbohydrates and produce isobutanol as a product. Our technology team developed our proprietary biocatalyst to efficiently convert fermentable sugars of all types into isobutanol by engineering isobutanol pathways into the biocatalyst. The advantage of this biocatalyst is that it (i) works in large scale fermentation systems, and (ii) can operate in complex biological mixtures such as corn mash or molasses and produce a suitable clean isobutanol product. The technology is designed to use similar carbohydrate feedstocks, similar to ethanol technology. For example, carbohydrates from non-food corn, sugar cane, molasses or cellulosic sugars each could be used depending upon cost and availability. We have already achieved yield (percentage of the theoretical maximum percentage of isobutanol that can be made from a given amount of feedstock) and rate (how fast the sugar fed to the fermentation is converted to isobutanol) sufficient for commercialization. While we believe that the majority of the development work on a commercially viable isobutanol producing yeast is complete, we expect to continue to make incremental improvements targeted to its commercial performance.

Butamax

Between 2011 and 2015, we were involved in an intellectual property dispute with Butamax Advanced Biofuels LLC ("Butamax"). On August 22, 2015, we entered into a Settlement Agreement and Mutual Release (the "Settlement Agreement") with Butamax, E.I. du Pont de Nemours & Company ("DuPont") and BP renewable fuels North America LLC ("BP Renewable Fuels" and, together with Butamax and DuPont, the "Butamax Parties"), that resolved the various disputes, lawsuits and other proceedings between one or more of the Butamax Parties and us, and created a new business relationship pursuant to which we and Butamax granted rights to each other under certain patents and patent applications in accordance with the terms of a Patent Cross-License Agreement (the "License Agreement"), which was entered into by us and Butamax concurrently with the Settlement Agreement. On September 21, 2021, we and Butamax and its affiliate, Danisco US Inc., entered into an Asset Purchase Agreement (the "Purchase Agreement"), pursuant to which we purchased all of Butamax’s rights, title and interests in certain U.S. and foreign patents and patent applications, subject to specified conditions and encumbrances, relating to the production, recovery and use of biobutanol that were owned by Butamax (the "Purchased Assets"). The Purchased Assets were previously subject to the terms and conditions of the License Agreement. Except with respect to certain existing licenses granted by Butamax pursuant to the License Agreement and other terms set forth in the Purchase Agreement, the License Agreement was terminated as of the effective date of the Purchase Agreement. See Note 7, *Intangible Assets*, to out Consolidated Financial Statements included herein for further discussion.

Customers

As described in “Market Traction and Financeable Customer Contracts” above, we have a growing portfolio of long-term sales agreements for our products following completion of our full-scale production facilities.

We currently have limited production of SAF and other renewable hydrocarbons at our development scale plants, and as such, we are not dependent on any specific customers at this time. Additionally, given our production capacity compared to the overall size of the North American market and the fungible demand for our products, we do not believe that a decline in a specific customer's purchases would have a material adverse long-term effect upon our financial results.

Government Regulation - Environmental Compliance Costs

Regulation by governmental authorities in the U.S. and other countries is a significant factor in the development, manufacture and marketing of second-generation renewable fuels. Our isobutanol and the next generation products isobutanol will be used to produce may require regulatory approval by governmental agencies prior to commercialization. In particular, renewable fuels are subject to rigorous testing and premarket approval requirements by the EPA’s Office of Transportation and Air Quality and regulatory authorities in other countries. In the U.S., various federal and, in some cases, state statutes and regulations also govern or impact the manufacturing, safety, storage and use of renewable fuels. The process of seeking required approvals and the continuing need for compliance with applicable statutes and regulations requires the expenditure of substantial resources. Regulatory approval, if and when obtained for any of the next generation products isobutanol is used to produce, may be limited in scope, which may significantly limit the uses for which our isobutanol and these next generation products may be marketed.

When built at a dry-mill facility, our GIFT™ fermentation process creates iDGs™, a potential animal feed component, as a co-product. We are currently approved to sell iDGs™ as animal feed through the self-assessed Generally Regarded as Safe ("GRAS") process of the United States Food and Drug Administration (the "FDA") via third party scientific review. While we believe we can rely on the GRAS process as we update our biocatalysts to increase isobutanol production, for further customer assurance, we also intend to pursue approval upon a completed biocatalyst from the Center for Veterinary Medicine of the FDA. Even if we receive such approval, the FDA’s policies may change and additional government regulations may be enacted that could prevent, delay or require regulatory approval of our co-products. We cannot predict the likelihood, nature or extent of adverse governmental regulations that might arise from future legislative or administrative action, either in the U.S. or abroad.

Our process contains a genetically engineered organism which, when used in an industrial process, is considered a new chemical under the EPA’s Toxic Substances Control Act program ("TSCA"). The EPA’s Biotechnology Program under TSCA requires the submission of certain information of the Office of Pollution Prevention and Toxic Substances. Due to the nature of our microorganism, we can utilize the TSCA Biotechnology Program Tier I and Tier II exemption criteria at our Luverne Facility. As we expand our business activities, we will pursue the EPA’s Microbial Commercial Activity Notice process for future plants. We do not anticipate a material adverse effect on our business or financial condition as a result of our efforts to comply with these requirements. However, the TSCA new chemical submission policies may change and additional government regulations may be enacted that could prevent or delay regulatory approval of our products. We cannot predict the likelihood, nature or extent of adverse governmental regulations that might arise from future legislative or administrative action, either in the U.S. or abroad.

There are various third-party certification organizations, such as ASTM International and Underwriters’ Laboratories, Inc. ("UL"), involved in certifying the transportation, dispensing and use of liquid fuel in the U.S. and internationally. In 2013, a specification for fuel grade isobutanol titled ASTM D7862 “Standard Specification for Butanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel” was published. In April 2016, ASTM International completed its process of approving the revision of ASTM D7566 (Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons) to include alcohol to jet synthetic paraffinic kerosene ("ATJ-SPK") derived from renewable isobutanol. Gevo’s SAF is ATJ-SPK for purposes of ASTM D7566. In addition, UL has published guidance on the use of isobutanol-gasoline blends in its UL87A fuel dispensers. When ATJ-SPK, which meets the specifications of ASTM D7566, is blended at a level of 50% or lower with petroleum-based jet fuel, which meets the specifications of ASTM D1655, the entire blended product meets the specifications of ASTM D1655, conventional jet fuel. In other words, the blend containing the ATJ-SPK is completely fungible with any conventional D1655 jet fuel. Voluntary standards development organizations may change and additional requirements may be enacted that could prevent or delay marketing approval of our products. The process of seeking required approvals and the continuing need for compliance with applicable statutes and regulations require the expenditure of substantial resources. We do not anticipate a material adverse effect on our business or financial conditions as a result of our efforts to comply with these requirements, but we cannot predict the likelihood, nature or extent of adverse third-party requirements that might arise from future action, either in the U.S. or abroad.

We are subject to various federal, state and local environmental laws and regulations, including those relating to the discharge of materials into the air, water and ground, the generation, storage, handling, use, transportation and disposal of hazardous materials and the health and safety of our employees. These laws and regulations require us to obtain environmental permits and comply with numerous environmental restrictions as we construct and operate isobutanol assets. They may require expensive pollution control equipment or operation changes to limit actual or potential impacts to the environment. A violation of these laws, regulations or permit conditions can result in substantial fines, natural resource damage, criminal sanctions, permit revocations and facility shutdowns.

There is a risk of liability for the investigation and cleanup of environmental contamination at each of the properties that we own or operate and at off-site locations where we arrange for the disposal of hazardous substances. If these substances are or have been disposed of or released at sites that undergo investigation or remediation by regulatory agencies, we may be responsible under the Comprehensive Environmental Response, Compensation and Liability Act or other environmental laws for all or part of the costs of investigation and remediation. We may also be subject to related claims by private parties alleging property damage and personal injury due to exposure to hazardous or other materials at or from the properties. Some of these matters may require us to expend significant amounts for investigation and cleanup or other costs. We are not aware of any material environmental liabilities relating to contamination at or from our facilities or at off-site locations where we have transported or arranged for the disposal of hazardous substances.

In addition, new laws, new interpretations of existing laws, increased governmental enforcement of environmental laws or other developments could require us to make significant additional expenditures. Continued government and public emphasis on environmental issues can be expected to result in increased future investments in environmental controls at our facilities which cannot be estimated at this time. Present and future environmental laws and regulations applicable to our operations, more vigorous enforcement policies and discovery of currently unknown conditions could all require us to make substantial expenditures. For example, our air emissions are subject to the Clean Air Act, the Clean Air Act Amendments of 1990 and similar state and local laws and associated regulations. Under the Clean Air Act, the EPA has promulgated National Emissions Standards for Hazardous Air Pollutants ("NESHAP"), which could apply to facilities that we own or operate if the emissions of hazardous air pollutants exceed certain thresholds. If a facility we operate is authorized to emit hazardous air pollutants above the threshold level, then we might still be required to come into compliance with another

NESHAP at some future time. New or expanded facilities might be required to comply with both standards upon startup if they exceed the hazardous air pollutant threshold. In addition to costs for achieving and maintaining compliance with these laws, more stringent standards may also limit our operating flexibility.

As a condition to granting the permits necessary for operating our facilities, regulators could make demands that increase our construction and operations costs, which might force us to obtain additional financing. For example, unanticipated water discharge limits could sharply increase construction costs for our projects. Permit conditions could also restrict or limit the extent of our operations. We cannot guarantee that we will be able to obtain or comply with the terms of all necessary permits to complete the retrofit of an ethanol plant. Failure to obtain and comply with all applicable permits and licenses could halt our construction and could subject us to future claims.

Our products benefit from the RFS Program in that our isobutanol and ethanol are currently eligible for Renewable Identification Numbers ("RINS") that have value based on the current RFS Program. The RFS Program could change, impacting our products, positively or negatively.

Various systems are being put in place around the world to measure CI and reduction of GHGs, with the intent of creating a system to monetize the value of the reduction of carbon. In order to benefit from such systems, companies need to have their products qualified through a regulatory process. There is no guarantee that any benefit could be gained. In 2019, we submitted a design pathway application to the California Air Resources Board to gain approval for low-carbon intensity ethanol utilizing beef manure biogas as a process input under the LCFS, and we may also seek approval under similar programs in the future.

People and Culture

Higher Purpose

Our employees strive to make environmental and social impacts in the world. Our employees are also guided by our Code of Business Conduct and Ethics, which helps them to uphold and strengthen the standards of integrity and innovation while continuously improving our environment, health, safety and sustainability, which has defined us since our founding. Our world and business may change, but our core values are a constant in everything we do.

Employees

As of December 31, 2021, we had 99 employees in North America. We also retain consultants, independent contractors, temporary and part-time workers. None of our facilities in the U.S. are covered by collective bargaining agreements. The Gevo team is made up of scientists, research and development experts, operations, administrative and business development professionals, skilled trades and energy technicians.

	Total
Employment	
Full-time	97
Part-time	2
Total	99
Department	
Production	35
Research and Development	21
General, administrative and business development	43
Total	99
Location	
Colorado	39
Iowa	5
Minnesota	23
Texas	7
South Dakota	19
Other	5
Foreign	1
Total	99

Code of Business Conduct and Ethics

We are committed to conducting business in accordance with the highest ethical standards. This means how we conduct ourselves is more than just a matter of policy and law; it is a reflection of our core values. Our Code of Business Conduct and Ethics provides specific guidance to all of our employees, outlining how they can and must uphold and strengthen the integrity that defines us. We maintain a global compliance hotline to allow for concerns to be brought forward.

Health and Safety

We strive to achieve safety excellence through increased focus on leading indicators, risk reduction, health and safety management systems and prevention to protecting the public health and environmental quality in our communities, as well as the health and safety of our employees, customers and neighbors. We strive to comply with all health and safety laws and regulations that apply to our business. We provide site safety orientation for all employees and guests as well as periodic refresher training for employees at the level appropriate for their role. We have received no violations and our proud that we have never had a fatality at a Gevo facility. During 2021, we had one recordable injury, no lost time incidents and a Total Recordable Injury Rate of 1.5.

Throughout the COVID-19 pandemic, we have remained focused on protecting the health, safety and well-being of our employees and managing the business to preserve our workforce. We provide time off for vaccinations and illness related to COVID-19. For all positions for which remote work is possible, employees have the choice to work from their home location to minimize potential exposure and ensure business continuity. We have implemented safety plans and protocols following guidance from the Centers for Disease Control, World Health Organization, and other federal, state, local and international regulations, and we continue to evolve our corporate and site-specific crisis management teams to actively manage and ensure compliance with these plans and protocols.

We are serious about maintaining the well-being of our employees and families, paying 100% of the premiums for health, dental and vision insurance for whole families. We also pay the premiums for disability and life insurance to assist in maintaining living standards when issues arise. We continue to endeavor to be agile in addressing employee needs in the quickly evolving environment while also being transparent across the workforce.

Diversity and Inclusion

In order to ensure that each of our employees can bring their full selves to work, we strive to foster a diverse, equitable, and inclusive workplace where all voices are heard and included. We continue to champion policies, practices and behaviors that amplify innovation on behalf of people, community and the planet. Diversity, equity and inclusion ("DEI") are critical to our success as an organization. Incorporating DEI into our business practices enhances innovation and enables our best talent to thrive in an environment where diverse perspectives are celebrated. This requires deliberate intention and action on the part of every employee and leader. We will continue to push forward on the path to a more diverse, equitable and inclusive culture and have committed to interview and consider at least one qualified woman and person of color for every open role, vice president and higher, including at the senior executive level and the Board of Directors.

We also launched our first women’s affinity group, led by our Chairman, Ruth Dreessen, to provide our women with the opportunity for mentorship from leaders throughout the organization.

We are working to improve gender and diversity at all levels of the business. As of December 31, 2021, women make up approximately 23% of our employee population and approximately 23% of our leadership roles, defined as manager and above. In 2021, we saw a decrease of approximately 6% of females in leadership roles within the organization. Further, employees identifying as diverse make up approximately 14% of our employee population and approximately 23% of our leadership roles, defined as manager and above. In 2021, we saw an increase of approximately 16% in diverse leaders within the organization. Last, we increased the gender diversity of the Gevo Board to 33% and are looking to expand the Board further to increase diversity and/or gender parity.

Attraction, Retention and Engagement

We are currently operating in an extremely challenging talent market. Market hiring surges, increased attrition and shifting work expectations have significantly impacted the attraction and retention of talent, creating a hyper-competitive marketplace. We understand that our long-term success will require a differentiated, targeted approach to talent attraction and retention. In response to these challenges, we took a number of actions in 2021 in an effort to enhance our ability to attract and retain diverse talent:

- We launched an annual talent review process to advance our internal talent placements, as well as plan for succession and growth.
- We conducted a compensation analysis and adjusted salaries for market competitiveness and pay equity. Minimum hourly wage rate is $19.00 an hour, which is 43% higher than minimum wage for Minnesota and $5.55 more per hour than the livable wage for an employee in the Rock County, MN.
- We launched our flexible work approach that balances the benefits of working remotely with the experience of working on-site.
- Our employees are enthusiastic about enriching their communities. We implemented a program to recognize their dedication and began matching community service efforts with up to 16 hours of paid time off.

We are committed to providing employment opportunities for people in our local communities. In 2022, we will be partnering with local technical colleges and universities to offer scholarships, tuition reimbursement and internships to students in the Energy programs and partner with them in showcasing non-traditional careers to achieve gender equity.

Our employees are highly engaged with our mission. We promote discussion and alignment through monthly town hall sessions with all employees, led by our CEO, Patrick Gruber, as well as fostering open door conversations with all members of management. Gevo is proud to have a 2021 turnover rate of 22.7%.

Further, we found that our employees could be effective while working outside the Gevo offices. Gevo's management philosophy is to lead with trust in our employees and supports a culture which enables employees to do their best work. And, as a company focused on reducing the world's carbon footprint, we hold that value for our employees as well and encourage them to reduce their personal carbon footprint and work from their homes, as their respective positions allow. This policy has allowed us to attract talent we might not otherwise have if we had restricted hiring to certain geographies.

Human Rights

Gevo honors human rights and respects the individual dignity of all persons globally. Our commitment to human rights requires that we understand and carry out our responsibilities consistent with our values and practices. We strive to ensure that human rights are upheld for our employees and all workers in our supply chain. Our commitment to human rights is defined in the Code of Business Conduct and Ethics, our supplier code of conduct, our dealer code of conduct and related policies and practices, which establish clear guidelines for our employees, suppliers and dealers while helping to inform our business decisions. We do not tolerate human rights abuses, such as forced labor, unlawful child labor or human trafficking. We are proud to contribute to the places where we work and support the residents of these places.

Available Information

Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to those reports (including related exhibits and supplemental schedules) filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, are made available, free of charge, through our website, as soon as reasonably practicable after such reports have been filed with, or furnished to, the SEC. Our website address is www.gevo.com. Information on our website is not incorporated by reference into, and does not constitute a part of, this report.

Item 1A. Risk Factors

You should carefully consider the risk factors described below before you decide to invest in our securities. The risks described below are not the only ones facing us. Our business is also subject to the risks that affect many other companies, such as competition, technological obsolescence, labor relations, general economic conditions, geopolitical changes and international operations. Additional risks and uncertainties not presently known to us or that we currently believe are immaterial may also impair our business operations and our liquidity. The risks described below could cause our actual results to differ materially from those contained in the forward-looking statements we have made in this Report, the information incorporated herein by reference and those forward-looking statements we may make from time to time.

Risk Related to our Business and Strategy

We have a history of net losses, and we may not achieve or maintain profitability.

We incurred net losses of $59.2 million, $40.2 million and $28.7 million during the years ended December 31, 2021, 2020 and 2019, respectively. As of December 31, 2021, we had an accumulated deficit of $557.4 million. We expect to incur losses and negative cash flows from operating activities for the foreseeable future. We currently derive limited revenue primarily from the sale of products produced at the Luverne and South Hampton Facilities.

Furthermore, we expect to spend significant amounts on the further development and commercial implementation of strategic plans and technology.

We also expect to spend significant amounts on (i) developing and financing our Net-Zero 1 Project and other similar growth projects, (ii) marketing, general and administrative expenses associated with our planned growth, (iii) management of operations as a public company, and (iv) debt service obligations. In addition, the cost of preparing, filing, prosecuting, maintaining and enforcing patent, trademark and other intellectual property rights and defending ourselves against claims by others that we may be violating their intellectual property rights may be significant.

In particular, over time, costs related to defending the validity of our issued patents and challenging the validity of the patents of others at the United States Patent and Trademark Office ("USPTO") may be significant. As a result, even if our revenues increase substantially, we expect to continue to incur new losses for the foreseeable future. We do not expect to achieve profitability during the foreseeable future and may never achieve it. If we fail to achieve profitability, or if the time required to achieve profitability is longer than we anticipate, we may not be able to continue our business operations. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis.

We will require substantial additional financings to achieve our goals, and a failure to obtain this capital when needed or on acceptable terms could force us to delay, limit, reduce or terminate our development and commercialization efforts.

We operate in a capital-intensive industry and will need substantial amount of capital to execute on our business plans. We believe that we will continue to expend substantial resources for the foreseeable future on further growth of our business, including developing, constructing, financing and acquiring facilities necessary for the production of our products on a commercial scale. These expenditures may include costs associated with our Net-Zero Projects, research and development, modifying and expanding the Luverne Facility to produce our products, developing biogas processing projects and wind projects, obtaining government and regulatory approvals, acquiring or constructing storage facilities and negotiating supply agreements for our products. In addition, other unanticipated costs may arise. Because the costs of developing our technology at a commercial scale are highly uncertain, we cannot reasonably estimate the amounts necessary to successfully commercialize our production.

To date, we have funded our operations primarily through equity offerings and issuances of debt. Based on our current plans and expectations, we will require additional funding to achieve our goals. In addition, the cost of preparing, filing, prosecuting, maintaining and enforcing patent, trademark and other intellectual property rights and defending against claims by others that we may be violating their intellectual property rights may be significant. Moreover, our plans and expectations may change as a result of factors currently unknown to us, and we may need additional funds sooner than expected and may seek to raise additional funds through public or private debt or equity financings. We may also choose to seek additional capital sooner than required due to favorable market conditions or strategic considerations.

Our future capital requirements will depend on many factors, including:

- the timing of and costs involved in financing and constructing our Net-Zero Projects, including our Net-Zero 1 Project;
- the timing of and costs involved in obtaining permits;
- the ability for us to deploy strains of yeast with improved performance that help to lower capital cost;
- the timing and costs associated with any future RNG projects or expansion of the Gevo RNG project;
- the costs involved in operating the Luverne Facility and South Hampton Facility;
- the timing of and the costs involved in developing adequate storage facilities for the products we produce;
- our ability to gain market acceptance for our products;
- our ability to negotiate additional supply agreements for the products we produce, and the timing and terms of those agreements, including terms related to sales price;
- our ability to negotiate sales of our products and the timing and terms of those sales, including terms related to sales price;
- our ability to establish and maintain strategic partnerships, licensing or other arrangements and the timing and terms of those arrangements; and
- the cost of preparing, filing, prosecuting, maintaining, defending and enforcing patent, trademark and other intellectual property claims, including litigation costs and the outcome of such litigation.

Additional funds may not be available when we need them, on terms that are acceptable to us, or at all. If needed funds are not available to us on a timely basis, we may be required to delay, limit, reduce or terminate:

- our Net-Zero Projects, including the Net-Zero 1 Project;
- our plans to enter into agreements with strategic partners;
- our production at the Luverne Facility, South Hampton Facility or other future facilities;
- our development of future RNG facilities or expansion of the Gevo RNG project;
- our efforts to prepare, file, prosecute, maintain and enforce patent, trademark and other intellectual property rights and defend against claims by others that we may be violating their intellectual property rights; and/or
- our activities in developing storage capacity and negotiating and performing under supply agreements that may be necessary for the commercialization of our products.

Our business is capital-intensive in nature and we rely on external financing to fund our growth strategy, including the development and construction of our Net-Zero Projects and other similar growth projects. Limitations on access to external financing could adversely affect our operating results.

We are in a capital-intensive business and we rely heavily on external financing for the costs of development and construction of our growth projects, such as the Net-Zero 1 Project, and other projected capital expenditures. Completion of our growth projects will require significant capital expenditures and construction costs. The recovery of the capital investment in our growth projects will generally occur over a long period of time. As a result, we must obtain funds from external sources to help develop and construct our existing project pipeline, to help finance the acquisition of system components, to help identify and develop new projects, to help fund research and development expenses and to help pay the general and administrative costs of operating our business. We may not be able to obtain the needed funds on terms acceptable to us, or at all. If we are unable to raise additional funds when needed, we could be required to delay development and construction of projects, reduce the scope of, abandon or sell some or all of our growth projects or default on our contractual commitments in the future, any of which would have a material adverse effect on our business, financial condition and operating results.

Our proposed growth projects may not be completed or, if completed, may not perform as expected. Our project development activities may consume a significant portion of our management's focus, and if not successful, reduce our profitability.

We plan to grow our business by building multiple production facilities, including greenfield and brownfield projects. Development projects may require us to spend significant sums for engineering, permitting, legal, financial advisory and other expenses before we determine whether a development project is feasible, economically attractive or capable of being financed.

Our development projects are typically planned to be large and complex, and we may not be able to complete them. There can be no assurance that we will be able to negotiate the required agreements, overcome any local opposition, or obtain the necessary licenses, permits and financing. Failure to achieve any of these elements may prevent the development and construction of a project. If that were to occur, we could lose all of our investment in development expenditures and may be required to write-off project development assets.

We may be unable to successfully perform under current or future supply and distribution agreements to provide our products, which could harm our commercial prospects.

We have entered into several supply agreements pursuant to which we agreed to supply our products. Under certain of these supply agreements, the purchasers agreed to pay for and receive, or cause to be received by a third party, or pay for even if not taken, the renewable hydrocarbon products under contract (a "take-or-pay" arrangement). The timing and volume commitment of certain of these agreements are conditioned upon, and subject to, our ability to complete the construction of a new or expanded production facility (the "Expanded Facility"). In order to commence construction of and complete the Expanded Facility, we must secure third-party financing. While we believe that we can secure adequate financing in order to commence construction of and complete the Expanded Facility and, in turn, perform under these agreements, we cannot assure you that we will be able to obtain adequate financing on favorable terms, or at all. Furthermore, we have not demonstrated that we can meet the production levels and specifications contemplated in certain of our current supply agreements, or future supply agreements. If our production is slower than we expect, if demand decreases or if we encounter difficulties in successfully completing the Expanded Facility, our counterparties may terminate our existing supply agreements and potential customers may be less willing to negotiate definitive supply agreements with us, and therefore cause our performance to suffer.

In addition, from time to time, we may enter into letters of intent, memoranda of understanding and other largely non-binding agreements or understandings with potential customers or partners in order to develop our business and the markets that we serve. We can make no assurance that legally binding, definitive agreements reflecting the terms of such non-binding agreements will be completed with such customers or partners, or at all.

Our supply agreements, including our take-or-pay purchase agreements, are subject to significant conditions precedent and, as a result, the revenues that we expect from such contracts may never be realized.

Our ability to realize revenue under our supply agreements, including our take-or-pay purchase agreements, is not guaranteed and is subject to significant conditions precedent. In order to actually realize revenue under such contracts, we are required to, among other things, complete the Expanded Facility or acquire, construct or retrofit a facility at another suitable location, which is, in turn, dependent on our ability to secure adequate financing. If we are unable to raise sufficient capital on acceptable terms, or at all, the revenues under such contracts may never be achieved. Our ability to obtain adequate financing will depend on, among other things, the status of our product development, our financial condition and general conditions in the capital, financial and debt markets at the time such financing is sought. In addition, any further equity or debt financings could result in the dilution of ownership interests of our then-current stockholders. Furthermore, even if we are able to satisfy all conditions precedent to our take-or-pay contracts, including completion of the Expanded Facility or acquiring, constructing or retrofitting a facility at another suitable location and securing adequate funding, we still may never realize the full amount of revenue that we expect or project to earn from such contracts. In any event, failure to realize the expected revenue thereunder would have a material adverse effect on our business, financial condition, results of operation and liquidity.

Fluctuations in the price of corn and other feedstocks may affect our cost structure.

Our approach to the renewable fuels and chemicals markets will be dependent on the price of corn and other feedstocks that will be used to produce our products. A decrease in the availability of plant feedstocks or an increase in the price may have a material adverse effect on our financial condition and operating results. At certain levels, prices may make these products uneconomical to use and produce as we may be unable to pass the full amount of feedstock cost increases on to our customers.

The price and availability of corn and other plant feedstocks may be influenced by general economic, market and regulatory factors. These factors include weather conditions, farming decisions, government policies and subsidies with respect to agriculture and international trade and global demand and supply. For example, corn prices may increase significantly in response to drought conditions in the midwestern region of the U.S. and any resulting decrease in the supply of corn could lead to the restriction of corn supplies, which in turn could cause further increases in the price of corn. The significance and relative impact of these factors on the price of plant feedstocks is difficult to predict, especially without knowing what types of plant feedstock materials we may need to use.

Fluctuations in the price and availability of energy to power our production facilities may harm our performance.

Our production facilities use significant amounts of energy to produce our products. Accordingly, our business is dependent upon electricity and natural gas produced by us or supplied by third parties. The prices and availability of energy resources are subject to volatile market conditions. These market conditions are affected by factors beyond our control, such as weather conditions, overall economic conditions and governmental regulations. Should the price of energy increase or be unavailable, our business could suffer and have a material adverse impact on our results of operations. In addition, a lack of availability of sufficient amounts of renewable energy to effectively decarbonize our facilities could have a material impact on our business and results of operations

Fluctuations in petroleum prices and customer demand patterns may reduce demand for renewable fuels and bio-based chemicals.

Our renewable fuels may be considered an alternative to petroleum-based fuels. Therefore, if the price of oil falls, any revenues that we generate from renewable fuel products could decline and we may be unable to produce products that are a commercially viable alternative to petroleum-based fuels. Additionally, demand for liquid transportation fuels, including renewable fuels, may decrease due to economic conditions or other factors outside of our control, which could have a material adverse impact on our business and results of operations.

Any decline in the value of carbon credits associated with our products could have a material adverse effect on our results of operations, cash flow and financial condition.

The sale of our products is often dependent on the value of carbon credits under the RFS Program, LCFS and other similar regulatory regimes. The value of these credits fluctuates based on market forces outside of our control. There is a risk that the supply of low-carbon alternative fuels outstrips demand, resulting in the value of carbon credits declining. Any such declines could mean that the economic benefits from our efforts to de-carbonize the Luverne Facility might not be realized. Any decline in the value of carbon credits associated with our products could have a material adverse effect on our results of operations, cash flow and financial condition.

We may not be successful in the commercialization of alcohol-to-SAF projects utilizing Axens technology.

Our future success on alcohol-to-SAF projects depends on our ability to produce commercial quantities of SAF from ethanol using Axens technology. We may encounter challenges in scaling up the Axens technology and/or the technology may not work as expected, or at all on a commercial scale. In addition, the cost to construct commercial alcohol-to-SAF facilities or the production costs associated with the operation of such facilities may be higher than we project. If we encounter such difficulties, this could significantly affect our profitability and have a material adverse impact on our business and results of operations.

We may not be successful in the development of individual steps in the production of commercial quantities of renewable hydrocarbon products from plant feedstocks in a timely or economic manner, or at all.

Our future success depends on our ability to produce commercial quantities of low-carbon isobutanol, ethanol and/or renewable hydrocarbon products in a timely and economic manner. While we have produced isobutanol using our biocatalysts at the Luverne Facility in commercial-scale fermenters, our biocatalysts have not yet produced isobutanol at fully optimized levels in fermenters typical of a full-scale commercial facility. The risk of contamination and other problems rises as we increase the scale of our production. If we are unable to successfully manage these risks, we may encounter difficulties in achieving our target production yield, rate, concentration or purity at a commercial scale, which could delay or increase the costs involved in commercializing our production.

The technological and logistical challenges associated with producing, marketing, selling and distributing isobutanol, renewable hydrocarbon products and ethanol are complex, and we may not be able to resolve any difficulties that arise in a timely or cost-effective manner, or at all.

We have limited experience operating, and have never built, a commercial isobutanol, renewable hydrocarbon or ethanol facility. We believe that we understand the engineering and process characteristics necessary to successfully build the additional facilities that we are contemplating and to scale up to larger facilities. We expect to incur additional capital expenditures to increase production of low-carbon isobutanol and renewable hydrocarbon products at our Net-Zero Projects and potentially also at the Luverne Facility. Our assumptions, however, may prove to be incorrect. Accordingly, we cannot be certain that we can consistently produce low-carbon isobutanol, ethanol or renewable hydrocarbon products in an economical manner in commercial quantities. If we fail to consistently produce low-carbon isobutanol, renewable hydrocarbon products and/or ethanol economically on a commercial scale or in commercial volumes, our commercialization of low-carbon isobutanol, ethanol or renewable hydrocarbon products and our business, financial condition and results of operations will be materially adversely affected.

Our actual costs may be greater than expected in developing our growth projects, causing us to realize significantly lower profits or greater losses on our projects.

We generally must estimate the costs of completing a specific project to prior to the construction of the project. The actual cost of labor and materials may vary from the costs we originally estimated. These variations may cause gross profit for a project to differ from those we originally estimated. Cost overruns on our growth projects could occur due to changes in a variety of factors such as:

- failure to properly estimate costs of engineering, materials, equipment, labor or financing;
- unanticipated technical problems with the structures, materials or services;
- unanticipated project modifications;
- changes in the costs of equipment, materials, labor or contractors;
- our suppliers' or contractors' failure to perform;
- changes in laws and regulations; and
- delays caused by weather conditions.

As projects grow in size and complexity, multiple factors may contribute to reduced profit or greater losses, and depending on the size of the particular project, variations from the estimated project costs could have a material adverse effect on our business. For example, if project costs exceed our estimates, it could cause us to realize significantly lower profits or greater losses on our projects.

Our facilities and processes may fail to produce products at the volumes, rates and costs we expect.

Some or all of our future production facilities may be in locations distant from corn or other feedstock sources, which could increase our feedstock costs or prevent us from acquiring sufficient feedstock volumes for commercial production. General market conditions might also cause increases in feedstock prices, which could likewise increase our production costs.

Even if we secure access to sufficient volumes of feedstock, our production facilities may fail to perform as expected. The equipment and subsystems that we install in our production facilities may never operate as planned. Our systems may prove incompatible with the original facility or require additional modification after installation. Unexpected problems may force us to cease or delay production and the time and costs involved with such delays may prove prohibitive. Any or all of these risks could prevent us from achieving the production throughput and yields necessary to achieve our target annualized production run rates and/or to meet the volume demands or minimum requirements of our customers, including pursuant to definitive supply or distribution agreements that we may enter into, which may subject us to monetary damages. Failure to achieve these rates or meet these minimum requirements, or achieving them only after significant additional expenditures, could substantially harm our commercial performance.

In addition, if we decide to utilize the Luverne Facility for production of our products, it is important to note that the Luverne Facility was constructed in 1998. As an older production facility, the Luverne Facility may be more susceptible to maintenance issues that result in production challenges than newer production facilities. Any such production challenges may delay our ramp up of production capacity, prevent us from producing significant quantities of our products.

We may be unable to produce renewable hydrocarbon products in accordance with customer specifications.

We may be unable to produce renewable hydrocarbon products to meet customer specifications, including those defined in ASTM D7862 "Standard Specification for Butanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel," ASTM D7566 "Standard Specifications for Aviation Turbine Fuel Containing Synthesized Hydrocarbons" or specifications to carbon intensity standards. We may need to add additional processing steps or incur capital expenditures in order to meet customer specifications which could add significant costs to our production process. If we fail to meet specific product or volume specifications contained in a supply agreement, the customer may have the right to seek an alternate supply of isobutanol or renewable hydrocarbon products and/or terminate the agreement completely, and we could be required to pay shortfall fees or otherwise be subject to damages. A failure to successfully meet the specifications of our potential customers could decrease demand and significantly hinder market adoption of our products, thus having a material adverse impact on our business and results of operations.

We lack significant experience operating commercial-scale facilities and may encounter substantial difficulties operating commercial plants or expanding our business.

We have limited experience operating commercial-scale isobutanol, ethanol, RNG and other renewable hydrocarbon facilities concurrently. Accordingly, we may encounter significant difficulties operating at a commercial scale once we expand our production capabilities, including at our Gevo RNG and Net-Zero Projects. Additionally, if we elect to produce any of our products at the Luverne Facility, we will need to successfully administer and manage this production. Although the employees at the Luverne Facility are experienced in the operation of ethanol facilities, and our future development partners or the entities that we acquire may likewise have such experience, we may be unable to manage production operations. The skills and knowledge gained in operating our current facilities may prove insufficient for successful operation of a large-scale facility or the Expanded Facility, and we may be required to expend significant time and money to develop our capabilities in large-scale facility operation. We may also need to hire new employees or contract with third parties to help manage our operations, and our performance will suffer if we are unable to hire qualified parties or if they perform poorly.

We may face additional operational difficulties as we further expand our production capacity, including our RNG facilities and the Expanded Facility. Integrating new facilities with our existing operations may prove difficult. Rapid growth, resulting from our operation of, or other involvement with, isobutanol and renewable hydrocarbon facilities or otherwise, may impose a significant burden on our administrative and operational resources. To effectively manage our growth and execute our expansion plans, we will need to expand our administrative and operational resources substantially and attract, train, manage and retain qualified management, technicians and other personnel. We may be unable to do so. Failure to meet the operational challenges of developing and managing increased production, or failure to otherwise manage our growth, may have a material adverse effect on our business, financial condition and results of operations.

We may have difficulties gaining market acceptance and successfully marketing our renewable hydrocarbon products to customers, including chemical producers, fuel distributors and refiners.

A key component of our business strategy is to market our products to chemical producers, fuels distributors, refiners and other fuel and chemical industry market participants. We have limited experience marketing our products on a commercial scale and we may fail to successfully negotiate marketing agreements in a timely manner or on favorable terms. If we fail to successfully market our products to refiners, fuels distributors, chemical producers and others, our business, financial condition and results of operations will be materially adversely affected.

A very limited market currently exists for isobutanol as a fuel or as a gasoline blendstock. Therefore, to gain market acceptance and successfully market our isobutanol to fuels distributors and refiners, we must effectively demonstrate the commercial advantages of using isobutanol over other renewable fuels and blendstocks, as well as our ability to produce isobutanol reliably on a commercial scale at a sufficiently low cost. We must show that isobutanol is compatible with existing infrastructure and does not damage pipes, engines, storage facilities or pumps. We must also overcome marketing and lobbying efforts by producers of other renewable fuels and blendstocks, including ethanol, many of whom may have greater resources than we do. If the markets for isobutanol as a fuel or as a gasoline blendstock do not develop as we currently anticipate, or if we are unable to penetrate these markets successfully, our revenue and growth rate could be materially and adversely affected.

We also intend to market our isobutanol to chemical producers for use in making various chemicals such as isobutylene, a type of butene that can be produced through the dehydration of isobutanol. Although a significant market currently exists for isobutylene produced from petroleum, which is widely used in the production of plastics, specialty chemicals, alkylate for gasoline blending and high octane aviation gasoline, no one has successfully created isobutylene on a commercial scale from bio-isobutanol. Therefore, to gain market acceptance and successfully market our isobutanol to chemical producers, we must show that our isobutanol can be converted into isobutylene at a commercial scale. As no company currently dehydrates commercial volumes of isobutanol into isobutylene, we must demonstrate the large-scale feasibility of the process and potentially reach agreements with companies that are willing to invest in the necessary dehydration infrastructure. Failure to reach favorable agreements with these companies, or the inability of their plants to convert isobutanol into isobutylene at sufficient scale, may slow our development in the chemicals market and could significantly affect our profitability.

Obtaining market acceptance in the chemicals industry is complicated by the fact that many potential chemicals industry customers have invested substantial amounts of time and money in developing petroleum-based production channels. These potential customers generally have well-developed manufacturing processes and arrangements with suppliers of chemical components and may display substantial resistance to changing these processes. Pre-existing contractual commitments, unwillingness to invest in new infrastructure, distrust of new production methods and lengthy relationships with current suppliers may all slow market acceptance of isobutanol.

We believe that consumer demand for environmentally sensitive products will drive demand among large brand owners for isobutanol, renewable hydrocarbon products and low-carbon ethanol. One of our marketing strategies is to leverage this demand to obtain commitments from large brand owners to purchase our products. We believe these commitments will, in turn, promote chemicals industry demand for our isobutanol and renewable hydrocarbon products. If consumer demand for environmentally sensitive products fails to develop at sufficient scale or if such demand fails to drive large brand owners to seek sources of renewable isobutanol or renewable hydrocarbon products, our revenue and growth rate could be materially and adversely affected.

Even if we are successful in consistently producing our products on a commercial scale, we may not be successful in negotiating additional fuel supply agreements or pricing terms to support the growth of our business.

We expect that many of our customers will be large companies with extensive experience operating in the fuels or chemicals markets. We lack significant commercial operating experience and may face difficulties in developing marketing expertise in these fields. Our business model relies upon our ability to successfully negotiate, structure and fulfill long-term supply agreements for our products. Certain agreements with existing and potential customers may initially only provide for the purchase of limited quantities from us. Our ability to increase our sales will depend in large part upon our ability to expand these existing customer relationships into long-term supply agreements. Maintaining and expanding our existing relationships and establishing new ones can require substantial investment without any assurance from customers that they will place significant orders. In addition, many of our potential customers may be more experienced in these matters than we are, and we may fail to successfully negotiate these agreements in a timely manner or on favorable terms which, in turn, may force us to slow our production, dedicate additional resources to increasing our storage capacity and/or dedicate resources to sales in spot markets. Furthermore, should we become more dependent on spot market sales, our profitability will become increasingly vulnerable to short-term fluctuations in the price and demand for petroleum-based fuels and competing substitutes.

Our isobutanol may be less compatible with existing refining and transportation infrastructure than we believe, which may hinder our ability to market our isobutanol on a large scale.

We believe that our isobutanol is fully compatible with existing refinery infrastructure. For example, when making isobutanol blends, we believe that gasoline refineries will be able to pump our isobutanol through their pipes and blend it in their existing facilities without damaging their equipment. If our isobutanol proves unsuitable for such handling, it will be more expensive for refiners to use our isobutanol than we anticipate, and they may be less willing to adopt it as a gasoline blendstock, forcing us to seek alternative purchasers.

Likewise, our plans for marketing our isobutanol are based upon our belief that it will be compatible with the pipes, tanks and other infrastructure currently used for transporting, storing and distributing gasoline. If our isobutanol or products incorporating our isobutanol cannot be transported with this equipment, we will be forced to seek alternative transportation arrangements, which will make our isobutanol and products produced from our isobutanol more expensive to transport and less appealing to potential customers. Reduced compatibility with either refinery or transportation infrastructure may slow or prevent market adoption of our isobutanol, which could substantially harm our performance.

If we engage in acquisitions, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.

If appropriate opportunities become available, we may acquire businesses, assets, technologies or products to enhance our business in the future. In connection with any future acquisitions, we could, subject to certain limitations in the agreements governing our indebtedness at such time:

- issue additional equity securities which would dilute our current stockholders;
- incur substantial debt to fund the acquisitions; or
- assume significant known or unknown liabilities.

Acquisitions involve numerous risks, including problems integrating the purchased operations, technologies or products, unanticipated costs and other liabilities, diversion of management's attention from our core business, adverse effects on existing business relationships with current and/or prospective partners, customers and/or suppliers, risks associated with entering markets in which we have no or limited prior experience and potential loss of key employees. Other than our acquisition of the Luverne Facility, we have not engaged in acquisitions in the past, and do not have experience in managing the integration process. Therefore, we may not be able to successfully integrate any businesses, assets, products, technologies or personnel that we might acquire in the future without a significant expenditure of operating, financial and management resources, if at all. The integration process could divert management time from focusing on operating our business, result in a decline in employee morale and cause retention issues to arise from changes in compensation, reporting relationships, future prospects or the direction of the business. In addition, we may acquire companies that have insufficient internal financial controls, which could impair our ability to integrate the acquired company and adversely impact our financial reporting. If we fail in our integration efforts with respect to acquisitions and are unable to efficiently operate as a combined organization, our business, financial condition and results of operations may be materially adversely affected.

If we engage in joint ventures, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.

If appropriate opportunities become available, we may enter into joint ventures with the owners of existing ethanol production facilities in order to acquire access to additional production capacity and renewable hydrocarbon production capabilities. We currently anticipate that in each such joint venture, the ethanol producer would contribute access to its existing ethanol production facility and we would be responsible for retrofitting such facility. Upon completion of any retrofit, and in some cases the attainment of certain performance targets, we expect both parties to the joint venture would receive a portion of the profits from the sale of products, consistent with our business model. In connection with these joint ventures, we could incur substantial debt to fund the retrofit of the accessed facilities and we could assume significant liabilities.

Realizing the anticipated benefits of joint ventures, including projected increases to production capacity and additional revenue opportunities, involves a number of potential challenges. The failure to meet these challenges could seriously harm our financial condition and results of operations. Joint ventures are complex and time consuming and we may encounter unexpected difficulties or incur unexpected costs related to such arrangements, including:

- difficulties negotiating joint venture agreements with favorable terms and establishing relevant performance metrics;
- difficulties completing the retrofits of the accessed facilities using our integrated fermentation technology;
- the inability to meet applicable performance targets related to the production of products;
- difficulties obtaining the permits and approvals required to produce and sell our products in different geographic areas;
- complexities associated with managing the geographic separation of accessed facilities;
- diversion of management attention from ongoing business concerns to matters related to the joint ventures;
- difficulties maintaining effective relationships with personnel from different corporate cultures; and
- the inability to generate sufficient revenue to offset retrofit costs.

Our joint venture partners may have significant amounts of existing debt and may not be able to service their existing debt obligations, which could cause the failure of a specific project and the loss by us of any investment we have made to retrofit the facilities owned by the joint venture partner. In addition, if we are unable to meet specified performance targets related to the production of our products at a facility owned by one of our joint venture partners, we may never become eligible to receive a portion of the profits of the joint venture and may be unable to recover the costs of retrofitting the facility.

If we lose key personnel, including key management personnel, or are unable to attract and retain additional personnel, it could delay our product development programs and harm our research and development efforts, make it more difficult to pursue partnerships or develop our own products or otherwise have a material adverse effect on our business.

Our business is complex and we intend to target a variety of markets. Therefore, it is critical that our management team and employee workforce are knowledgeable in the areas in which we operate. The departure, illness or absence of any key members of our management, including our named executive officers, or the failure to attract or retain other key employees who possess the requisite expertise for the conduct of our business, could prevent us from developing and commercializing our products for our target markets and entering into partnerships or licensing arrangements to execute our business strategy. In addition, the loss of any key scientific staff, or the failure to attract or retain other key scientific employees, could prevent us from developing and commercializing our products for our target markets and entering into partnerships or licensing arrangements to execute our business strategy. We may not be able to attract or retain qualified employees in the future due to the intense competition for qualified personnel among biotechnology and other technology-based businesses, particularly in the advanced renewable fuels area, or due to the limited availability of personnel with the qualifications or experience necessary for our renewable chemicals and advanced renewable fuels business. If we are not able to attract and retain the necessary personnel to accomplish our business objectives, we may experience staffing constraints that will adversely affect our ability to meet the demands of our partners and customers in a timely fashion or to support our internal research and development programs. In particular, our product and process development programs are dependent on our ability to attract and retain highly skilled scientists. Competition for experienced scientists and other technical personnel from numerous companies and academic and other research institutions may limit our ability to do so on acceptable terms. All of our employees are at-will employees, meaning that either the employee or we may terminate their employment at any time.

Our planned activities will require additional expertise in specific industries and areas applicable to the products and processes developed through our technology platform or acquired through strategic or other transactions, especially in the end markets that we seek to penetrate. These activities will require the addition of new personnel, and the development of additional expertise by existing personnel. The inability to attract personnel with appropriate skills or to develop the necessary expertise could impair our ability to grow our business.

We may face substantial competition from companies with greater resources and financial strength, which could adversely affect our performance and growth.

We may face substantial competition in the markets for isobutanol, renewable hydrocarbon products, polyester, rubber, plastics, fibers, other polymers and ethanol. Our competitors include companies in the incumbent petroleum-based industry as well as those in the nascent renewable fuels industry. The incumbent petroleum-based industry benefits from a large established infrastructure, production capability and business relationships. The incumbents' greater resources and financial strength provide significant competitive advantages that we may not be able to overcome in a timely manner. Academic and government institutions may also develop technologies which will compete with us in the chemicals, solvents and blendstock markets.

Our ability to compete successfully will depend on our ability to develop proprietary products that reach the market in a timely manner and are technologically superior to and/or are less expensive than other products on the market. Many of our competitors have substantially greater production, financial, research and development, personnel and marketing resources than we do. In addition, certain of our competitors may also benefit from local government subsidies and other incentives that are not available to us. As a result, our competitors may be able to develop competing and/or superior technologies and processes, and compete more aggressively and sustain that competition over a longer period of time than we could. Our technologies and products may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors. As more companies develop new intellectual property in our markets, the possibility of a competitor acquiring patent or other rights that may limit our products or potential products increases, which could lead to litigation. Furthermore, to secure purchase agreements from certain customers, we may be required to enter into exclusive supply contracts, which could limit our ability to further expand our sales to new customers. Likewise, major potential customers may be locked into long-term, exclusive agreements with our competitors, which could inhibit our ability to compete for their business.

In addition, various governments have recently announced a number of spending programs focused on the development of clean technologies, including alternatives to petroleum-based fuels and the reduction of carbon emissions. Such spending programs could lead to increased funding for our competitors or a rapid increase in the number of competitors within those markets.

We also may face substantial competition as we develop our RNG projects and seek to work with farmers and landowners to source our biogas feedstock and lease land to install and operate RNG processing facilities. Our competitors include established companies and developers with significantly greater resources and financial strength, which may provide them with competitive advantages that we may not be able to overcome in a timely manner, or at all.

Our limited resources relative to many of our competitors may cause us to fail to anticipate or respond adequately to new developments and other competitive pressures. This failure could reduce our competitiveness and market share, adversely affect our results of operations and financial position and prevent us from obtaining or maintaining profitability.

Our future success will depend on our ability to maintain a competitive position with respect to technological advances.

The renewable fuels industry is characterized by rapid technological change. Our future success will depend on our ability to maintain a competitive position with respect to technological advances. Technological development by others may impact the competitiveness of our products in the marketplace. Competitors and potential competitors who have greater resources and experience than we do may develop products and technologies that make ours obsolete or may use their greater resources to gain market share at our expense.

Business interruptions, including those related to COVID-19, may have an adverse impact on our business and our financial results.

We are vulnerable to natural disasters and other events that could disrupt our operations, such as riots, civil disturbances, war, terrorist acts, pandemics, such as COVID-19, floods, infections in our laboratory or production facilities or those of our contract manufacturers and other events beyond our control. We do not have a detailed disaster recovery plan. In addition, we may not carry sufficient business interruption insurance to compensate us for losses that may occur. Any losses or damages we incur could have a material adverse effect on our cash flows and success as an overall business.

The COVID-19 pandemic has had an adverse impact on global commercial activity, including the global transportation industry and its supply chain, and has contributed to significant volatility in financial markets. It resulted in travel restrictions and extended shutdowns of businesses in various industries including, among others, the airline industry, and significantly reduced overall economic output. It is possible that that the impact of the COVID-19 pandemic on general economic activity could continue to negatively impact our revenue and operating results for 2022 and beyond. In light of the current and potential future disruption to our business operations and those of its customers, suppliers and other third parties with whom we do business, we considered the impact of the COVID-19 pandemic on our business. The impact of the COVID-19 pandemic on the global transportation industry could continue to result in varying demand for our transportation fuel products, which could have a material adverse effect on our business, financial condition and our prospects for the foreseeable future.

The risks generally associated with the COVID-19 pandemic could magnify other risks discussed in this Report and any of our SEC filings. For example, the evolving changes in financial markets could have a material impact on our ability to obtain additional financing, which could impact our liquidity. Volatility in the financial markets could make it more difficult to raise money from selling equity on the capital markets, the impact of COVID-19 on financial markets could limit potential lenders' ability to provide funds for the financing of our Net-Zero Projects or the terms of any finance transactions could be worse than anticipated. In addition, the effectiveness of external parties, including governmental and non-governmental organizations, in continuing to combat the spread and severity of COVID-19 could have a material impact on demand for our business. Further, steps taken by market counterparties such as commercial airlines could have an impact on their ability to perform under agreements to which we are a party, which could impact our business. Commercial counterparties may also seek to amend supply agreements in the future as a result of COVID-19 or other similar pandemics. The full extent of the impact and effects of the COVID-19 pandemic on our business, operations, liquidity, financial condition and results of operations remain uncertain at this time.

Our business and operations would suffer in the event of information technology system failures or a cyber-attack.

Our business is dependent on proprietary technologies, processes and information that we have developed, much of which is stored on our computer systems. We also have entered into agreements with third parties for hardware, software, telecommunications and other information technology ("IT") services in connection with our operations. Our operations depend, in part, on how well we and our vendors protect networks, equipment, IT systems and software against damage from a number of threats, including, but not limited to, cable cuts, damage to physical plants, natural disasters, intentional damage and destruction, fire, power loss, hacking, computer viruses, vandalism, theft, malware, ransomware and phishing attacks. Any of these and other events could result in IT system failures, delays, a material disruption of our business or increases in capital expenses. Our operations also depend on the timely maintenance, upgrade and replacement of networks, equipment and IT systems and software, as well as preemptive expenses to mitigate the risks of failures.

Furthermore, the importance of such information technology systems and networks and systems has increased due to many of our employees working remotely. Additionally, if one of our service providers were to fail and we were unable to find a suitable replacement in a timely manner, we could be unable to properly administer our outsourced functions.

As cyber threats continue to evolve, we may be required to expend significant additional resources to continue to modify or enhance our protective measures or to investigate and remediate any information security vulnerabilities. While we have implemented security resources to protect our data security and information technology systems, such measures may not prevent such events. Significant disruption to our IT system or breaches of data security could have a material adverse effect on our business, financial condition and results of operations.

We may engage in hedging transactions, which could adversely impact our business.

In the future, we may engage in hedging transactions to offset some of the effects of volatility in commodity prices. Hedging activities may cause us to suffer losses, such as if we purchase a position in a declining market or sell a position in a rising market. Furthermore, hedging would expose us to the risk that we may have under- or over-estimated our need for a specific commodity or that the other party to a hedging contract may default on its obligation. If there are significant swings in commodity prices, or if we purchase more corn for future delivery than we can process, we may have to pay to terminate a futures contract, resell unneeded corn inventory at a loss or produce our products at a loss, all of which would have a material adverse effect on our financial performance. We may vary the hedging strategies we undertake, which could leave us more vulnerable to increases in commodity prices or decreases in the prices of our products. Future losses from hedging activities and changes in hedging strategy could have a material adverse effect on our operations.

Ethical, legal and social concerns about genetically engineered products and processes, and similar concerns about feedstocks grown on land that could be used for food production, could limit or prevent the use of our products, processes and technologies and limit our revenues.

Some of our processes involve the use of genetically engineered organisms or genetic engineering technologies. Additionally, our feedstocks may be grown on land that could be used for food production, which subjects our feedstock sources to “food versus fuel” concerns. If we are not able to overcome the ethical, legal and social concerns relating to genetic engineering or food versus fuel, our products and processes may not be accepted. Any of the risks discussed below could result in increased expenses, delays or other impediments to our programs or the public acceptance and commercialization of products and processes dependent on our technologies or inventions.

Our ability to develop and commercialize one or more of our technologies, products or processes could be limited by the following factors:

- public attitudes about the safety and environmental hazards of, and ethical concerns over, genetic research and genetically engineered products and processes, which could influence public acceptance of our technologies, products and processes;
- public attitudes regarding and potential changes to laws governing ownership of genetic material, which could harm our intellectual property rights with respect to our genetic material and discourage others from supporting, developing or commercializing our products, processes and technologies;
- public attitudes and ethical concerns surrounding production of feedstocks on land which could be used to grow food, which could influence public acceptance of our technologies, products and processes;
- governmental reaction to negative publicity concerning genetically engineered organisms, which could result in greater government regulation of genetic research and derivative products; and
- governmental reaction to negative publicity concerning feedstocks produced on land which could be used to grow food, which could result in greater government regulation of feedstock sources.

The subjects of genetically engineered organisms and food versus fuel have received negative publicity, which has aroused public debate. This adverse publicity could lead to greater regulation and trade restrictions on imports of genetically engineered products or feedstocks grown on land suitable for food production.

The biocatalysts that we develop have significantly enhanced characteristics compared to those found in naturally occurring enzymes or microbes. While we produce our biocatalysts only for use in a controlled industrial environment, the release of such biocatalysts into uncontrolled environments could have unintended consequences. Any adverse effect resulting from such a release could have a material adverse effect on our business and financial condition, and we may be exposed to liability for any resulting harm.

As our products have not previously been used as a commercial fuel in significant amounts, their use subjects us to product liability risks.

Isobutanol, SAF and renewable premium gasoline have not been used as a commercial fuel in large quantities or for a long period of time. Research regarding these products and its distribution infrastructure is ongoing. Although isobutanol, SAF and renewable premium gasolines have been tested on some engines, there is a risk that they may damage engines or otherwise fail to perform as expected. If these products degrade the performance or reduce the life-cycle of engines, or cause them to fail to meet emissions standards, market acceptance could be slowed or stopped, and we could be subject to product liability claims. A significant product liability lawsuit could substantially impair our production efforts and could have a material adverse effect on our business, reputation, financial condition and results of operations.

We may not be able to use some or all of our net operating loss carry-forwards to offset future income.

We have net operating loss carryforwards due to prior period losses generated before January 1, 2021, which if not utilized will begin to expire at various times over the next 20 years. If we are unable to generate sufficient taxable income to utilize our net operating loss carryforwards, these carryforwards could expire unused and be unavailable to offset future income tax liabilities.

In addition, under Section 382 of the Internal Revenue Code of 1986, as amended (the “Code”), a corporation that undergoes an “ownership change” (generally defined as a greater than 50% change (by value) in its equity ownership over a three-year period) is subject to limitation on its ability to utilize its pre-change net operating loss carry-forwards, or net operating losses, to offset future taxable income. We undertook a detailed study of our net operating loss carryforwards through December 31, 2021 to determine whether such amounts are likely to be limited by Section 382 of the Code. As a result of this analysis, we currently believe any Section 382 of the Code limitations will significantly impact our ability to offset income with available net operating loss carryforwards. We have experienced more than one ownership change in prior years, and the issuance of shares in connection with our initial public offering itself triggered an ownership change. In addition, future changes in our stock ownership, which may be outside of our control, may trigger an ownership change, as may future equity offerings or acquisitions that have equity as a component of the purchase price.

Competitiveness of our products for fuel use (including RNG) depends in part on government economic incentives for renewable energy projects or other related policies that could change.

We depend, in part, on international, federal, state and local government incentives, including but not limited to RINs, LCFS credits in California, Clean Fuel Program credits in Oregon, Renewable Energy Credits (“RECs”), rebates, tax credits and other incentives to end users, distributors, system integrators and manufacturers of renewable energy projects, that promote the use of renewable energy. These government economic incentives could be reduced or eliminated altogether, or the categories of renewable energy qualifying for such government economic incentives could be changed. These renewable energy program incentives are subject to regulatory oversight and could be administratively or legislatively changed in a manner that could have a material adverse effect on our operations. Reductions in, changes to, or eliminations or expirations of governmental incentives could result in decreased demand for, and lower revenues from, our projects and products. Further, our ability to generate revenue from the various government economic incentives depends on our strict compliance with the applicable federal and state programs, which are complex and can involve a significant degree of judgment. If the agencies that administer and enforce these programs disagree with our judgments, otherwise determine that we are not in compliance, conduct reviews of our activities or make changes to the programs, then our ability to generate revenue from the economic incentives could be temporarily restricted pending completion of reviews or as a penalty, permanently limited or lost entirely, and we could also be subject to fines or other sanctions.

In addition, we may be required to register our projects or qualify our products with the federal government, various states or other countries. Delays in obtaining registration or qualification of our projects or products could delay future revenues and could adversely affect our cash flows. Further, we typically make a large investment in our projects prior to receiving registration and/or qualification. Failure of our projects or products to qualify for government economic incentives could have a material adverse effect on our business.

Risks Related to Intellectual Property

Our ability to compete may be adversely affected if we are unsuccessful in defending against any claims by competitors or others that we are infringing upon their intellectual property rights.

The various bioindustrial markets in which we plan to operate are subject to frequent and extensive litigation regarding patents and other intellectual property rights. In addition, many companies in intellectual property-dependent industries, including the renewable energy industry, have employed intellectual property litigation as a means to gain an advantage over their competitors. As a result, we may be required to defend against claims of intellectual property infringement that may be asserted by our competitors against us and, if the outcome of any such litigation is adverse to us, it may affect our ability to compete effectively.

Litigation, interferences, opposition proceedings or other intellectual property proceedings inside and outside of the U.S. may divert management time from focusing on business operations, could cause us to spend significant amounts of money and may have no guarantee of success. Any future intellectual property litigation could also force us to do one or more of the following:

- stop selling, incorporating, manufacturing or using our products that use the subject intellectual property;
- obtain from a third party asserting its intellectual property rights, a license to sell or use the relevant technology, which license may not be available on reasonable terms, or at all;
- redesign those products or processes, such as our processes for producing isobutanol and ethanol, that use any allegedly infringing or misappropriated technology, which may result in significant cost or delay to us, or which redesign could be technically infeasible;
- pay attorneys' fees and expenses; or
- pay damages, including the possibility of treble damages in a patent case if a court finds us to have willfully infringed certain intellectual property rights.

We are aware of a significant number of patents and patent applications relating to aspects of our technologies filed by, and issued to, third parties. We cannot assure you that we will ultimately prevail if any of this third-party intellectual property is asserted against us.

Our ability to compete may be adversely affected if we do not adequately protect our proprietary technologies or if we lose some of our intellectual property rights through costly litigation or administrative proceedings.

Our success will depend in part on our ability to obtain patents and maintain adequate protection of our intellectual property covering our technologies and products and potential products in the U.S. and other countries. We have adopted a strategy of seeking patent protection in the U.S. and in certain foreign countries with respect to certain of the technologies used in or relating to our products and processes. We own rights to hundreds of issued patents and filed patent applications in the U.S. and in various foreign jurisdictions. When and if issued, patents would expire at the end of their term and any patent would only provide us commercial advantage for a limited period of time, if at all. Our patent applications are directed to our enabling technologies and to our methods and products which support our business in the advanced renewable fuels and renewable chemicals markets. We intend to continue to apply for patents relating to our technologies, methods and products as we deem appropriate.

Only some of the patent applications that we have filed in the U.S. or in any foreign jurisdictions, and only certain of the patent applications filed by third parties in which we own rights, have been issued. A filed patent application does not guarantee a patent will issue and a patent issuing does not guarantee its validity, nor does it give us the right to practice the patented technology or commercialize the patented product. Third parties may have or obtain rights to "blocking patents" that could be used to prevent us from commercializing our products or practicing our technology. The scope and validity of patents and success in prosecuting patent applications involve complex legal and factual questions and, therefore, issuance, coverage and validity cannot be predicted with any certainty. Patents issuing from our filed applications may be challenged, invalidated or circumvented. Moreover, third parties could practice our inventions in secret and in territories where we do not have patent protection. Such third parties may then try to sell or import products made using our inventions in and into the U.S. or other territories and we may be unable to prove that such products were made using our inventions. Additional uncertainty may result from implementation of the Leahy-Smith America Invents Act, enacted in September 2011, as well as other potential patent reform legislation passed by the U.S. Congress and from legal precedent handed down by the Federal Circuit Court and the U.S. Supreme Court, as they determine legal issues concerning the scope, validity and construction of patent claims. Because patent applications in the U.S. and many foreign jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and because publication of discoveries in the scientific literature often lags behind the actual discoveries, there is additional uncertainty as to the validity of any patents that may issue and the potential for "blocking patents" coming into force at some future date. Accordingly, we cannot ensure that any of our currently filed or future patent applications will result in issued patents, or even if issued, predict the scope of the claims that may issue in our and other companies' patents. Any proceedings challenging our patents may result in the claims being amended or canceled. If the claims are amended or canceled, the scope of our patent claims may be narrowed, which may reduce the scope of protection afforded by our patent portfolio. Given that the degree of future protection for our proprietary rights is uncertain, we cannot ensure that (i) we were the first to make the inventions covered by each of our filed applications, (ii) we were the first to file patent applications for these inventions, (iii) the proprietary technologies we develop will be patentable, (iv) any patents issued will be broad enough in scope to provide commercial advantage and prevent circumvention, and (v) competitors and other parties do not have or will not obtain patent protection that will block our development and commercialization activities.

These concerns apply equally to patents we have licensed, which may likewise be challenged, invalidated or circumvented, and the licensed technologies may be obstructed from commercialization by competitors' "blocking patents." In addition, we generally do not control the patent prosecution and maintenance of subject matter that we license from others. Generally, the licensors are primarily or wholly responsible for the patent prosecution and maintenance activities pertaining to the patent applications and patents we license, while we may only be afforded opportunities to comment on such activities. Accordingly, we are unable to exercise the same degree of control over licensed intellectual property as we exercise over our own intellectual property and we face the risk that our licensors will not prosecute or maintain it as effectively as we would like.

In addition, unauthorized parties may attempt to copy or otherwise obtain and use our products or technology. Monitoring unauthorized use of our intellectual property is difficult, particularly where, as here, the end products reaching the market generally do not reveal the processes used in their manufacture, and particularly in certain foreign countries where the local laws may not protect our proprietary rights as fully as in the U.S., so we cannot be certain that the steps we have taken in obtaining intellectual property and other proprietary rights will prevent unauthorized use of our technology. If competitors are able to use our technology without our authorization, our ability to compete effectively could be adversely affected. Moreover, competitors and other parties such as universities may independently develop and obtain patents for technologies that are similar to or superior to our technologies. If that happens, the potential competitive advantages provided by our intellectual property may be adversely affected. We may then need to license these competing technologies, and we may not be able to obtain licenses on reasonable terms, if at all, which could cause material harm to our business. Accordingly, litigation may be necessary for us to assert claims of infringement, enforce patents we own or license, protect trade secrets or determine the enforceability, scope and validity of the intellectual property rights of others.

Our commercial success also depends in part on not infringing patents and proprietary rights of third parties, and not breaching any licenses or other agreements that we have entered into with regard to our technologies, products and business. We cannot be certain that patents have not or will not be issued to third parties that could block our ability to obtain patents or to operate our business as we would like, or at all. There may be patents in some countries that, if valid, may block our ability to commercialize products in those countries if we are unsuccessful in circumventing or acquiring rights to these patents. There may also be claims in patent applications filed in some countries that, if granted and valid, may also block our ability to commercialize products or processes in these countries if we are unable to circumvent or license them.

As is commonplace in the biotechnology industries, some of our directors, employees and consultants are or have been employed at, or associated with, companies and universities that compete with us or have or will develop similar technologies and related intellectual property. While employed at these companies, these employees, directors and consultants may have been exposed to or involved in research and technology similar to the areas of research and technology in which we are engaged. Though we have not received such a complaint, we may be subject to allegations that we, our directors, employees or consultants have inadvertently or otherwise used, misappropriated or disclosed alleged trade secrets or confidential or proprietary information of those companies. Litigation may be necessary to defend against such allegations and the outcome of any such litigation would be uncertain.

Under some of our research agreements, our partners share joint rights in certain intellectual property we develop. Such provisions may limit our ability to gain commercial benefit from some of the intellectual property we develop and may lead to costly or time-consuming disputes with parties with whom we have commercial relationships over rights to certain innovations.

If any other party has filed patent applications or obtained patents that claim inventions also claimed by us, we may have to participate in interference, derivation or other proceedings declared by the USPTO to determine priority of invention and, thus, the right to the patents for these inventions in the U.S. These proceedings could result in substantial cost to us even if the outcome is favorable. Even if successful, such a proceeding may result in the loss of certain claims. Even successful outcomes of such proceedings could result in significant legal fees and other expenses, diversion of management time and efforts and disruption in our business. Uncertainties resulting from initiation and continuation of any patent or related litigation could harm our ability to compete.

If our biocatalysts, or the genes that code for our biocatalysts, are stolen, misappropriated or reverse engineered, others could use these biocatalysts or genes to produce competing products.

Third parties, including our contract manufacturers, customers and those involved in shipping our biocatalysts, may have custody or control of our biocatalysts. If our biocatalysts, or the genes that code for our biocatalysts, were stolen, misappropriated or reverse engineered, they could be used by other parties who may be able to reproduce these biocatalysts for their own commercial gain. If this were to occur, it would be difficult for us to discover or challenge this type of use, especially in countries with limited intellectual property protection.

We may not be able to enforce our intellectual property rights throughout the world.

The laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the U.S. Many companies have encountered significant problems in protecting and enforcing intellectual property rights in certain foreign jurisdictions, and, particularly with any future international partners, we may face new and increased risks and challenges in protecting and enforcing our intellectual property rights abroad. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to bioindustrial technologies. This could make it difficult for us to stop the infringement of our patents or misappropriation of our other intellectual property rights. Proceedings to enforce our patents and other proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business. Accordingly, our efforts to enforce our intellectual property rights in such countries may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop.

Confidentiality agreements with employees and others may not adequately prevent disclosures of trade secrets and other proprietary information.

We rely in part on trade secret protection to protect our confidential and proprietary information and processes. However, trade secrets are difficult to protect. We have taken measures to protect our trade secrets and proprietary information, but these measures may not be effective. We require new employees and consultants to execute confidentiality agreements upon the commencement of an employment or consulting arrangement with us. These agreements generally require that all confidential information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept confidential and not disclosed to third parties. These agreements also generally provide that know-how and inventions conceived by the individual in the course of rendering services to us shall be our exclusive property. Nevertheless, these agreements may not be enforceable, our proprietary information may be disclosed, third parties could reverse engineer our biocatalysts and others may independently develop substantially equivalent proprietary information and techniques or otherwise gain access to our trade secrets. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position. In addition, an unauthorized breach in our information technology systems may expose our trade secrets and other proprietary information to unauthorized parties.

We have received funding from U.S. government agencies, which could negatively affect our intellectual property rights.

Some of our research has been funded by grants from U.S. government agencies. When new technologies are developed with U.S. government funding, the government obtains certain rights in any resulting patents and technical data, generally including, at a minimum, a nonexclusive license authorizing the government to use the invention or technical data for noncommercial purposes. U.S. government funding must be disclosed in any resulting patent applications, and our rights in such inventions will normally be subject to government license rights, periodic progress reporting, foreign manufacturing restrictions and march-in rights. March-in rights refer to the right of the U.S. government, under certain limited circumstances, to require us to grant a license to technology developed under a government grant to a responsible applicant or, if we refuse, to grant such a license itself. March-in rights can be triggered if the government determines that we have failed to work sufficiently towards achieving practical application of a technology or if action is necessary to alleviate health or safety needs, to meet requirements of federal regulations or to give preference to U.S. industry. If we breach the terms of our grants, the government may gain rights to the intellectual property developed in our related research. The government's rights in our intellectual property may lessen its commercial value, which could adversely affect our performance.

Risks Related to Legal and Regulatory

The U.S. renewable fuels industry is highly dependent upon certain federal and state legislation and regulation and any changes in legislation or regulation could have a material adverse effect on our results of operations, cash flows and financial condition.

The EPA has implemented the RFS Program pursuant to the Energy Policy Act of 2005 (the "Energy Policy Act") and the Energy Independence and Security Act of 2007. The RFS Program sets annual quotas for the quantity of renewable fuels that must be blended into motor fuels consumed in the U.S. The domestic market for renewable fuels is significantly impacted by federal mandates under the RFS Program for volumes of renewable fuels required to be blended with gasoline. Future demand for renewable fuels will be largely dependent upon incentives to blend renewable fuels into motor fuels, including the price of renewable fuels relative to the price of gasoline, the relative octane value of the renewable fuel, constraints in the ability of vehicles to use higher renewable fuel blends, the RFS Program and other applicable environmental requirements. Any significant increase in production capacity above the RFS Program minimum requirements may have an adverse impact on renewable fuel prices. Any change in government policies regarding the RFS Program could have a material adverse effect on our business and the results of our operations.

Waivers of the RFS minimum levels of renewable fuels included in motor fuels or of the requirements by obligated parties to comply with the regulations could have a material adverse effect on our results of operations. Under the Energy Policy Act, the U.S. Department of Energy, in consultation with the Secretary of Agriculture and the Secretary of Energy, may waive the renewable fuels mandate with respect to one or more states if the Administrator of the EPA determines that implementing the requirements would severely harm the economy or the environment of a state, a region or the nation, or that there is inadequate supply to meet the requirement. Additionally, the EPA has exercised the authority to waive the requirements of the RFS minimum levels for certain small refiners. Any waiver of the RFS minimum levels with respect to one or more states would reduce demand for renewable fuels and could cause our results of operations to decline and our financial condition to suffer. Further activity by the EPA to waive the requirements for small refiners could cause softening of pricing in the industry and cause our results of operations to similarly decline.

A critical state program is California's LCFS program, which is designed to reduce GHG emissions associated with transportation fuels used in California by ensuring that the fuel sold in California meets declining targets for such emissions. The regulation quantifies life-cycle GHG emissions by assigning a CI score to each transportation fuel based on that fuel's life-cycle assessment. Each petroleum fuel provider, generally the fuel's producer or importer (the "Regulated Party"), is required to ensure that the overall CI score for its fuel pool meets the annual CI target for a given year. A Regulated Party's fuel pool can include gasoline, diesel and their blend stocks and substitutes. This obligation is tracked through credits and deficits. Fuels with a CI score lower than the annual standard earn a credit, and fuels that are higher than the standard result in a deficit. Several other states also have or are considering adopting this model. Oregon's Clean Fuels Program, enacted in 2009 and implemented in 2016, operates using a credit system similar to the California LCFS program. Any changes to California's LCFS program or failure of other states to implement similar programs could have a material adverse effect on our business and the results of our operations.

We may face substantial delays in obtaining regulatory approvals for use of our renewable premium gasoline product, which could substantially hinder our ability to commercialize our renewable premium gasoline product in the U.S.

Commercialization of our renewable premium gasoline product in the U.S. requires approvals from state and/or federal agencies. Before we can sell our renewable premium gasoline product as a fuel or as a gasoline blendstock, we must obtain certain approvals or certifications from the EPA. There can be no assurances that the EPA will grant such approvals or certifications. Any delay or failure in receiving approval will slow or prevent the commercialization of our renewable premium gasoline product, which could have a material adverse effect on our business, financial condition and results of operations.

Additionally, California requires that fuels meet both its fuel certification requirements and a separate state low-carbon fuel standard. Any delay or failure in receiving approval for our renewable premium gasoline product will slow or prevent the commercialization of our renewable premium gasoline product, which could have a material adverse effect on our business, financial condition and results of operations.

There are also various third-party certification organizations, such as ASTM International and Underwriters' Laboratories, Inc., involved in standard-setting regarding the transportation, dispensing and use of liquid fuel in the U.S. and abroad. These organizations may change the current standards and additional requirements may be enacted that could prevent or delay approval of our renewable premium gasoline product. The process of seeking required approvals and the continuing need for compliance with applicable standards may require the expenditure of substantial resources, and there is no guarantee that we will satisfy these standards in a timely manner, if ever.

Our isobutanol product may encounter physical or regulatory issues that could limit its usefulness as a gasoline blendstock.

In the gasoline blendstock market, isobutanol can be used in conjunction with, or as a substitute for, ethanol and other widely used fuel oxygenates, and we believe our isobutanol is physically compatible with typical gasoline engines. However, there is a risk that under actual engine conditions, isobutanol will face significant limitations, making it unsuitable for use in high percentage gasoline blends. Additionally, current regulations limit gasoline blends to low percentages of isobutanol, and also limit combination isobutanol-ethanol blends. On June 12, 2018, the EPA announced that it approved the registration of isobutanol as a fuel additive for blending into gasoline at levels up to 16 volume percent for on-road automotive use. There can be no assurances that the EPA registration of isobutanol as a fuel additive for blending into gasoline at levels up to 16 volume percent will not be revoked or changed. Government agencies may maintain or even increase the restrictions on isobutanol gasoline blends. As we believe that the potential to use isobutanol in higher percentage blends than is feasible for ethanol will be an important factor in successfully marketing isobutanol to refiners, a low blend wall could significantly limit commercialization of isobutanol as a gasoline blendstock.

We may be required to obtain additional regulatory approvals for use of our iDGs as animal feed, which could delay our ability to sell iDGs increasing our net cost of production and harming our operating results.

Our production facilities and many of the ethanol plants that we might retrofit use or will use dry-milled corn as a feedstock. We plan to sell, as animal feed, the iDGs left as a co-product of fermenting isobutanol from dry-milled corn. We believe that this will enable us to offset a significant portion of the expense of purchasing corn for fermentation. We are currently approved to sell iDGs as animal feed through the self-assessed GRAS process of the FDA via third party scientific review. In order to improve the value of our iDGs, we are working with The Association of American Feed Control Officials ("AAFCO") to establish a formal definition for our iDGs as well as clearance for the materials into animal feed. We believe obtaining AAFCO approval will increase the value of our iDGs by offering customers of our iDGs further assurance of the safety of our iDGs. If we make certain changes in our biocatalyst whereby we can no longer rely on our GRAS process, we would be required to obtain FDA approval for marketing our iDGs. While we believe we can rely on the GRAS process as we update our biocatalysts to increase isobutanol production, for further customer assurance, we also intend to pursue approval upon a completed biocatalyst from the Center for Veterinary Medicine of the FDA. FDA testing and approval can take a significant amount of time, and there is no guarantee that we will ever receive such approval. While we have sold initial quantities of our iDGs from the Luverne Facility, if FDA or AAFCO approval is delayed or never obtained, or if we are unable to secure market acceptance for our iDGs, our net cost of production will increase, which may hurt our operating results.

Reductions or changes to existing regulations and policies may present technical, regulatory and economic barriers, all of which may significantly reduce demand for renewable fuels or our ability to supply our products.

The market for renewable fuels is heavily influenced by foreign, federal, state and local government laws, regulations and policies. Changes in these laws, regulations and policies or how these laws, regulations and policies are implemented and enforced could cause the demand for renewable fuels to decline and deter investment in the research and development of renewable fuels.

Concerns associated with renewable fuels, including land usage, national security interests and food crop usage, 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. Any inability to address these requirements and any regulatory or policy changes could have a material adverse effect on our business, financial condition and results of operations.

Additionally, our isobutanol, ethanol and/or renewable hydrocarbon plants may emit GHG. Any changes in state or federal emissions regulations, including the passage of cap-and-trade legislation or a carbon tax, could limit our production of isobutanol, renewable hydrocarbon products and iDGs and increase our operating costs, which could have a material adverse effect on our business, financial condition and results of operations. The results of U.S. elections could lead to changes in federal or state laws and regulations that could have a material adverse effect on our business, prospects, financial condition and results of operations.

We use hazardous materials in our business and we must comply with environmental laws and regulations. Any claims relating to improper handling, storage or disposal of these materials or noncompliance with applicable laws and regulations could be time consuming and costly and could adversely affect our business and results of operations.

Our research and development processes involve the use of hazardous materials, including chemical, radioactive and biological materials. Our operations also produce hazardous waste. We cannot eliminate entirely the risk of accidental contamination or discharge and any resultant injury from these materials. Federal, state and local laws and regulations govern the use, manufacture, storage, handling and disposal of, and human exposure to, these materials. We may be sued for any injury or contamination that results from our use or the use by third parties of these materials, and our liability may exceed our total assets. Although we believe that our activities conform in all material respects with environmental laws, there can be no assurance that violations of environmental, health and safety laws will not occur in the future as a result of human error, accident, equipment failure or other causes. Compliance with applicable environmental laws and regulations may be expensive, and the failure to comply with past, present or future laws could result in the imposition of fines, third-party property damage, product liability and personal injury claims, investigation and remediation costs, the suspension of production or a cessation of operations, and our liability may exceed our total assets. Liability under environmental laws can be joint and several and without regard to comparative fault. Environmental laws could become more stringent over time, imposing greater compliance costs and increasing risks and penalties associated with violations, which could impair our research, development or production efforts and harm our business.

Our international activities may increase our exposure to potential liability under anti-corruption, trade protection, tax and other laws and regulations.

In the course of our relationships with international partners, we may become subject to certain foreign tax, environmental and health and safety regulations that did not previously apply to us or our products. Such regulations may be unclear, not consistently applied and subject to sudden change. Implementation of compliance policies could result in additional operating costs, and our failure to comply with such laws, even inadvertently, could result in significant fines and/or penalties.

Additionally, the Foreign Corrupt Practices Act and other anti-corruption laws and regulations (“Anti-Corruption Laws”) prohibit corrupt payments by our employees, vendors or agents. Even with implementation of policies, training and internal controls designed to reduce the risk of corrupt payments, our employees, vendors or agents may violate our policies. Our international partnerships may significantly increase our exposure to potential liability. Our failure to comply with Anti-Corruption Laws could result in significant fines and penalties, criminal sanctions against us, our officers or our employees, prohibitions on the conduct of our business, and damage to our reputation.

Risks Related to Owning Our Securities

The market price of our common stock may be adversely affected by the future issuance and sale of additional shares of our common stock or by our announcement that such issuances and sales may occur.

We cannot predict the size of future issuances or sales of shares of our common stock in connection with future acquisitions or capital raising activities, or the effect, if any, that such issuances or sales may have on the market price of our common stock. The issuance and sale of substantial amounts of shares of our common stock, or the announcement that such issuances and sales may occur, could adversely affect the market price of our common stock.

Future issuances of our common stock or instruments convertible or exercisable into our common stock may materially and adversely affect the price of our common stock and cause dilution to our existing stockholders.

Historically, we have raised capital by issuing common stock and warrants in public offerings because no other reasonable sources of capital were available. These public offerings of common stock and warrants have materially and adversely affected the prevailing market prices of our common stock and caused significant dilution to our stockholders. We have also historically raised capital or refinanced outstanding debt through the issuance of convertible notes.

We may need to raise capital through these public offerings of common stock, warrants and convertible debt in the future.

We may obtain additional funds through public or private debt or equity financings, subject to certain limitations in the agreements governing our indebtedness. If we issue additional shares of common stock or instruments convertible into common stock, it may materially and adversely affect the price of our common stock.

Our stock price may be volatile, and your investment in our securities could suffer a decline in value.

The market price of shares of our common stock has experienced significant price and volume fluctuations. We cannot predict whether the price of our common stock will rise or fall. A variety of factors may have a significant effect on our stock price, including:

- actual or anticipated fluctuations in our liquidity, financial condition and operating results;
- the position of our cash and cash equivalents;
- the capital costs required to construct our Net-Zero Projects;
- our ability to obtain certain regulatory permits or approvals for our production facilities, including our Net-Zero Projects;
- the impact of the COVID-19 pandemic to our business, our financial condition, our results of operation and liquidity;
- actual or anticipated changes in our growth rate relative to our competitors;
- actual or anticipated fluctuations in our competitors' operating results or changes in their growth rate;
- announcements of technological innovations by us, our partners or our competitors;
- announcements by us, our partners or our competitors of significant acquisitions, strategic partnerships, joint ventures or capital commitments;
- the entry into, modification or termination of licensing arrangements, marketing arrangements, and/or research, development, commercialization, supply, off-take or distribution arrangements;
- our ability to consistently produce commercial quantities of our products;
- additions or losses of customers or partners;
- our ability to obtain certain regulatory approvals for the use of our isobutanol and ethanol in various fuels and chemicals markets;
- commodity prices, including oil, ethanol and corn prices;
- additions or departures of key management or scientific personnel;
- competition from existing products or new products that may emerge;
- issuance of new or updated research reports by securities or industry analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- litigation involving us, our general industry or both;
- disputes or other developments related to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- announcements or expectations of additional financing efforts or the pursuit of strategic alternatives;
- changes in existing laws, regulations and policies applicable to our business and products, and the adoption of or failure to adopt carbon emissions regulation;
- sales of our common stock or equity-linked securities, such as warrants, by us or our stockholders;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- general market conditions in our industry; and
- general economic and market conditions, including as a result of the COVID-19 pandemic.

Furthermore, the stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions such as recessions, interest rate changes or international currency fluctuations, may negatively impact the market price of shares of our common stock, regardless of our operating performance, and cause the value of your investment to decline.

Additionally, in the past, companies that have experienced volatility in the market price of their stock have been subject to securities class action litigation or other derivative shareholder lawsuits. We may be the target of this type of litigation in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business regardless of the outcome.

The price of our common stock could also be affected by possible sales of common stock by investors who view our warrants as a more attractive means of equity participation in us and by hedging or engaging in arbitrage activity involving our common stock. The hedging or arbitrage could, in turn, affect the trading prices of our warrants, if any trading market becomes established, or any common stock that holders receive upon exercise of such warrants.

Sales of a substantial number of shares of our common stock or securities linked to our common stock, such as our warrants (should an established market for such securities then exist), in the public market could occur at any time. These sales, or the perception in the market that such sales may occur, could reduce the market price of our common stock.

In addition, certain holders of our outstanding common stock have rights, subject to certain conditions, to require us to file registration statements covering their shares and to include their shares in registration statements that we may file for ourselves or other stockholders.

The estimates and assumptions on which our financial projections are based may prove to be inaccurate.

Our financial projections, including any projected investment returns on projects, sales or earnings guidance or outlook that we may provide from time to time, are dependent on estimates and assumptions related to, among other things, industry growth, product and plant development, estimated capital expenses for growth development projects, market share projections, product pricing and sale, customer interest in our products, availability of government incentives, tax rates, accruals for estimated liabilities, and our ability to raise sufficient funds or generate sufficient cash flow to continue operations and/or expand our production capabilities. Our financial projections are based on historical experience and on various other estimates and assumptions that we believe to be reasonable under the circumstances and at the time they are made, and our actual results may differ materially from our financial projections.

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.

We may seek additional capital through a combination of public and private equity offerings, debt financings, strategic partnerships and licensing arrangements. To the extent that we raise additional capital through the sale or issuance of equity, warrants or convertible debt securities, the ownership interest of our existing shareholders will be diluted, and the terms of such securities may include liquidation or other preferences that adversely affect your rights as a stockholder. If we raise capital through debt financing, it may involve agreements that include covenants further limiting or restricting our ability to take certain actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through strategic partnerships or licensing agreements with third parties, we may have to relinquish valuable rights to our technologies or grant licenses on terms that are not favorable to us. If we are unable to raise additional funds when needed, we may be required to delay, limit, reduce or terminate our development and commercialization efforts.

We do not anticipate paying cash dividends, and accordingly, stockholders must rely on stock appreciation for any return on their investment.

We have never paid cash dividends on our common stock and we do not expect to pay cash dividends on our common stock at any time in the foreseeable future. The future payment of dividends directly depends upon our future earnings, capital requirements, financial requirements and other factors that our board of directors will consider. As a result, only appreciation of the price of our common stock, which may never occur, will provide a return to stockholders. Investors seeking cash dividends should not invest in our common stock.

If securities or industry analysts do not publish research or reports about our business, or publish negative reports about our business, our stock price and trading volume could decline. The trading market for our common stock will be influenced by the research and reports that securities or industry analysts publish about us or our business.

We do not have any control over securities or industry analysts. If one or more of the analysts who cover us downgrade our common stock or change their opinion of our common stock, our common stock price would likely decline which in turn would likely cause a decline in the value of our warrants. If one or more of these analysts cease coverage of us or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our common stock price and the price of our warrants to decline or the trading volume of our common stock to decline.

We are subject to anti-takeover provisions in our certificate of incorporation, our bylaws and under Delaware law that could delay or prevent an acquisition of the Company, even if the acquisition would be beneficial to our stockholders.

Provisions in our certificate of incorporation and our bylaws may delay or prevent an acquisition of the Company. Among other things, our certificate of incorporation and bylaws provide for a board of directors that is divided into three classes with staggered three-year terms, provide that all stockholder action must be effected at a duly called meeting of the stockholders and not by a consent in writing, and further provide that only our board of directors may call a special meeting of the stockholders. These provisions may also 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 of directors, who are responsible for appointing the members of our management team. Furthermore, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law (the “DGCL”), which prohibits, with some exceptions, stockholders owning in excess of 15% of our outstanding voting stock from merging or combining with us. Finally, our charter documents establish advance notice requirements for nominations for election to our board of directors and for proposing matters that can be acted upon at stockholder meetings. Although we believe these provisions together provide an opportunity to receive higher bids by requiring potential acquirers to negotiate with our board of directors, they would apply even if an offer to acquire the Company may be considered beneficial by some stockholders.

Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our certificate of incorporation provides that the Court of Chancery of the State of Delaware shall, unless we consent in writing to the selection of an alternative forum, be the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the Company, (ii) any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee of the Company to the Company or its stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, or (iv) any action asserting a claim governed by the internal affairs doctrine, in each case subject to said Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein.

The exclusive forum provision may limit a stockholder’s ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, employees or agents, which may discourage such lawsuits against us and our directors, officers, employees and agents. Stockholders who do bring a claim in the Court of Chancery could face additional litigation costs in pursuing any such claim, particularly if they do not reside in or near the State of Delaware. The Court of Chancery may also reach different judgments or results than would other courts, including courts where a stockholder considering an action may be located or would otherwise choose to bring the action, and such judgments or results may be more favorable to us than to our stockholders. 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 adversely affect our business and financial condition. Notwithstanding the foregoing, the exclusive forum provision shall not preclude or contract the scope of exclusive federal or concurrent jurisdiction for actions brought under the Exchange Act or the Securities Act, or the respective rules and regulations promulgated thereunder.

Any person or entity purchasing or otherwise acquiring any interest in any of our securities shall be deemed to have notice of and consented to these provisions. This exclusive forum provision may limit a stockholder's ability to bring a claim in a judicial forum of its choosing for disputes with us or our directors, officers or other employees, which may discourage lawsuits against us and our directors, officers and other employees.

If a court were to find the exclusive 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, results of operations and financial condition. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management and other employees.

Item 1B. Unresolved Staff Comments

None.

Item 3. Legal Proceedings

From time to time, we have been and may again become involved in legal proceedings arising in the ordinary course of our business. We are not presently a party to any litigation that we believe to be material and we are not aware of any pending or threatened litigation against us that we believe could have a material adverse effect on our business, operating results, financial condition or cash flows.

On February 7, 2022, an incident occurred at one of the anaerobic digesters that is part of our RNG project that resulted in the accidental discharge of a mixture of water and manure into the environment. We promptly notified the Iowa Department of Natural Resources (the "DNR") and began mitigation work to minimize the impact of the discharge. The DNR has issued Gevo a notice of violation in connection with the discharge. There is a possibility that the Iowa Department of Natural Resources will initiate an enforcement action that could result in a monetary sanction being levied against Gevo for the accidental discharge. We do not believe that any such monetary sanction would be material or exceed $300,000.

Item 4. Mine Safety Disclosures

Not Applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities Market for Common Stock

Market Information

The Company's common stock is listed and traded on the Nasdaq Capital Market under the symbol "GEVO".

Holders of Record

As of January 31, 2022, there were approximately 35 holders of record of our common stock. We believe that the number of beneficial owners is substantially greater than the number of record holders because a large portion of our common stock is held of record through brokerage firms in "street name."

Dividends

No cash dividends have been paid on our common stock to date, nor do we anticipate paying dividends in the foreseeable future. Any future determination to declare cash dividends on our common stock will be made at the discretion of our Board of Directors, subject to compliance and limitations under our debt arrangements in effect at such time.

Recent Sales of Unregistered Securities; Use of Proceeds from Registered Securities

None.

Purchases of Equity Securities by the Issuer

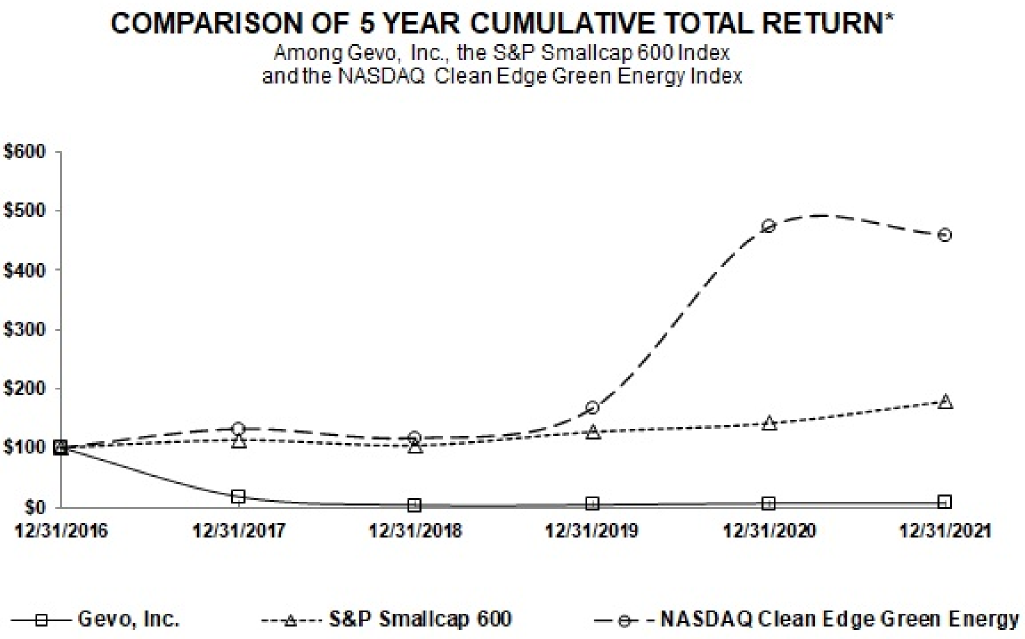
Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number of Shares that May Yet Be Purchased Under the Plans or Programs
October 1, 2021 to October 31, 2021	—	$ —	—	—
November 1, 2021 to November 30, 2021	—	$ —	—	—
December 1, 2021 to December 31, 2021 (1)	15,900	$ 4.84	—	—
Total	15,900	$ 4.84	—	—

(1) Represents shares withheld from employees to cover tax withholding obligations upon the vesting of restricted stock awards. The average prices listed in the above table are averages of the fair market prices at which we valued shares withheld for purposes of calculating the number of shares to be withheld.

Performance Graph

The following information is not deemed to be "soliciting material" or to be "filed" with the SEC or subject to Regulation 14A or 14C under the Exchange Act or to the liabilities of Section 18 of the Exchange Act, and will not be deemed to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Exchange Act, except to the extent the Company specifically incorporates it by reference into such a filing.

The following line graph compares the cumulative total shareowner return on our common stock against the cumulative total return of the S&P Smallcap 600 Index and the NASDAQ Clean Edge Green Energy Index for the each of the five years ended December 31, 2021. The graph assumes a $100 investment in our common stock and each index at December 31, 2016.



	December 31, 2016	December 31, 2017	December 31, 2018	December 31, 2019	December 31, 2020	December 31, 2021
Gevo, Inc.	$ 100.00	$ 17.06	$ 2.83	$ 3.34	$ 6.14	$ 6.18
S&P Smallcap 600	100.00	113.23	103.63	127.24	141.60	179.58
NASDAQ Clean Edge Green Energy	100.00	132.05	116.05	165.57	471.59	459.13

The information in the graph will not be considered solicitation material, nor will it be filed with the SEC or incorporated by reference into any future filing under the Securities Act or the Exchange Act, unless we specifically incorporate it by reference into our filing.

Item 6. [Reserved]

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our audited financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K (this “Annual Report”). Some of the information contained in this discussion and analysis and set forth elsewhere in this Annual Report, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. You should review the section titled “Risk Factors” in Part I, Item 1A of this Annual Report for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Company Overview

We are a growth-oriented company with the mission of solving greenhouse gas emissions for those sectors of the transportation industry that are not amenable to electrification or hydrogen. We are focused on transforming renewable energy into energy-dense liquid hydrocarbons that can be used as renewable fuels, such as SAF, with the potential to achieve a "net-zero" GHG footprint. We believe that this addresses the global need of reducing GHG emissions with "drop in" sustainable alternatives to petroleum fuels. We use the Argonne National Laboratory’s GREET model to measure, predict and verify GHG emissions across the life-cycle of our products. The "net-zero" concept means that we expect to produce fuels that consume as much carbon dioxide in their manufacture as they produce when burned.

Our primary market focus, given current demand and growing customer interest, is SAF. We believe that we also have commercial opportunities for other renewable hydrocarbon products, such as hydrocarbons for gasoline blendstocks, and diesel fuel; ingredients for the chemical industry, such as ethylene and butenes; plastics and materials; and other chemicals. The global fuel consumption by commercial airlines was an all-time high of 95 billion gallons in 2019. However, due to the COVID-19, the fuel consumption dropped to only 52 billion gallons in 2020 and reached 57 billion gallons in 2021. The airline industry is looking for at least 10% of its fuel needs to be sustainable by 2030 (with the potential for up to 30% at the high end).

Our production processes use carbohydrates as a feedstock. Carbohydrates are plant matter that results from photosynthesis. Photosynthesis is the natural process by which carbon dioxide is captured from the air by plants. The carbon in carbohydrates is therefore renewable because it is already in the atmosphere. The carbohydrates are fermented to produce alcohol intermediate products (e.g., ethanol or isobutanol). The alcohol-based intermediates are then chemically processed to make renewable hydrocarbons.

We believe that we will be able to develop the marketplace, customers, and production capacity to achieve at least 1 billion gallons of sales by 2030. We believe that two approaches will be required. The first approach, the development of greenfield sites (i.e., the development of a project on an undeveloped site), allows us to optimize production and the integration of technology. We expect that utilizing greenfield sites will have the potential to achieve lower CI scores over the long run, compared to other approaches. The second approach, leveraging installed alcohol production capacity, has the advantage that the fermentation capacity already exists via existing ethanol plants. Those existing ethanol plants would need to be decarbonized and hydrocarbon production capacity would need to be installed.

In early 2021, we announced the concept of “Net-Zero Projects” as a series of planned facilities to produce energy dense liquid hydrocarbons using renewable energy and our proprietary technology. The concept of a Net-Zero Project is to convert renewable energy (photosynthetic, wind, renewable natural gas, biogas) from a variety of sources into energy dense liquid hydrocarbons that when burned in traditional engines, have the potential to achieve net-zero GHG emissions across the whole life-cycle of the liquid fuel as measured across the whole of the life-cycle based on the GREET Model, the pre-eminent science-based life-cycle analysis model. The GREET Model takes into account emissions and impacts "cradle to cradle" for renewable resource-based fuels including inputs and generation of raw materials, agriculture practices, chemicals used in production processes of both feedstocks and products, energy sources used in production and transportation and the end use of the products, which for fuel products is usually burning to release energy.

Recent Developments

At-the-Market Offering Program. In September 2021, the at-the-market offering program was amended to provide available capacity under the at-the-market offering program of $500 million.

During the year ended December 31, 2021, we issued 24,420,579 shares of common stock under the at-the-market offering program for total proceeds of $135.8 million, net of commissions and other offering related expenses totaling $3.6 million.

COVID-19

COVID-19. The COVID-19 pandemic has had an adverse impact on global commercial activity, including the global transportation industry and its supply chain, and has contributed to significant volatility in financial markets. It resulted in travel restrictions and extended shutdowns of businesses in various industries including, among others, the airline industry, and significantly reduced overall economic output. It is possible that that the impact of the ongoing COVID-19 pandemic on general economic activity could continue to negatively impact the Company's revenue and operating results, particularly as new variants of COVID-19 are discovered. In light of the current and potential future disruption to its business operations and those of its customers, suppliers and other third parties with whom the Company does business, management considered the impact of the COVID-19 pandemic on the Company's business. The impact of the COVID-19 pandemic on the global transportation industry could continue to result in less demand for the Company's transportation fuel products, which could have a material adverse effect on the Company's business, financial condition and prospects for the foreseeable future.

During the first quarter of 2020, we suspended production at our Luverne Facility due to COVID-19 and an unfavorable commodity environment. The suspension of production and a corresponding reduction in the Company's workforce that occurred during the first quarter of 2020 had an adverse impact on the Company's financial results for the year ended December 31, 2021, reducing revenue by 87% compared to the year ended December 31, 2020. Revenue was reduced by 77% for the year December 31, 2020 compared to the year ended December 31, 2019 as a result of COVID-19. The Luverne Facility re-commenced operations during July 2021. There is a risk that COVID-19 could have a material adverse impact on the development of the Company's Net-Zero 1 Project, customer demand and cash flow, depending on the extent of our future production activities.

The Company has considered multiple scenarios, with both positive and negative inputs, as part of the significant estimates and assumptions that are inherent in its financial statements and are based on trends in customer behavior and the economic environment throughout the year ended December 31, 2021 and beyond as the COVID-19 pandemic has impacted the industries in which the Company operates. These estimates and assumptions include the collectability of billed receivables and the estimation of revenue and tangible assets. With regard to collectability, the Company believes it may face atypical delays in client payments going forward, but the Company has not experienced significant delays in collection as of December 31, 2021. In addition, management believes that the demand for certain discretionary lines of business may decrease, and that such decrease will impact its financial results in succeeding periods. Non-discretionary lines of business may also be adversely affected, for example because reduced economic activity or disruption in hydrocarbon markets could reduce demand for SAF, isooctane and isooctene.

Results of Operations

The following discussion of our financial condition and results of operations should be read in conjunction with our Consolidated Financial Statements and the notes to those Consolidated Financial Statements appearing in this Report. This discussion contains forward-looking statements that involve significant risks and uncertainties. As a result of many factors, such as those set forth under “Risk Factors” in Part I, Item 1A of this Report, our actual results may differ materially from those anticipated in these forward-looking statements.

This section of this Report discusses year-to-year comparisons between 2021 and 2020, as well as other discussions of 2021 and 2020 items. The complete Management’s Discussion and Analysis of Financial Condition and Results of Operations for year-to-year comparisons between 2020 and 2019 and other discussions of 2019 items can be found within Part II, Item 7, to our Annual Report on Form 10-K filed with the SEC on March 17, 2020, which is available free of charge on the SEC's website at www.sec.gov and our corporate website at www.gevo.com.

Comparison of the Years Ended December 31, 2021 and 2020
(in thousands)

	Years Ended December 31, 2021	Years Ended December 31, 2020	Change
Revenue and cost of goods sold			
Ethanol sales and related products, net	$ 50	$ 3,809	$ (3,759)
Hydrocarbon revenue	483	1,501	(1,018)
Other revenue	178	226	(48)
Total revenues	711	5,536	(4,825)
Cost of goods sold	7,687	9,313	(1,626)
Depreciation and amortization	4,478	5,690	(1,212)
Gross loss	(11,454)	(9,467)	(1,987)
Operating expenses			
Research and development expense	6,775	3,511	3,264
Selling, general and administrative expense	25,493	11,192	14,301
Preliminary stage project costs	10,581	1,698	8,883
Loss on disposal of assets	5,137	625	4,512
Depreciation and amortization	650	214	436
Restructuring expense	—	254	(254)
Total operating expenses	48,636	17,494	31,142
Loss from operations	(60,090)	(26,961)	(33,129)
Other income (expense)			
Gain on forgiveness of SBA Loans	641	—	641
Interest expense	(251)	(2,094)	1,843
Interest and dividend income	571	102	469
(Loss) from modification of 2020 Notes	—	(732)	732
(Loss) on conversion of 2020/21 Notes to common stock	—	(1,916)	1,916
(Loss) gain from change in fair value of 2020/21 Notes embedded derivative liability	—	(8,607)	8,607
Other income (expense), net	(74)	22	(96)
Total other income (expense)	887	(13,225)	14,112
Net loss	$ (59,203)	$ (40,186)	$ (19,017)

Revenue. As a result of COVID-19 and in response to an unfavorable commodity environment, we suspended ethanol and distiller's grains production in March 2020. Revenue from the sale of ethanol, isobutanol and related products during the year ended December 31, 2021 was $0.7 million, a decrease of $4.8 million from the year ended December 31, 2020.

Hydrocarbon revenues are comprised of SAF, isooctane and isooctene sales. Hydrocarbon revenue decreased $1.0 million during the year ended December 31, 2021 primarily as a result of fewer shipments of finished products from the South Hampton Facility. The South Hampton Facility was unable to produce significant amounts of jet fuel during the second half of 2021 due to a lack of availability of isobutanol to convert into SAF renewable jet fuel after halting production due to impacts from COVID-19. The South Hampton Facility began producing renewable premium gasoline or jet fuel with supply from the Luverne Facility during the fourth quarter of 2021.

Cost of goods sold. Our cost of goods sold decreased $1.6 million during the year ended December 31, 2021 compared to the prior year primarily the result of suspending ethanol production in March 2020 as a result of COVID-19 and in response to an unfavorable commodity environment. We began producing isobutanol during the third quarter 2021 resulting in higher production costs. The cost of goods sold was significantly higher for isobutanol without the coproduction of ethanol as operated in previous years as we worked to improve and refine our production processes. Cost of goods sold included inventory write down to net realizable value of approximately $5.2 million and $1.2 million during the years ended December 31, 2021 and 2020, respectively.

Prior to the Luverne Facility restarting production, cost of goods sold was primarily comprised of costs to process SAF, isooctane and isooctene at our South Hampton Facility, as well as costs to maintain the Luverne Facility.

Depreciation and amortization. Depreciation and amortization related to cost of goods sold decreased approximately $1.2 million during the year ended December 31, 2021 compared to the prior year as certain assets became fully depreciated during the year ended December 31, 2020. Depreciation and amortization related to cost of operating expenses increased approximately $0.4 million during the year ended December 31, 2021 compared to the prior year primarily due to $0.3 million of amortization for patents acquired in September 2021.

Research and development expense. Research and development expense increased by approximately $3.3 million during the year ended December 31, 2021 compared with to the prior year, due primarily to $2.2 million of personnel costs from increased headcount, recruiting and stock-based compensation and $0.9 million of consulting expenses as we work to improve our process for growing and fermenting yeast strains.

Selling, general and administrative expense. Selling, general and administrative expenses increased approximately $14.3 million during the year ended December 31, 2021 compared to the prior year, due primarily to $9.7 million increase in personnel costs related to increased headcount, recruiting costs and stock-based compensation, $1.7 million for increased consulting fees related to regulatory consulting and compliance with Section 404(b) of the Sarbanes-Oxley Act, $1.1 million attributable to professional fees related to new contracts and extensive shareholder outreach for the annual stockholder meeting and $1.0 million for higher costs for insurance.

Preliminary stage project costs. Preliminary stage project costs increased by approximately $8.9 million during the year ended December 31, 2021 compared with the prior year due primarily to increased consulting and research and development expenses related to our Gevo RNG and Net-Zero projects. During the year ended December 31, 2021, the preliminary stage project costs were primarily related to $5.7 million of front-end engineering costs and $2.7 million for personnel expenses to support the growth in business activity for our Gevo RNG and Net-Zero projects. During the year ended December 31, 2020, the preliminary stage project costs were primarily related to consulting for front-end engineering costs and for personnel expenses to support the growth in business activity at our Gevo RNG project. During the second quarter 2021, we began capitalizing the Gevo RNG project costs after completing certain front-end engineering studies and determining it was probable that we would build the Gevo RNG project. During the third quarter 2021, we began capitalizing our Net-Zero 1 project costs after completing certain front-end engineering studies and determining it was probable that we would build Net-Zero 1.

Loss on disposal of assets. As a result of suspending the production of ethanol at the Luverne Facility, we wrote-off $5.1 million of costs related to the installation of the fractionation equipment returned to the manufacturer during the year ended December 31, 2021. The returned equipment and related installation costs had been planned to be used in ethanol production.

Restructuring expenses. During the year ended December 31, 2020, we incurred $0.3 million of restructuring charges related to the restructuring of Agri-Energy in response to COVID-19, termination of employees at Agri-Energy and Gevo and renegotiating contracts.

Gain on forgiveness of SBA Loans. During the year ended December 31, 2021, the Small Business Administration forgave $0.6 million of the Company's SBA Loans and accrued interest.

Interest expense. Interest expense during the year ended December 31, 2021 decreased by $1.8 million compared to the prior year, due to the conversion of our 12% convertible senior secured notes due 2020/2021 (the “2020/21 Notes”) to common stock during 2020. During the year ended December 31, 2021, we capitalized $2.1 million of interest associated with the Gevo RNG project.

Interest and dividend income. Interest and dividend income increased approximately $0.5 million during the year ended December 31, 2021 compared to the prior year due to interest earned from investments in marketable securities.

(Loss) from modification of 2020 Notes. During the year ended December 31, 2020, we incurred $0.7 million of legal and professional fees to modify the 2020 Notes into the 2020/21 Notes.

(Loss) on conversion of 2020/21 Notes. During the year ended December 31, 2020, we incurred a $1.9 million loss related to the conversion of $2.0 million of 2020/21 Notes into common stock during July 2020 and $12.7 million of 2020/21 Notes into common stock during December 2020, which reflects the cost of the make-whole payments.

(Loss) gain from change in fair value of the 2020/21 Notes and 2020 Notes embedded derivative liability. We incurred no gain (loss) from the change in fair value of the 2020/21 Notes during the year ended December 31, 2021 since the 2020/21 Notes and the 2020 Notes were converted to common stock in 2020.

Sources of Our Revenues

Our current and historic revenues are primarily derived from: (i) the sale of isobutanol and related products; (ii) hydrocarbon sales consisting primarily of the sale of SAF and isooctane derived from our isobutanol; and (iii) government grants and research and development programs.

Principal Components of Our Cost Structure.

Cost of Goods Sold. Our cost of goods sold consists primarily of costs directly associated with the production of isobutanol, SAF and isooctane. Such costs include direct materials, direct labor, other operating costs and certain plant overhead costs. Direct materials include corn feedstock, denaturant and process chemicals. Direct labor includes compensation (including stock-based compensation) of personnel directly involved in production operations. Other operating costs include utilities and natural gas and wind power usage.

Depreciation and Amortization. Depreciation and amortization associated with costs of goods sold relates to property, plant and equipment directly associated with the production of isobutanol, SAF and isooctane. Depreciation and amortization associated with operating expenses relates to property, plant and equipment used in product development and unrelated to cost of goods sold.

Research and Development. Our research and development expense consists of costs incurred to identify, develop and test our technologies for the production of isobutanol and the development of downstream applications thereof. Research and development expense include personnel costs (including stock-based compensation), consultants and related contract research, facility costs, supplies, license fees paid to third parties for use of their intellectual property and patent rights and other overhead expenses incurred to support our research and development programs.

Selling, General and Administrative. Selling, general and administrative expense consist of personnel costs (including stock-based compensation), consulting and service provider expenses (including patent counsel-related costs), legal fees, marketing costs, insurance costs, occupancy-related costs, travel and relocation expenses and hiring expenses.

Preliminary Stage Project Costs. Preliminary stage project costs consist of consulting, preliminary engineering costs, personnel expenses (including stock-based compensation) and research and development expenses to support the business activities of our Gevo RNG and Net-Zero projects.

Loss on Disposal of Assets. Loss on disposal of assets consists of costs related to the installation of the fractionation equipment returned to the manufacturer as a result of suspending the production of ethanol at the Luverne Facility. The returned equipment and related installation costs had been planned to be used in ethanol production.

Liquidity and Capital Resources

As of December 31, 2021, we had cash and cash equivalents totaling $40.8 million, short and long-term restricted cash totaling $95.2 million and short and long-term marketable securities totaling $339.7 million. The marketable securities are highly liquid and can be converted to cash when it is needed for operations.

Since our inception in 2005, we have devoted most of our cash resources to research and development, manufacturing ethanol, isobutanol and related products and selling, general and administrative activities related to the commercialization of isobutanol and related products from renewable feedstocks. We have incurred losses since inception and expect to incur losses at least until our expected large-scale hydrocarbon production capacity is fully operational. We have financed our operations primarily with proceeds from multiple sales of equity and debt securities, borrowings under debt facilities and product sales. During 2021, we invested most of those proceeds for the upgrade, development and construction of our existing facilities and new projects associated with the Luverne Facility, Gevo RNG and Net-Zero 1.

The continued operation of our business is dependent upon raising additional capital through future public and private equity offerings, debt financings or through other alternative financing arrangements. Successful attainment of profitable operations is dependent upon future events, including our ability to raise sufficient capital to expand our commercial hydrocarbon production capabilities, completion of our development activities, continued advancement of our hydrocarbon sales agreements, continued advancement of our technologies and knowhow and attracting and retaining qualified personnel.

Our transition to profitability is dependent upon, among other things, the successful development and commercialization of our product candidates, the development, acquisition and construction of additional production facilities to support our offtake agreements, the achievement of a level of revenues adequate to support our cost structure and the ability to raise capital to finance the development, acquisition and construction of additional productions facilities.

We intend to fund future operations through additional private and/or public offerings of debt or equity securities. In addition, we may seek additional capital through arrangements with strategic partners or from other sources. There can be no assurance that we will be able to raise additional funds or achieve or sustain profitability or positive cash flows from operations on acceptable terms, or at all.

The following table sets forth the major sources and uses of cash for each of the periods set forth below (in thousands):

	Year Ended December 31,	
	2021	2020
Net cash used in operating activities	$ (43,536)	$ (19,338)
Net cash used in investing activities	(411,620)	(5,905)
Net cash provided by financing activities	512,851	87,279

Operating Activities

Our primary uses of cash from operating activities are personnel related expenses and research and development-related expenses including costs incurred under development agreements, costs of licensing of technology, legal-related costs, expenses for production of isobutanol and related products and expenses for the operation of the Luverne Facility and South Hampton Facility.

During the year ended December 31, 2021, net cash used for operating activities was $43.5 million compared to $19.3 million for the year ended December 31, 2020. The $24.2 million decrease in operating cash flows was primarily due to increased costs associated with beginning production of isobutanol during the third quarter 2021 and maintenance of the Luverne Facility, increased engineering and development fees on our Gevo RNG and Net-Zero 1 projects, increases in personnel expenses to support the growth in business activity, professional fees related to new contracts and extensive shareholder outreach for the annual stockholder meeting and consulting to support compliance with Section 404(b) of the Sarbanes-Oxley Act.

During 2022, we expect to produce isobutanol to supply the South Hampton Facility so that renewable premium gasoline and jet fuel can be produced.

In January 2022, Gevo RNG began to start-up operations. The start-up process is expected to take a few months and reach a steady state operation in the second quarter of 2022 which will allow time for Gevo to apply for credits under the federal RFS and the LCFS in California, including verification of carbon intensity levels and other requirements. Depending on the timing of the qualification and approval processes for obtaining credits under RFS and LCFS, Gevo expects to generate biogas revenue starting in the second quarter of 2022 and sales of credits under RFS and LCFS in late second quarter of 2022 and the fourth quarter of 2022, respectively.

During the first quarter 2022, Gevo RNG will move from preliminary stage project to production when it begins producing RNG. Net-Zero 1 will continue to be reported as a preliminary stage project cost until it is placed into production.

During the year ended December 31, 2020, net cash used for operating activities was $19.3 million compared to $20.8 million for the year ended December 31, 2019. The $1.5 million decrease in operating cash flows was primarily due to reduced production at the Luverne Facility offset by increased engineering and development costs for our Gevo RNG project. During the first quarter of 2020, we terminated our ethanol production at the Luverne Facility due to COVID-19 and an unfavorable commodity environment.

Investing Activities

During the year ended December 31, 2021, we used $411.6 million in cash for investing activities, of which $422.4 million related to purchasing marketable securities and $59.7 million primarily related to construction in process attributable to the Gevo RNG project, and to a lesser extent, the purchase of a Hydrocarbon-Process Pilot Unit for our Luverne Facility and Net-Zero 1 project and $9.2 million for the purchase of patents, which was partially offset by proceeds of $79.6 million from the sale of marketable securities.

During the year ended December 31, 2020, we used $5.9 million in cash for investing activities, including $1.0 million related to capital expenditures at our Luverne Facility related to dry fractionation and hydrocarbon skid equipment and $4.5 million related to our RNG project.

We have substantially completed constructing the Gevo RNG project and expect to invest an additional $8 million in the aggregate to complete the Gevo RNG project in the first quarter of 2022. Gevo RNG start-up commenced during the first quarter 2022 and we expect to generate biogas revenue starting in the second quarter of 2022 and sales of credits under RFS and LCFS in late second quarter of 2022 and the fourth quarter of 2022, respectively. . We estimate investing approximately $100 million in Net-Zero 1 engineering, development, long-lead equipment deposits, and legal and other costs associated with obtaining a non-recourse debt financing over the next 12 months. We also estimate spending of approximately $21 million for design-engineering of our Net-Zero 2 Project and $5 million for the development of our Verity project, including the Gevo Grower Program, in 2022.

Financing Activities

During the year ended December 31, 2021, we generated $512.9 million in cash from financing activities, which primarily consisted of $490.5 million from the sale of common stock and exercise of warrants and $69.0 million from the 2021 Bonds proceeds offset by $35.0 in debt and equity offering costs, $7.0 million net settlement of common stock for taxes under our stock plans and $4.6 million of payments on equipment loans and lease liabilities.

During the year ended December 31, 2020, we generated $87.3 million in cash from financing activities, which primarily consisted of $8.4 million of net proceeds under our "at-the-market" offering program, receiving $16.1 million from the sale of common stock and warrants in a public offering in July 2020, $45.8 million from the sale of common stock and pre-funded warrants in the August 2020 Offering, $17.1 million from the exercise of Series 2020-A warrants to purchase shares of the Company’s common stock (each, a “Series 2020-A Warrant”), Series 2020-B warrants to purchase shares of the Company’s common stock (all of which were exercised as of December 31, 2020) and Series 2020-C warrants to purchase shares of the Company’s common stock (all of which were exercised as of December 31, 2021), and $1.0 million from the Small Business Administration's Paycheck Protection Program discussed below, offset by $0.5 million paid on loans payable - other.

2021 Bonds. In April 2021, the Authority issued an aggregate principal amount of $68,155,000 of its 2021 Bonds in a public offering for the benefit of Gevo RNG, a subsidiary of Gevo, to finance the construction of the Gevo RNG project.

The 2021 Bonds are reported at their amortized cost, and were issued at a premium of $0.8 million. Debt issuance costs totaled $3.0 million for the year ended December 31, 2021. The Company will amortize the debt issuance costs and the premium as a component of interest expense over the life of the related debt instrument using the interest method. The 2021 Bonds have been recorded as a long-term liability and will become current on the earlier of (i) one year prior to the Initial Mandatory Tender Date or (ii) upon the Company’s exercise of its call option to tender or redeem the Bonds. See Note 14, *Debt*, for further information.

January 2021 Offering. In January 2021, we completed a registered direct offering pursuant to a securities purchase agreement with certain institutional and accredited investors providing for the issuance and sale by us of an aggregate of 43,750,000 shares of our common stock at a price of $8.00 per share in a registered direct offering. The net proceeds to us from the January 2021 Offering totaled approximately $321.7 million, after deducting placement agent fees and other estimated offering expenses payable by us, and not including any future proceeds from the exercise of the Warrants. We intend to use the net proceeds from the January 2021 Offering to fund development and investment in our RNG and Net-Zero 1 projects, working capital and for other general corporate purposes. During the year ended December 31, 2021, we used approximately $72.1 of the proceeds for investment in our RNG and Net-Zero 1 projects as well as the purchase of patent portfolio from Butamax and an exclusivity license from Axens.

During the year ended December 31, 2020, we received notices of exercise from holders of our Series 2020-A Warrants to issue an aggregate of 28,042,834 shares of common stock for total gross proceeds of approximately $16.8 million. During the year ended December 31, 2021, we received notices of exercise from holders of our Series 2020-A Warrants to issue an aggregate of 1,866,558 shares of common stock for total gross proceeds of approximately $1.1 million. Following these exercises, Series 2020-A Warrants to purchase 90,608 shares of our common stock remain outstanding at an exercise price of $0.60 per share as of January 31, 2022.

At-the-Market Offering Program. In February 2018, we commenced an at-the-market offering program, which allows us to sell and issue shares of our common stock from time-to-time. In September 2021, the at-the-market offering program was amended to provide available capacity under the at-the-market offering program of $500 million.

During the year ended December 31, 2021, we issued 24,420,579 shares of common stock under the at-the-market offering program for total proceeds of $135.8 million, net of commissions and other offering related expenses. During the year ended December 31, 2020,we issued 3,518,121 shares of common stock under the at-the-market offering program for total proceeds of $8.4 million, net of commissions and other offering related expenses.

2020/21 Notes. In January 2020, we entered into an Exchange and Purchase Agreement which exchanged all of the outstanding principal amount of the 2020 Notes, which totaled $14.1 million including unpaid accrued interest, for approximately $14.4 million in aggregate principal amount of our newly created 2020/21 Notes. During the year ended December 31, 2020, we recognized an approximately $0.7 million loss on the modification of the 2020 Notes within the Consolidated Statements of Operations.

In July 2020, certain holders of the 2020/21 Notes converted $2.0 million in the aggregate principal amount of 2020/21 Notes (including the conversion of an additional $0.3 million for make-whole payment) into 4,169,426 shares of common stock pursuant to the terms of the indenture. In December 2020, certain holders of the 2020/21 Notes converted the remaining $12.7 million in aggregate principal amount of 2020/21 Notes (including the conversion of an additional $1.2 million for make-whole payment) into an aggregate of 5,672,654 shares of common stock pursuant to the terms of the 2020/21 Notes related Indenture. As a result, as of December 31, 2020, all obligations under the 2020/2021 Notes had been fully paid and satisfied, and the 2020/2021 Notes related indenture had been terminated in accordance with its terms at maturity on December 31, 2020. During the year ended December 31, 2020, we recognized an approximately $1.9 million loss on the conversion as a result of the make-whole payments of the 2020/21 Notes into common stock within the Consolidated Statements of Operations.

See Note 14, *Debt*, to our Consolidated Financial Statements included herein for further discussion of the 2020/21 Notes.

Loans Payable - Other. During the first quarter of 2020, we purchased equipment under a financing lease. The equipment notes and financing lease pay interest between 4% and 21%, have total monthly payments of $0.1 million and mature at various date through February 2025. The equipment loans are secured by the related equipment.

In April 2020, we entered into two loan agreements with Live Oak Banking Company, pursuant to which we obtained two unsecured loans from the Small Business Administration's Paycheck Protection Program (“SBA PPP”) totaling $1.0 million in the aggregate (the "SBA Loans"). During the year ended December 31, 2021, the Small Business Administration forgave the entire balance of $0.6 million of the Company's SBA Loans and accrued interest.

See Note 14, *Debt*, to our Consolidated Financial Statements included herein for further discussion.

Critical Accounting Estimates

Our Consolidated Financial Statements are based on the application of U.S. GAAP, which requires us to make estimates and assumptions about future events that affect the amounts reported in our Consolidated Financial Statements and the accompanying notes. Future events and their effects cannot be determined with certainty; therefore, the determination of estimates requires the exercise of judgment. We believe our judgments related to these accounting estimates are appropriate. However, if different assumptions or conditions were to prevail, the results could be materially different from the amounts recorded.

Leases, Right-of-Use Assets and Related Liabilities

Description: The Company enters into various arrangements which constitute a lease as defined by ASC 842, *Leases*, as part of its ongoing business activities and operations. Leases represent a contract or part of a contract that conveys the right to control the use of identified property, plant or equipment (an identified asset) for a period of time in exchange for consideration. Such contracts result in both (a) right-of-use assets ("ROU"), which represent the Company's right to use an underlying asset for the term of the contract; and (b) a corresponding lease liability which represents the Company's obligation to make the lease payments arising from the contract. The Company has elected not to recognize a ROU asset and lease liability for any lease with an original lease term of 12 months or less. Lease expense for such leases is recognized on a straight-line basis over the lease term.

Judgments and Uncertainties: Certain judgements and uncertainties related to lease liabilities and ROU assets exist as these are initially measured at the lease commencement date. The lease liability is based on the present value of lease payments over the lease term, discounted using an estimate of the Company's incremental borrowing rate for a collateralized loan with the same term and payment as the lease. The discount rate is a significant judgement. The ROU assets are measured based on the amount of the lease liability adjusted for any lease payments made to the lessor at or before the lease commencement date less any lease incentives received. There is uncertainty related to the lease payments as re-negotiated lease payment occur and as amendments are made to the agreements. From the beginning, renewal options are included in the calculation of our ROU assets and lease liabilities when we determine that the option is reasonably certain of exercise based on an analysis of the relevant facts and circumstances.

Sensitivity of Estimate to Change: The liability relating to these operating and finance lease agreements are based on the Company's incremental borrowing rate for a collateralized loan with the same term and payment as the lease. A 1.0% increase or a 1.0% decrease in the annual implicit rate could cause an estimated $0 to $1.0 million fluctuation in the present value calculation of the lease liability for any of the finance leases based on the size of the lease liability.

Recent Accounting Pronouncements

See Note 2 in Item 8. "Financial Statements and Supplemental Data," of this Report, for a discussion of recent accounting pronouncements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

We are exposed to market risk during the normal course of business from changes in equity price and foreign currency risks. We do not use derivative financial instruments as part of an overall strategy to manage market risk; however, we may consider such arrangements in the future as we evaluate our business and financial strategy.

Equity Price Risk

We have in the past, and may in the future, seek to acquire additional funding by sale of common stock and other equity. The price of our common stock has been volatile in the past and may also be volatile in the future. As a result, there is a risk that we may not be able to sell our common stock at an acceptable price should the need for new equity funding arise.

Foreign Currency Risk

We are exposed to foreign currency risks that arise from normal business operations. These risks include transactions denominated in currencies other than U.S. dollar. We do not have significant exposure to foreign currency exchange rates but may in the future.

Interest Rate Risk

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because our investments, including cash equivalents, are invested in money market funds and U.S. treasury or government obligations. However, because of the short-term nature of the duration of our portfolio and the low-risk profile of our investments, we believe an immediate 10% change in market interest rates would not be expected to have a material impact on the fair market value of our investments portfolio or on our financial condition or results of operations.

Item 8. Financial Statements and Supplementary Data

Index to Gevo, Inc. Consolidated Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders
Gevo, Inc.

Opinion on the financial statements
We have audited the accompanying consolidated balance sheets of Gevo, Inc. (a Delaware corporation) and subsidiaries (the “Company”) as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive income (loss), stockholders’ equity, and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the Company’s internal control over financial reporting as of December 31, 2021, based on criteria established in the 2013 Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”), and our report dated February 24, 2022 expressed an unqualified opinion.

Basis for opinion
These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical audit matters
Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ GRANT THORNTON LLP

We have served as the Company’s auditor since 2015.

Denver, Colorado
February 24, 2022

GEVO, INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except share and per share amounts)

	Note Reference Number	December 31, 2021	December 31, 2020
Assets			
Current assets			
Cash and cash equivalents		$ 40,833	$ 78,338
Marketable securities (current)	5, 20	275,340	—
Restricted cash (current)	4	25,032	—
Accounts receivable, net	2	978	527
Inventories	10	2,751	2,491
Prepaid expenses and other current assets	6	6,857	1,914
Total current assets		351,791	83,270
Property, plant and equipment, net	11	139,141	66,408
Long-term marketable securities	5, 20	64,396	—
Long-term restricted cash	4	70,168	—
Operating right-of-use assets	9	2,414	133
Finance right-of-use assets	9	27,297	176
Intangible assets, net	7	8,938	114
Deposits and other assets		2,331	1,998
Total Assets	21	$ 666,476	$ 152,099
Liabilities			
Current liabilities			
Accounts payable and accrued liabilities	13	$ 28,288	$ 3,943
Operating lease liabilities (current)	9	772	172
Finance lease liabilities (current)	9	3,413	10
Loans payable - other (current)	14	158	807
Total current liabilities		32,631	4,932
2021 Bonds payable (long-term)	14, 20	66,486	—
Loans payable - other (long-term)	14	318	447
Operating lease liabilities (long-term)	9	1,902	—
Finance lease liabilities (long-term)	9	17,797	162
Other long-term liabilities		87	179
Total liabilities		119,221	5,720
Commitments and Contingencies	19		
Stockholders' Equity			
Common stock, $0.01 par value per share; 250,000,000 authorized; 201,988,662 and 128,138,311 shares issued and outstanding at December 31, 2021 and 2020, respectively.	3, 12	2,020	1,282
Additional paid-in capital	16	1,103,224	643,269
Accumulated other comprehensive loss	5	(614)	—
Accumulated deficit		(557,375)	(498,172)
Total stockholders' equity		547,255	146,379
Total Liabilities and Stockholders' Equity		$ 666,476	$ 152,099

See the accompanying Notes to the Consolidated Financial Statements.

GEVO, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(In thousands, except share and per share amounts)

	Note Reference Number	Year Ended December 31, 2021	2020	2019
Revenue and cost of goods sold				
Ethanol sales and related products, net	8	$ 50	$ 3,809	$ 22,115
Hydrocarbon revenue	8	483	1,501	2,338
Other revenue	8	178	226	34
Total revenues	8, 21	711	5,536	24,487
Cost of goods sold (exclusive of depreciation shown below), (including noncash compensation expense of $0.04 million (none in 2020 or 2019))	16	7,687	9,313	30,286
Depreciation and amortization	7, 11, 21	4,478	5,690	6,447
Gross loss		(11,454)	(9,467)	(12,246)
Operating expenses				
Research and development expense (including noncash compensation expense of $2.0 million, $0.6 million, $0.3 million, respectively)	16	6,775	3,511	3,868
Selling, general and administrative expense (including noncash compensation expense of $7.8 million, $1.5 million and $1.1 million, respectively)	16	25,493	11,192	9,823
Preliminary stage project costs		10,581	1,698	205
Loss on disposal of assets		5,137	625	4
Depreciation and amortization	7, 11, 21	650	214	209
Restructuring expense	3	—	254	—
Total operating expenses		48,636	17,494	14,109
Loss from operations	21	(60,090)	(26,961)	(26,355)
Other income (expense)				
Gain on forgiveness of SBA Loans	14	641	—	—
Interest expense	14, 21	(251)	(2,094)	(2,738)
Interest and dividend income	5	571	102	33
(Loss) on modification of 2020 Notes		—	(732)	—
(Loss) on conversion of 2020/21 Notes to common stock	14	—	(1,916)	—
(Loss) gain from change in fair value of 2020/21 Notes and 2020 Notes embedded derivative liability	14	—	(8,607)	394
Other income (expense), net		(74)	22	6
Total other income (expense)		887	(13,225)	(2,305)
Net loss		$ (59,203)	$ (40,186)	$ (28,660)
Net loss per share - basic and diluted	2	$ (0.30)	$ (0.71)	$ (2.35)
Weighted-average number of common shares outstanding - basic and diluted		195,794,606	56,881,586	12,177,906

See the accompanying Notes to the Consolidated Financial Statements.

GEVO, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(in thousands)

	Note Reference Number	Year to Date December 31, 2021	2020	2019
Net Loss		$ (59,203)	$ (40,186)	$ (28,660)
Other comprehensive income (loss):				
Unrealized (loss) on available-for-sale securities, net of tax		(524)	—	—
Adjustment for net (loss) realized and included in net income	5	(90)	—	—
Total change in unrealized (loss) on marketable debt securities		(614)	—	—
Comprehensive loss		$ (59,817)	$ (40,186)	$ (28,660)

See the accompanying Notes to the Consolidated Financial Statements.

GEVO, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands, except share amounts)

	Note Reference Number	Common Stock Shares	Common Stock Amount	Paid-In Capital	Comprehensive Loss	Accumulated Deficit	Stockholders' Equity
Balance, December 31, 2018		8,640,583	$ 86	$ 518,027	$ —	$ (429,326)	$ 88,787
Issuance of common stock, net of issue costs		3,965,688	40	11,317	—	—	11,357
Non-cash stock-based compensation	16	—	—	1,221	—	—	1,221
Issuance of common stock under stock plans, net of taxes		1,476,961	15	(216)	—	—	(201)
Net loss		—	—	—	—	(28,660)	(28,660)
Balance, December 31, 2019		14,083,232	141	530,349	—	(457,986)	72,504
Issuance of common stock and common stock warrants, net of issue costs	3	46,290,808	463	69,614	—	—	70,077
Issuance of common stock upon exercise of warrants	3, 12	53,678,400	537	16,545	—	—	17,082
Issuance of common stock upon conversion of 2020/21 Notes	14	9,842,080	99	24,958	—	—	25,057
Issuance of common stock in exchange for services rendered		101,730	1	93	—	—	94
Non-cash stock-based compensation	16	—	—	2,101	—	—	2,101
Issuance of common stock under stock plans, net of taxes		4,142,061	41	(391)	—	—	(350)
Net loss		—	—	—	—	(40,186)	(40,186)
Balance December 31, 2020		128,138,311	1,282	643,269	—	(498,172)	146,379
Issuance of common stock, net of issue costs	3	68,170,579	682	456,765	—	—	457,447
Issuance of common stock upon exercise of warrants	3, 12	1,866,758	18	1,103	—	—	1,121
Non-cash stock-based compensation	16	—	—	7,700	—	—	7,700
Issuance of common stock under stock plans, net of taxes		3,813,014	38	(5,613)	—	—	(5,575)
Other comprehensive loss		—	—	—	(614)	—	(614)
Net loss		—	—	—	—	(59,203)	(59,203)
Balance, December 31, 2021		201,988,662	$ 2,020	$ 1,103,224	$ (614)	$ (557,375)	$ 547,255

See the accompanying Notes to the Consolidated Financial Statements.

GEVO, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Note Reference Number	Year Ended December 31, 2021	2020	2019
Operating Activities				
Net loss		$ (59,203)	$ (40,186)	$ (28,660)
Adjustments to reconcile net loss to net cash used in operating activities:				
Loss (gain) from the change in fair value of 2020/21 Notes and 2020 Notes embedded derivative liability		—	8,607	(394)
Loss on conversion of 2020/21 Notes to common stock	14	—	1,916	—
Loss on disposal of assets		5,137	625	4
(Gain) on forgiveness of SBA Loans	14	(641)	—	—
Stock-based compensation	16	9,874	2,125	1,349
Depreciation and amortization	7, 11	5,128	5,904	6,656
Non-cash lease expense		52	62	48
Non-cash interest expense		37	761	1,346
Changes in operating assets and liabilities:				
Accounts receivable		(257)	608	(609)
Inventories		(259)	945	(35)
Prepaid expenses and other current assets, deposits and other assets		(3,133)	782	(1,824)
Accounts payable, accrued expenses and long-term liabilities		(271)	(1,487)	1,280
Net cash used in operating activities		(43,536)	(19,338)	(20,839)
Investing Activities				
Acquisitions of property, plant and equipment		(59,662)	(5,905)	(5,989)
Acquisition of patents	7	(9,170)	—	—
Proceeds from sale of marketable securities	5	79,574	—	—
Purchase of marketable securities		(422,362)	—	—
Proceeds from sale of property, plant and equipment		—	—	32
Investment in Juhl	2	—	—	(1,500)
Net cash used in investing activities		(411,620)	(5,905)	(7,457)
Financing Activities				
Proceeds from issuance of 2021 Bonds	14	68,995	—	—
Debt and equity offering costs	3, 14	(34,955)	(6,370)	(232)
Proceeds from issuance of common stock and common stock warrants	3, 12	489,373	76,414	11,589
Proceeds from the exercise of warrants	12	1,121	17,082	—
Net settlement of common stock under stock plans		(7,041)	(350)	(201)
Payment on loans payable - other		(154)	(501)	(292)
Payment of finance lease liabilities		(4,488)	(2)	—
Proceeds from SBA Loans	14	—	1,006	—
Net cash provided by financing activities		512,851	87,279	10,864
Net increase (decrease) in cash and cash equivalents and restricted cash		57,695	62,036	(17,432)
Cash, cash equivalents and restricted cash				
Beginning of year		78,338	16,302	33,734
End of year		$ 136,033	$ 78,338	$ 16,302

See the accompanying Notes to the Consolidated Financial Statements.

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GEVO, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS—(Continued)
(In thousands)

Schedule of cash, cash equivalents and restricted cash	**Year Ended December 31,**		
	2021	**2020**	**2019**
Cash and cash equivalents	$ 40,833	$ 78,338	$ 16,302
Restricted cash (current)	25,032	—	—
Long-term restricted cash	70,168	—	—
Total cash, cash equivalents and restricted cash	$ 136,033	$ 78,338	$ 16,302

Supplemental disclosures of cash and non-cash investing and financing transactions	**Year Ended December 31,**		
	2021	**2020**	**2019**
Cash paid for interest expensed	$ 214	$ 1,333	$ 1,392
Cash paid for interest capitalized to construction in progress	1,020	—	—
Non-cash interest capitalized to construction in progress	1,125	—	—
Non-cash purchase of property, plant and equipment	20,287	197	368
Issuance of common stock upon exchange of debt and make-whole	—	25,057	—
Issuance of common stock in exchange for services rendered	—	94	—
Original issue discount paid with 2020/21 Notes	—	282	—
Right-of-use asset purchased with financing lease	28,514	—	—
Right-of-use asset purchased with operating lease	2,593	192	280
Equipment and insurance financed with notes payable	—	—	1,041

See the accompanying Notes to the Consolidated Financial Statements.

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GEVO, INC.
Notes to Consolidated Financial Statements

1. Nature of Business and Financial Condition

Nature of Business. Gevo, Inc. (Nasdaq: GEVO) ("Gevo" or the "Company," which, unless otherwise indicated, refers to Gevo, Inc. and its subsidiaries), a Delaware corporation founded in 2005, is a growth-oriented company with the mission of solving greenhouse gas emissions for those sectors of the transportation industry that are not amenable to electrification or hydrogen.

The Company is focused on transforming renewable energy into energy-dense liquid hydrocarbons that can be used as renewable fuels, such as sustainable aviation fuel ("SAF"), with the potential to achieve a "net-zero" greenhouse gas ("GHG") footprint. The Company uses the Argonne National Laboratory's GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) model (the "GREET Model") to measure, predict and verify GHG emissions across the life-cycle of its products. The "net-zero" concept means that Gevo expects to produce fuels that consume as much carbon dioxide in their manufacture as the fuels produce when burned.

Gevo's primary market focus, given current demand and growing customer interest, is SAF. The Company believes that it also has commercial opportunities for other renewable hydrocarbon products, such as hydrocarbons for gasoline blendstocks and diesel fuel; ingredients for the chemical industry, such as ethylene and butenes; plastics and materials; and other chemicals.

The Company believes it has the technology and know-how to convert various carbohydrate feeds through a fermentation process into alcohols and then transform the alcohols into renewable fuels and materials. While the Company expects its first major capital deployments to focus on the production of SAF, Gevo recognizes that there are opportunities to operate in several different markets and it will pursue those opportunities when appropriate based on customer interest, access to capital and expected investment returns.

Gevo currently operates two development scale plants: (i) a demonstration facility in Silsbee, Texas that is operated in partnership with South Hampton Resources, Inc. (the "South Hampton Facility") and (ii) a wholly-owned development plant in Luverne, Minnesota (the "Luverne Facility").

The Luverne Facility was originally constructed in 1998 and is located on approximately 55 acres of land, which contains approximately 50,000 square feet of building space. Gevo currently plans to install a 1 million gallon per year alcohol-to-hydrocarbon process pilot unit that is expected to produce olefins and fuel products for market development and testing purposes. This pilot unit is expected to be complete and delivered to the Luverne Facility in late 2022. The pilot unit will also be used in training of employees for Net-Zero 1 and other future projects.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

Gevo's initial renewable natural gas ("RNG") project, Gevo RNG, will generate RNG captured from dairy cow manure which will be supplied by three dairies located in Northwest Iowa totaling over 20,000 milking cows.

Ultimately, the Company believes that the attainment of profitable operations is dependent upon future events, including, but not limited to (i) the successful development of the Company's initial Net-Zero Project (the "Net-Zero 1 Project") and future projects for the production of energy dense liquid hydrocarbons using renewable energy and our proprietary technology; and (ii) the achievement of a level of revenues adequate to support its cost structure.

COVID-19. The novel coronavirus ("COVID-19") pandemic has had an adverse impact on global commercial activity, including the global transportation industry and its supply chain, and has contributed to significant volatility in financial markets. It is possible that that the impact of the COVID-19 pandemic on general economic activity could continue to negatively impact the Company's revenue and operating results for 2022 and beyond.

During the first quarter of 2020, the Company suspended the ethanol production at its Luverne Facility due to COVID-19 and an unfavorable commodity environment. The suspension of ethanol production and a reduction in the Company's workforce that occurred during the first quarter of 2020 due to the impact of COVID-19 had an adverse impact on the Company's financial results for the year ended December 31, 2021 reducing revenue by 87% compared to the year ended December 31, 2020. Revenue was reduced by 77% for the year December 31, 2020 compared to the year ended December 31, 2019 as a result of COVID-19. The Luverne Facility re-commenced operations during July 2021.

Financial Condition. The Company has incurred consolidated net losses since inception and had a significant accumulated deficit as of December 31, 2021. The Company’s cash and cash equivalents totaled $40.8 million, short and long-term restricted cash totaled $95.2 million and marketable securities totaled $339.7 million as of December 31, 2021. Gevo expects to use its cash, cash equivalents, restricted cash and marketable securities for the following purposes: (i) identification, development, acquisition and construction of new production facilities and to plan for expanded production to fulfill existing off-take agreements, including the Company's Net-Zero Projects; (ii) investment in RNG projects; (iii) development of the Luverne Facility; (iv) development, acquisition and operation of sustainable ethanol-to-SAF plants to produce SAF alone or with partners; (v) operating activities at the Company’s corporate headquarters in Colorado, including research and development work; (vi) exploration of strategic alternatives and additional financings, including project financing; and (vii) future debt service obligations.

The Company expects to incur future net losses as it continues to fund the development and commercialization of its product candidates. To date, the Company has financed its operations primarily with proceeds from issuance of equity and debt securities, borrowings under debt facilities and product sales. The Company’s transition to profitability is dependent upon, among other things, the successful development and commercialization of its product candidates, the development, acquisition and construction of additional production facilities to support that Company’s off-take agreement, the achievement of a level of revenues adequate to support the Company’s cost structure, and the ability to raise capital to finance the development, acquisition and construction of additional productions facilities. Management intends to fund future operations through additional private and/or public offerings of debt or equity securities. In addition, the Company may seek additional capital through arrangements with strategic partners or from other sources, and it will continue to address its cost structure. Notwithstanding, there can be no assurance that the Company will be able to raise additional funds or achieve or sustain profitability or positive cash flows from operations on acceptable terms, or at all. Management believes it has adequate cash to fund operations for at least one year from the date the financial statements are issued.

2. Summary of Significant Accounting Policies

Principles of Consolidation. The Consolidated Financial Statements of Gevo include the accounts of its wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Basis of Presentation. The Consolidated Financial Statements of the Company (which include the accounts of its wholly-owned subsidiaries Gevo Asset, LLC, Gevo RNG Holdco, LLC, Gevo NW Iowa RNG, LLC ("Gevo RNG"), Gevo Net-Zero HoldCo, LLC, Gevo Net-Zero 1, LLC ("Net-Zero 1") and Agri-Energy, LLC ("Agri-Energy")) have been prepared pursuant to the rules and regulations of the U.S. Securities and Exchange Commission (the "SEC") and accounting principles generally accepted in the U.S. ("U.S. GAAP") for complete financial statements. These statements reflect all normal and recurring adjustments which, in the opinion of management, are necessary to present fairly the financial position, results of operations and cash flows of the Company at December 31, 2021.

Reclassifications. The Company reclassified certain prior period amounts to conform to the current period presentation, including the categorization of preliminary stage project costs and depreciation and amortization on the Consolidated Statements of Operations. These reclassifications had no impact on total revenues, total cost of goods sold, total operating expenses, net loss or stockholders' equity for any period.

Use of Estimates. The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ materially from those estimates.

Concentrations of Credit Risk. The Company’s financial instruments that are exposed to concentrations of credit risk consist of cash and cash equivalents in excess of the federally insured limits. The Company’s cash and cash equivalents are deposited with high credit-quality financial institutions and are primarily in demand deposit accounts.

Cash and Cash Equivalents. The Company maintains its cash and cash equivalents in highly liquid interest-bearing money market accounts or non-interest-bearing demand accounts. The Company considers all highly liquid investments purchased with a maturity of three months or less at the date of acquisition to be cash equivalents.

Marketable Securities. The Company’s marketable securities consist of marketable debt securities and have been classified and accounted for as available-for-sale. Management determines the appropriate classification of its investments at the time of purchase and reevaluates the classifications at each balance sheet date. The Company classifies its marketable securities as either short-term or long-term based on each instrument’s underlying contractual maturity date. Marketable securities with maturities of 12 months or less are classified as short-term and marketable securities with maturities greater than 12 months are classified as long-term. The Company’s marketable securities are carried at fair value, with unrealized gains and losses, net of taxes, reported as a component of accumulated other comprehensive income in shareholders’ equity, with the exception of unrealized losses believed to be other-than-temporary, which are reported in earnings in the current period.

Accounts Receivable. The Company records receivables for products shipped and services provided but for which payment has not yet been received. As of December 31, 2021, trade accounts receivable totaled $0.1 million, while other accounts receivable totaled $0.9 million. As of December 31, 2020, trade accounts receivable totaled $0.5 million. Th Company currently has limited production of SAF and other renewable hydrocarbons at our development scale plants, and as such, we are not dependent on any specific customers at this time.

Inventories. Inventory is recorded at net realizable value. Cost of goods sold is determined by the average cost method. Isobutanol and ethanol inventory cost consists of the applicable share of raw material, direct labor and manufacturing overhead. Work in process inventory includes unfinished SAF, isooctane and isooctene inventory. Spare Parts inventory consists of the parts required to maintain and operate the Company’s Luverne Facility and is recorded at cost. For each reporting period, the Company reviews the value of inventories on hand to estimate the recoverability through future sales. The Company reduces its inventories with adjustments for lower of cost or market valuation.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

Property, Plant and Equipment. Property, plant and equipment are recorded at cost less accumulated depreciation and amortization. Depreciation and amortization are computed using the straight-line method over the assets' estimated useful lives. Leasehold improvements are amortized over the term of the lease agreement or the service lives of the improvements, whichever is shorter. Assets under construction are depreciated when they are placed into service. Maintenance and repairs are charged to expense as incurred and expenditures for major improvements are capitalized.

Construction in Progress. Construction in progress represents expenditures necessary to bring an asset, project, new facilities or equipment to the condition and location necessary for its intended use are capitalized and recorded at cost. Once completed and ready for its intended use, the asset is transferred to property, plant and equipment to be depreciated or amortized.

Depreciation and Amortization. Capitalized costs are depreciated or amortized using the straight-line method at rates sufficient to depreciate such costs over the shorter of estimated productive lives of such assets or the useful life of the individual assets. The estimates of productive lives may change, possibly in the near term, resulting in changes to depreciation and amortization rates in future reporting periods.

Capitalized Internal-Use Software Costs. Software development costs are capitalized when module development begins, it is probable that the project will be completed, and the software will be used as intended. Costs associated with preliminary project stage activities, training, maintenance and all other post implementation stage activities are expensed as incurred. Internal-use software is amortized on a straight-line basis, generally over three to five years. We evaluate the useful lives of these assets on an annual basis and test for impairment whenever events or changes in circumstances occur that could impact the recoverability of these assets.

Impairment of Long-Lived Assets. The Company evaluates the recoverability of the recorded amount of long-lived assets, including property, plant and equipment, licenses, patents, operating lease right-of-use assets, finance lease right-of-use assets and capitalized internal use software when events or changes in circumstances indicate that their carrying amount may not be recoverable. The carrying amount of a long-lived asset is considered to be impaired if it exceeds the sum of the undiscounted cash flows expected to result from the use and eventual disposition of the assets. If the Company determines that an asset is impaired, it measures the impairment to be recognized as the amount by which the recorded amount of the asset exceeds its fair value. We report assets to be disposed of at the lower of the recorded amount or fair value less cost to sell. The Company determines fair value using a discounted future cash flow analysis.

Investment in Juhl. In September 2019, Agri-Energy purchased 1.5 million shares of Series A preferred stock of Juhl Clean Energy Assets, Inc. ("Juhl") for a purchase price of $1.00 per share in connection with the development of wind electrical energy generating facility project near the Luverne Facility. An affiliate of Juhl constructed, owns and operates the wind project, and Agri-Energy purchases the electricity directly from the City of Luverne. The investment in Juhl is accounted for under the cost method.

Leases, Right-of-Use Assets and Related Liabilities. The Company enters into various arrangements which constitute a lease as defined by Accounting Standards Codification ("ASC") 842, *Leases*, as part of its ongoing business activities and operations. Leases represent a contract or part of a contract that conveys the right to control the use of identified property, plant or equipment (an identified asset) for a period of time in exchange for consideration. Such contracts result in both (a) right-of-use assets, which represent the Company's right to use an underlying asset for the term of the contract; and (b) a corresponding lease liability which represents the Company's obligation to make the lease payments arising from the contract. The Company has elected not to recognize a right-of-use asset and lease liability for any lease with an original lease term of 12 months or less. Lease expense for such leases is recognized on a straight-line basis over the lease term.

A lease is classified as a finance lease when one or more of the following criteria are met: (i) the lease transfers ownership of the asset by the end of the lease term, (ii the lease contains an option to purchase the asset that is reasonably certain to be exercised, (iii) the lease term is for a major part of the remaining useful life of the asset, (iv) the present value of the lease payments equals or exceeds substantially all of the fair value of the asset, and (v) the asset is of such a specialized nature that it is expected to have no alternative use to the lessor at the end of the lease term. If a lease does not meet any of these criteria, the lease is classified as an operating lease.

Lease liabilities are initially measured at the lease commencement date based on the present value of lease payments over the lease term, discounted using an estimate of the Company's incremental borrowing rate for a collateralized loan with the same term and payment as the lease. Right-of-use assets are measured based on the amount of the lease liability adjusted for any lease payments made to the lessor at or before the lease commencement date less any lease incentives received. All right-of-use assets are evaluated for impairment in accordance with accounting standards applicable to long-lived assets.

Renewal options are included in the calculation of our right-of-use assets and lease liabilities when the Company determines that the option is reasonably certain of exercise based on an analysis of the relevant facts and circumstances. Certain of the Company's leases require variable lease payments that do not depend on an index or rate and such payments are excluded from the calculation of the right-of-use asset and lease liability and are recognized as variable lease cost when incurred.

The Company has elected the practical expedient to account for the lease and non-lease components as a single lease component for its dairy lease and fuel supply asset class. This results in a significantly higher right-of-use assets and lease liabilities than if the Company had not elected this practical expedient.

Lease cost for operating leases consists of the fixed lease payments recognized on a straight-line basis over the lease term plus variable lease payments as incurred. Lease cost for finance leases consists of amortization of the right-of-use assets on a straight-line basis over the lease term, interest expense on the lease liability and variable lease payments as incurred.

Axens License. Costs related to licenses, including legal fees, are capitalized and amortized over the estimated useful lives using the straight-line method. The license is included in "Prepaid expenses and other current assets" in the Consolidated Balance Sheets.

Intangible assets. Intangible assets consist of patents. Costs related to patents, including legal fees, are capitalized and amortized over the estimated useful lives using the straight-line method. Amortization expense is recorded in "Depreciation and amortization" in the Operating expenses section of the Consolidated Statements of Operations. For patents purchased in an asset acquisition, the useful life is determined by valuation estimates of remaining economic life. The patents are included in "Intangible assets, net" in the Consolidated Balance Sheets.

The Company periodically evaluates the amortization period and carrying value of its licenses and patents to determine whether any events or circumstances warrant revised estimated useful life or reduction in value.

Borrowing Costs. The borrowing costs that are directly attributable to acquisition and construction of an asset that needs a substantially long period of time for its intended use commence to be capitalized and recorded as part of the cost of the asset when expenditures for the asset and borrowing costs have been incurred, and the activities relating to the acquisition and construction that are necessary to prepare the asset for its intended use have commenced. The capitalization of borrowing costs ceases when the asset under acquisition or construction becomes ready for its intended use and the borrowing costs incurred thereafter are recognized in profit or loss for the current period. Capitalization of borrowing costs is suspended during periods in which the acquisition or construction of an asset is interrupted abnormally and the interruption lasts for more than three months, until the acquisition or construction is resumed.

Debt Issuance Costs and Debt Discounts/Premiums. Debt issuance costs are costs with third parties incurred in connection with the Company's debt financings that have been capitalized and are being amortized over the stated maturity period or estimated life of the related debt using the effective interest method. Debt issuance costs are presented as a direct reduction of the carrying amount of the related debt. Debt discounts, including fees paid to lenders, and debt premiums are amortized over the life of the related debt using the effective interest method. Debt discounts and premiums are presented as a reduction and increase, respectively, in the carrying amount of the related debt. Amortization of debt issuance costs, discounts and premiums is included in interest expense.

Fair Value of Financial Instruments. We record various financial instruments at fair value. U.S. GAAP defines fair value 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 in the principal or most advantageous market for the asset or liability. U.S. GAAP also classifies the inputs used to measure fair value into the following hierarchy:

Level 1: Quoted market prices in an active market for identical assets or liabilities.
Level 2: Quoted prices in active markets for similar assets or liabilities, quoted prices for identical or similar assets in markets that are not active, or inputs other than quoted prices that are observable for the asset or liability.
Level 3: Unobservable inputs for the asset or liability.

The Company believes that the carrying value of its cash and cash equivalents, restricted cash, accounts receivable, accounts payable, accrued liabilities and loans payable - other approximate fair value due to their short maturities.

Warrants. Warrants are classified as a component of permanent equity when they are freestanding financial instruments that are legally detachable and separately exercisable from the shares of common stock with which they were issued, are immediately exercisable, do not embody an obligation for the Company to repurchase its shares, permit the holders to receive a fixed number of shares of common stock upon exercise and do not provide any guarantee of value or return.

The Series 2020-A Warrants are classified as a component of permanent equity. The Company valued the Series 2020-A Warrants at issuance using the Black-Scholes option pricing model and determined the fair value. The key inputs to the valuation model included a weighted average volatility of 130%, risk free rate of 0.31% and an expected term of five years.

Revenue Recognition. The Company records revenue from the sale of ethanol and related products, hydrocarbon products and funding from government grants and cooperative agreements. The Company recognizes revenue when all of the following criteria are satisfied: (i) it has identified a contract with a customer; (ii) it has identified the performance obligations of the customer; (iii) it has determined the transaction price; (iv) it has allocated the transaction price to the identified performance obligations in the contract with the customer; and (v) it has satisfied each individual performance obligation with the contract with a customer.

Ethanol and related products as well as hydrocarbon products are generally shipped free-on-board shipping point. Collectability of revenue is reasonably assured based on historical evidence of collectability between the Company and its customers. In accordance with the Company's agreements for the marketing and sale of ethanol and related products, commissions due to marketers are deducted from the gross sales price at the time payment was remitted. Ethanol and related products sales are recorded net of commissions and shipping and handling costs. Sales and other taxes that the Company collects concurrent with revenue-producing activities are excluded from revenue.

Cost of Goods Sold. Cost of goods sold includes costs incurred in conjunction with the operations for the production of isobutanol and costs directly associated with the ethanol and related products production process such as costs for direct materials, direct labor and certain plant overhead costs. Costs associated with the operations for the production of isobutanol includes costs for direct materials, direct labor and plant utilities, including natural gas and wind power. Direct materials consist of dextrose for initial production of isobutanol, corn feedstock, denaturant and process chemicals. Direct labor includes compensation of personnel directly involved in production operations. Costs of direct materials for the production of ethanol and related products consist of corn feedstock, denaturant and process chemicals. Direct labor includes compensation of personnel directly involved in the operation of the Luverne Facility. Plant overhead costs primarily consists of plant utilities. Cost of goods sold is mainly affected by the cost of corn and natural gas. Corn is the most significant raw material cost. The Company purchases natural gas and wind power to power steam generation in the production process and to dry the distillers grains, a by-product of ethanol and related products production.

Research and Development. Research and development costs are expensed as incurred. The Company's research and development costs consist of expenses incurred to identify, develop, and test its technologies for the production of isobutanol and the development of downstream applications thereof. Research and development expense includes personnel costs (including stock-based compensation), consultants and related contract research, facility costs, supplies, license fees and milestone payments paid to third parties for use of their intellectual property and patent rights and other direct and allocated expenses incurred to support the Company's overall research and development programs.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

Selling, General and Administrative. Selling, general and administrative expense are expensed as incurred. The Company's selling, general and administrative costs consist of personnel costs (including stock-based compensation), consulting and service provider expenses (including patent counsel-related costs), legal fees, marketing costs, insurance costs, occupancy-related costs, travel and relocation expenses and hiring expenses.

Preliminary Stage Project Costs. Preliminary stage project costs consist of consulting, preliminary engineering costs, personnel expenses and research and development expenses to support the business activity for the Company's Gevo RNG and Net-Zero projects.

Stock-Based Compensation. The Company’s stock-based compensation expense includes expenses associated with share-based awards granted to employees and board members, and expenses associated with awards under its employee stock purchase plan ("ESPP"). Our stock-based compensation is classified as either an equity award or a liability award in accordance with U.S. GAAP. The fair value of an equity-classified award is determined at the grant date and is amortized on a straight-line basis over the vesting life of the award. The fair-value of a liability-classified award is determined on a quarterly basis through the final vesting date and is amortized based on the current fair value of the award and the percentage of vesting period incurred to date.

The grant date fair value for stock option awards is estimated using the Black-Scholes option pricing model and the grant date fair value for restricted stock awards is based upon the closing price of the Company’s common stock on the date of grant. The Company recognizes compensation costs for share-based payment awards granted to employees net of actual forfeitures and recognizes stock-based compensation expense for only those awards expected to vest on a straight-line basis over the requisite service period of the award, which is currently the vesting term of up to four years.

The Company accounts for stock-based employee compensation plans under the fair value recognition and measurement provisions in accordance with applicable accounting standards, which require all stock-based payments to employees, including grants of stock options and restricted stock awards, to be measured based on the grant date fair value of the awards, with the resulting expense generally recognized on a straight-line basis over the period during which the employee is required to perform service in exchange for the award.

Stock-based compensation expense related to restricted stock awards and stock options are recorded net of actual forfeitures in our Consolidated Statements of Operations.

Liability awards are subject to variable accounting treatment, such that they are remeasured at fair value each reporting period through the Consolidated Statements of Operations. Any impact of forfeitures are based on actual forfeitures, although not affecting the fair value measurement of the awards, should be reflected at that time as well.

Income Taxes. Deferred tax assets and liabilities are recognized based on the difference between the carrying amounts of assets and liabilities in the financial statements and their respective tax bases. Deferred tax assets and liabilities are measured using currently enacted tax rates in effect in the years in which those temporary differences are expected to reverse. Deferred tax assets should be reduced by a valuation allowance if, based on the weight of available evidence, it is more likely than not that some portion or all of the deferred tax assets will not be realized.

In preparing our Consolidated Financial Statements, we estimate the actual amount of taxes currently payable or receivable as well as deferred tax assets and liabilities attributable to temporary differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. Deferred income tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which these temporary differences are expected to be recovered or settled. Changes in deferred tax assets and liabilities generally have a direct impact on earnings in the period of the changes. Mining taxes represent federal and state taxes levied on mining operations. As the mining taxes are calculated as a percentage of mining profits, we classify them as income taxes. Where applicable tax laws and regulations are either unclear or subject to varying interpretations, it is possible that changes in these estimates could occur that materially affect the amounts of deferred income tax assets and liabilities recorded in the Consolidated Financial Statements.

Each period, we evaluate the likelihood of whether or not some portion or all of each deferred tax asset will be realized and provide a valuation allowance for those deferred tax assets for which it is more likely than not that the related benefits will not be realized. When evaluating our valuation allowance, we consider historic and future expected levels of taxable income, the pattern and timing of reversals of taxable temporary timing differences that give rise to deferred tax liabilities, and tax planning initiatives. Levels of future taxable income are affected by, among other things, market gold and silver prices, production costs, quantities of proven and probable reserves, interest rates, federal and local legislation, and foreign currency exchange rates. If we determine that all or a portion of the deferred tax assets will not be realized, a valuation allowance will be recorded with a charge to income tax expense. Conversely, if we determine that we will ultimately be able to realize all or a portion of the related benefits for which a valuation allowance has been provided, all or a portion of the related valuation allowance will be reduced with a credit to income tax expense.

In addition, the calculation of income tax expense involves significant management estimation and judgment involving a number of assumptions. In determining these amounts, management interprets tax legislation in each of the jurisdictions in which we operate and makes estimates of the expected timing of the reversal of future tax assets and liabilities. We also make assumptions about future earnings, tax planning strategies and the extent to which potential future tax benefits will be used. We are also subject to assessments by various taxation authorities which may interpret tax legislation differently, which could affect the final amount or the timing of tax payments.

The Company may from time to time be assessed interest or penalties by major tax jurisdictions, although there have been no such assessments historically with any material impact to its financial results. The Company would recognize interest and penalties related to unrecognized tax benefits within the income tax expense line in the accompanying Consolidated Statements of Operations. Accrued interest and penalties would be included within the related tax liability line in the Consolidated Balance Sheets.

Net Loss Per Share. Basic net loss per share is computed by dividing the net loss attributable to Gevo's common stockholders for the period by the weighted-average number of common shares outstanding during the period. Diluted earnings per share ("EPS") includes the dilutive effect of common stock equivalents and is computed using the weighted-average number of common stock and common stock equivalents outstanding during the reporting period. Diluted EPS for the years ending December 31, 2021, 2020 and 2019 excluded common stock equivalents because the effect of their inclusion would be anti-dilutive or would decrease the reported loss per share.

The following table sets forth securities that could potentially dilute the calculation of diluted earnings per share:

	Year Ended December 31,		
	2021	**2020**	**2019**
Warrants to purchase common stock - liability classified	7,126	56,735	54,989
Warrants to purchase common stock - equity classified	90,608	1,957,166	—
Convertible 2020 Notes	—	—	974,139
Outstanding options to purchase common stock	4,746,368	1,552	1,561
Stock appreciation rights	67,739	67,739	67,739
Total	4,911,841	2,083,192	1,098,428

Recently Adopted Accounting Pronouncements

Financial Instruments - Credit Losses. Measurement of Credit Losses on Financial Instruments. In June 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2016-13, *Financial Instruments - Credit Losses. Measurement of Credits Losses on Financial Instruments* ("ASU 2016-13"), which replaces accounting for credit losses for most financial assets, including trade accounts receivable, and certain other instruments that are not measured at fair value through income. ASU 2016-13 replaces the current “incurred loss” model, in which losses are recognized when a loss is incurred as of the date of the balance sheet, to an “expected credit loss” model, which includes a broader range of information to estimate expected credit losses over the lifetime of the financial asset. ASU 2016-13 is effective for fiscal years beginning after December 15, 2022 for smaller reporting companies, however the Company adopted this ASU as of Q4 2021 since the Company lost its smaller reporting company status. The adoption of this standard primarily applies to the valuation of the Company’s trade accounts receivables. The Company sells primarily to a small quantity of large customers with significant balance sheets and those financial assets are often settled within two - to - three months after the completion of the corresponding sales transaction. The adoption of this standard did not have a material impact on the Company’s Consolidated Financial Statements.

Government Assistance Disclosures. In November 2021, the FASB issued ASU No. 2021-10 *Government Assistance (Topic 832) Disclosures by Business Entities about Government Assistance* ("ASU 2021-10"), which increase the transparency of government assistance including the disclosure of (i) the types of assistance, (ii) an entity’s accounting for the assistance, and (iii) the effect of the assistance on an entity’s financial statements. ASU 2021-10 is effective for fiscal years beginning after December 15, 2021. Early application of the ASU is permitted. See Note 14, *Debt*, for additional disclosures related to the Small Business Administration’s Paycheck Protection Program ("SBA PPP").

3. Miscellaneous Financial Information

January 2021 Offering. On January 19, 2021, the Company completed a registered direct offering pursuant to a securities purchase agreement with certain institutional and accredited investors providing for the issuance and sale by the Company of an aggregate of 43,750,000 shares of the Company's common stock at a price of $8.00 per share (the "January 2021 Offering"). The net proceeds to the Company from the January 2021 Offering were approximately $321.7 million, after deducting placement agent fees and other estimated offering expenses payable by the Company.

August 2020 Offering. On August 25, 2020, the Company completed a registered direct offering pursuant to a securities purchase agreement with certain institutional and accredited investors providing for the issuance and sale by the Company of an aggregate of (i) 21,929,313 shares of the Company's common stock (the "Shares") at a price of $1.30 per share, and (ii) 16,532,232 pre-funded Series 2020-C warrants to purchase one share of the Company's common stock (each, a "Series 2020-C Warrant") at a price of $1.29 per Series 2020-C Warrant, in a registered direct offering (the "August 2020 Offering"). The pre-funded Series 2020-C Warrants are exercisable beginning on the date of issuance at a nominal exercise price of $0.01 per share of common stock any time until the Series 2020-C Warrants are exercised in full. As of December 31, 2020, all of the Series 2020-C Warrants were exercised.

The net proceeds to the Company from the August 2020 Offering were approximately $45.8 million, after deducting placement agent fees and other estimated offering expenses payable by the Company, and not including any future proceeds from the exercise of the Warrants. The Company used the net proceeds from the August 2020 Offering to fund working capital and for other general corporate purposes.

July 2020 Offering. On July 6, 2020, Gevo completed a public offering (the "July 2020 Offering") of (i) 20,896,666 Series 1 units (the "Series 1 Units") at a price of $0.60 per Series 1 Unit, and (ii) 9,103,334 Series 2 units (the "Series 2 Units") at a price of $0.59 per Series 2 Unit. The July 2020 Offering was made under a registration statement on Form S-1 filed with the Securities and Exchange Commission, declared effective on September 30, 2020.

Each Series 1 Unit consisted of one share of the Company's common stock and one Series 2020-A Warrant to purchase one share of the Company's common stock (each, a "Series 2020-A Warrant"). Each Series 2 Unit consists of a pre-funded Series 2020-B warrant to purchase one share of the Company's common stock (each, a "Series 2020-B Warrant" and, together with the Series 2020-A Warrants, the "Warrants") and one Series 2020-A Warrant. The Series 2020-A Warrants are exercisable beginning on the date of original issuance and will expire five years from the date of issuance, at an exercise price of $0.60 per share. The pre-funded Series 2020-B Warrants are exercisable beginning on the date of issuance at a nominal exercise price of $0.01 per share of common stock any time until the Series 2020-B Warrants are exercised in full. In connection with the July 2020 Offering, the Company issued Series 2020-A Warrants to purchase an aggregate of 30,000,000 shares of common stock. As of December 31, 2020, all of the Series 2020-B Warrants were exercised.

The net proceeds to the Company from the July 2020 Offering were approximately $16.1 million, after deducting placement agent fees and other offering expenses payable by the Company, and not including any future proceeds from the exercise of the Warrants. The Company used the net proceeds from the July 2020 Offering to fund working capital and for other general corporate purposes.

During the year ended December 31, 2020, the Company received notices of exercise from holders of its Series 2020-A Warrants to issue an aggregate of 28,042,834 shares of common stock for total gross proceeds of approximately $16.8 million. During the year ended December 31, 2021, the Company received notices of exercise from holders of our Series 2020-A Warrants to issue an aggregate of 1,866,558 shares of common stock for total gross proceeds of approximately $1.1 million. As of December 31, 2021, there were 90,608 Series 2020-A Warrants outstanding.

At-the-Market Offering Program. In February 2018, the Company commenced an at-the-market offering program, which allows it to sell and issue shares of its common stock from time-to-time. In September 2021, the at-the-market offering program was amended to increase the available capacity to $500 million.

During the year ended December 31, 2021, the Company issued 24,420,579 shares of common stock under the at-the-market offering program for total proceeds of $135.8 million, net of commissions and other offering related expenses totaling $3.6 million.

During the year ended December 31, 2020, the Company issued 3,518,121 shares of common stock under the at-the-market offering program for total proceeds of $8.4 million, net of commissions and other offering related expenses totaling $0.2 million.

As of December 31, 2021, the Company has remaining capacity to issue up to approximately $500 million of common stock under the at-the-market offering program, respectively.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

2021 Bonds. On April 15, 2021, the Iowa Finance Authority (the "Authority") issued an aggregate principal amount of $68,155,000 of its Solid Waste Facility Revenue Bonds (Gevo NW Iowa RNG, LLC Renewable Natural Gas Project), Series 2021 (Green Bonds) (the "2021 Bonds") in a public offering for the benefit of Gevo RNG, a subsidiary of Gevo, to finance the construction of the Gevo RNG project.

The 2021 Bonds are reported at their amortized cost. The 2021 Bonds were issued at a premium of $0.8 million. Debt issuance costs totaled $3.0 million. The Company will amortize the debt issuance costs and the premium as a component of interest expense over the life of the related debt instrument using the interest method. The 2021 Bonds have been recorded as a long-term liability and will become current on the earlier of (i) one year prior to the Initial Mandatory Tender Date or (ii) upon the Company's exercise of its call option to tender or redeem the Bonds. See Note 14, *Debt*, for further information.

Significant Customers. The following table summarizes the customers making up greater than 10% of the Company's consolidated revenue for the three years ended December 31, 2021, 2020 and 2019 in addition to the segment where such revenue is reported:

		Year Ended December 31,		
	Segment (Note 21)	2021	2020	2019
Customer A	Gevo	53%	21%	—%
Customer B	Agri-Energy	24%	—%	—%
Customer C	Gevo	10%	—%	—%
Customer D	Agri-Energy	—%	52%	71%
Customer E	Agri-Energy	—%	15%	17%
Total		87%	88%	88%

Related Party Transaction. During the year ended December 31, 2020, Gevo paid Blocksize Capital GmbH ("Blocksize"), a company in which one director of Gevo had an indirect ownership interest, and Leaf Resources, a company in which one director of Gevo serves as a director, a total of $0.1 million for services rendered. The Company owed these companies a total of $0.1 million as of December 31, 2020. There were no related party transactions during the years ended December 31 2021 or 2019.

Restructuring Expenses. During the first quarter 2020, the Company terminated its ethanol production at the Luverne Facility. In addition, due to the impact of the COVID-19 pandemic on the global economy and the Company's industry, in March 2020, the Company reduced its workforce, impacting 26 people at the Luverne Facility and four people at the Company's corporate headquarters. Affected employees were offered a severance package which included a one-time payment, one month of health insurance and acceleration of vesting for any unvested restricted stock awards.

The Company intends to continue developing its hydrocarbon business, including the planned expansion of the Luverne Facility, and the Company expects to move forward in securing the project funding needed to expand the Luverne Facility. The expansion is designed to allow the Company to produce large quantities of sustainable aviation fuel and renewable gasoline. The Company also expects to continue engineering efforts for the construction of a commercial renewable hydrocarbon production facility, as well as additional decarbonization projects, at the Luverne Facility.

As of December 31, 2020, the Company had the following liabilities outstanding related to the restructuring expense included in "Accounts payable and accrued liabilities" in the Consolidated Balance Sheets ($0 at December 31, 2021) (in thousands):

	December 31, 2019	Additions	Payments	December 31, 2020
Severance (including payroll taxes)	$ —	$ 96	$ (96)	$ —
Lease agreements	—	158	(158)	—
Total	$ —	$ 254	$ (254)	$ —

4. Restricted Cash and Restricted Cash Equivalents

The Company's restricted cash and restricted cash equivalents consists of unused proceeds from the issuance of the 2021 Bonds which are restricted for the purpose of constructing the Gevo NW Iowa RNG, LLC Renewable Natural Gas Project as well as amounts pledged and assigned to Citibank, N.A., in its capacity as credit facility provider of the 2021 Bonds (the "Credit Facility Provider") as collateral for the reimbursement obligations of Gevo. As of December 31, 2021, the unused restricted bond proceeds of $24.0 million included in restricted cash is classified as current since the proceeds will be distributed within 12 months. As of December 31, 2021, the restricted collateral included in restricted cash totaled $71.2 million, $1.0 million of which secures interest payments to be made within 12 months and is classified as current. The Company is entitled to receive interest income on the restricted cash at an agreed rate of return of 0.10% but has no ability to direct the use of the restricted cash. See Note 14, *Debt*, for further information.

The proceeds from issuance of the 2021 Bonds are maintained by the Trustee under a Trust Indenture dated April 15, 2021 and released to the Company only to pay costs of the construction of the biogas facility operated by Gevo RNG. See Note 14, *Debt*, for further information on the Trust Indenture. As the proceeds of the 2021 Bonds are restricted, the amounts from bond trustee are also considered to be restricted cash. Restricted cash is included with cash and cash equivalents on the Statements of Cash Flows.

The restricted cash held by the bond trustee as of December 31, 2021 is made up of the following (in thousands):

Restricted Cash Held by Bond Trustee	
Bond proceeds	$ 68,995
Disbursement of funds	(44,780)
Interest paid on bonds	(216)
Interest income	11
Total restricted cash held by bond trustee	24,010
Total restricted collateral	71,190
Total restricted cash and restricted cash equivalents	95,200
Current portion	(25,032)
Long-term restricted cash and restricted cash equivalents	$ 70,168

5. Marketable Securities

The cost of marketable securities sold is based upon the specific identification method. During the year ended December 31, 2021, the Company recorded the following realized (loss) from the sale of available-for-sale marketable securities ($0 during the year ended December 31, 2020 or 2019) (in thousands):

Sales proceeds	$	79,574
Amortized cost		(79,664)
Realized (loss)	$	(90)

Interest receivable related to the marketable securities of $1.5 million was included within "Prepaid expenses and other current assets" on the accompanying Consolidated Balance Sheets as of December 31, 2021 ($0 at December 31, 2020).

Interest income totaled $0.5 million the year ended December 31, 2021 (nil during the years ended December 31, 2020 and 2019) and is included in "Interest and dividend income" in the Consolidated Statements of Operations.

Future maturities of the Company's marketable securities are $275.3 million in 2022 and $64.4 million in 2023.

6. Axens License

On September 22, 2021, Gevo entered into an agreement with Axens North America, Inc. (“Axens”) that establishes a strategic alliance aimed at accelerating the commercialization of sustainable alcohol-to-SAF projects in the United States. As part of the alliance, Axens brings technologies with over 60 related patents, engineering packages, proprietary catalysts and certain proprietary equipment required to convert ethanol into SAF. Axens would also provide process guarantees to Gevo for commercial alcohol-to-SAF projects. The Company paid a fee of $3.25 million in 2021 for Axens to provide certain alcohol-to-SAF services exclusively to Gevo for the first year of the agreement. The fee paid by the Company may be offset against future license fees and is included in "Other current assets" in the Consolidated Balance Sheets. The fee is included in the Gevo segment.

7. Intangible Assets

On September 21, 2021, the Company entered into an asset purchase agreement with Butamax Advanced Biofuels LLC and its affiliate, Danisco US Inc. (collectively, "Butamax"), pursuant to which the Company purchased all of Butamax’s rights, title and interests in certain U.S. and foreign patents and patent applications, subject to specified conditions and encumbrances, relating to the production, recovery and use of biobutanol that were owned by Butamax, for $9.2 million, including $0.2 million of legal fees. Management evaluated the patents to determine whether the patents (i) supported current products; (ii) supported planned research and development; or (iii) prevent others from competing with Gevo's products. Based on the Company's estimated purchase price allocation, approximately $4.3 million of the purchase price was allocated to the purchase of patents to support current products and planned product research and $4.9 million for patents purchased for defensive purposes. The patents are included in "Intangible assets" in the Consolidated Balance Sheets. The Gevo segment owns $8.8 million and the Agri-Energy segment owns $0.1 million of the net carrying amount of the patents.

Identifiable intangible assets were comprised of the following (in thousands):

	December 31, 2021			
	Gross Carrying Amount	**Accumulated Amortization**	**Net**	**Weighted Average Life (Years)**
Finite-lived intangible assets:				
Patents	$ 4,575	$ (368)	$ 4,207	7.3
Defensive assets	4,895	(164)	4,731	8.4
Identifiable tangible assets	$ 9,470	$ (532)	$ 8,938	7.9

	December 31, 2020			
	Gross Carrying Amount	**Accumulated Amortization**	**Net**	**Weighted Average Life (Years)**
Finite-lived intangible assets:				
Patents	$ 300	$ (186)	$ 114	5.2

Amortization expense was as follows (in thousands):

	Years Ended December 31,		
	2021	2020	2019
Related to cost of goods sold	$ 21	$ 21	$ 165
Related to research and development expense	161	—	—
Related to selling, general and administrative expense	164	—	—
Total	$ 346	$ 21	$ 165

The following table details the estimated net amortization of identifiable intangible assets as of December 31, 2021 (in thousands):

Year Ending December 31,	Patents	Defensive Assets	Total
2022	$ 599	$ 585	$ 1,184
2023	599	585	1,184
2024	600	587	1,187
2025	599	585	1,184
2026	585	585	1,170
Thereafter	1,225	1,804	3,029
Total	$ 4,207	$ 4,731	$ 8,938

8. Revenues from Contracts with Customers and Other Revenue

The Company's current and historical revenues have consisted of the following: (a) ethanol sales and related products revenue, net; (b) hydrocarbon revenue; and (c) other revenue, which has historically consisted primarily of revenues from governmental and cooperative research grants.

Ethanol sales and related products revenues, net. Ethanol sales and related products revenues, net, are sold to customers on a free-on-board, shipping point basis. Each transaction occurs independent of any other sale, and once sold, there are no future obligations on the part of the Company to provide post-sale support or promises to deliver future goods or services.

Hydrocarbon revenue. Hydrocarbon revenues include sales of SAF, isooctene and isooctane and are sold mostly on a free-on-board, shipping point basis. Each transaction occurs independent of any other sale, and once sold, there are no future obligations on the part of the Company to provide post-sale support or promises to deliver future goods or services.

Other revenue. Other revenue includes occasional short-term (less than one-year) consulting services and leases of certain storage facilities located at the Luverne Facility.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

The following table sets forth the components of the Company's revenues between those generated from contracts with customers and those generated from arrangements that do not constitute a contract with a customer (in thousands):

	Year Ended December 31, 2021		
Major Goods/Service Line	**Revenues from Contracts with Customers**	**Other Revenues**	**Total**
Ethanol sales and related products, net	$ 50	$ —	$ 50
Hydrocarbon revenue	483	—	483
Other revenue	—	178	178
	$ 533	$ 178	$ 711
Timing of Revenue Recognition			
Goods transferred at a point in time	$ 533	$ —	$ 533
Services transferred over time	—	178	178
	$ 533	$ 178	$ 711

	Year Ended December 31, 2020		
Major Goods/Service Line	**Revenues from Contracts with Customers**	**Other Revenues**	**Total**
Ethanol sales and related products, net	$ 3,809	$ —	$ 3,809
Hydrocarbon revenue	1,501	—	1,501
Other revenue	153	73	226
	$ 5,463	$ 73	$ 5,536
Timing of Revenue Recognition			
Goods transferred at a point in time	$ 5,310	$ —	$ 5,310
Services transferred over time	153	73	226
	$ 5,463	$ 73	$ 5,536

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

	Year Ended December 31, 2019		
Major Goods/Service Line	**Revenues from Contracts with Customers**	**Other Revenues**	**Total**
Ethanol sales and related products, net	$ 22,115	$ —	$ 22,115
Hydrocarbon revenue	2,338	—	2,338
Other revenue	—	34	34
	$ 24,453	$ 34	$ 24,487
Timing of Revenue Recognition			
Goods transferred at a point in time	$ 24,453	$ —	$ 24,453
Services transferred over time	—	34	34
	$ 24,453	$ 34	$ 24,487

Goods transferred at a point-in-time. For the years ended December 31, 2021, 2020 and 2019, there were no contracts with customers for which consideration was variable or for which there were multiple performance obligations for any given contract. Accordingly, the entire transaction price is allocated to the goods transferred. As of December 31, 2021 and 2020, there were no remaining unfulfilled or partially fulfilled performance obligations.

All goods transferred are tested to ensure product sold satisfies contractual product specifications prior to transfer. The customer obtains control of the goods when title and risk of loss for the goods has transferred, which in most cases is "free-on-board, shipping point". All material contracts have payment terms of between one to three months and there are no return or refund rights.

Services transferred over time. For the years ended December 31, 2021, 2020 and 2019, there were no contracts for which consideration was variable or for which there were multiple performance obligations for any given contract. Accordingly, the entire transaction price is allocated to the individual service performance obligation. As of December 31, 2021 and 2020, respectively, there were no material unfulfilled or partially fulfilled performance obligations.

Contract Assets and Trade Receivables. As of December 31, 2021 and 2020, there were no contract assets or liabilities as all customer amounts owed to the Company are unconditional and the Company does not receive payment in advance for its products. Accordingly, amounts owed by customers are included in "Accounts receivable, net" on the Company's Consolidated Balance Sheets. In addition, due to the nature of the Company's contracts, there are no costs incurred or to be paid in the future that qualify for asset recognition as a cost to fulfill or obtain a contract. The Company recorded an allowance for doubtful accounts for one customer which represents 27% of the trade accounts receivable as of December 31, 2021. The Company recorded $0 allowance for doubtful accounts as of December 31, 2020.

9. Leases, Right-of-Use Assets and Related Liabilities

The Company is party to an operating lease contract for the Company’s office and research facility in Englewood, Colorado, which expires in January 2029. The lease does not contain an option to extend the lease that is reasonably certain to be exercised. The Company also leases certain equipment under an operating lease at its Agri-Energy Facility that expires in 2025. All other operating leases qualified for the short-term scope exemption elected by the Company. The Company recognizes rent expense on its operating lease on a straight-line basis. The Company has elected the practical expedient to not separate lease components from non-lease components for these asset classes.

The Company also has four finance leases for land and fuel supply under arrangements related to Gevo RNG. Under these contracts, the Company leases land from dairy farmers on which it is building three anaerobic digesters, related equipment and pipelines to condition raw biogas from cow manure provided by the farmers. The partially conditioned biogas will be transported from the three digester sites to a central gas upgrade system located at the fourth site that will upgrade the biogas to pipeline quality natural gas for sale. These leases expire at various dates between 2031 and 2050. Certain leases provide the Company with the right to terminate the lease prior to the stated lease expiration date; however, the Company is reasonably certain not to exercise such termination right and thus periods beyond this termination right have been recognized as part of the Company’s right-of-use assets and lease liabilities. In addition, some of these leases include renewal periods that have been deemed to be reasonably certain to be exercised and as such have been recognized as part of the Company’s right-of-use assets and lease liabilities. The Company has elected the practical expedient to not separate lease components from non-lease components for this dairy lease asset class and therefore, all amounts paid to the lessor under these arrangements for cow manure and nonlease services are classified as lease payments and included in the calculation of the right-of-use assets and lease liabilities. This results in significantly higher right-of-use assets and lease liabilities than if the Company did not elect this practical expedient.

As of December 31, 2021 and 2020, right-of-use assets under operating and financing leases, operating and financing leases liabilities are included in the Consolidated Balance Sheets as follows:

	December 31,	
	2021	2020
Right-of-Use Assets		
Operating leases	$ 2,414	$ 133
Financing leases	27,297	176
Total	$ 29,711	$ 309
Operating Lease Liabilities		
Current	$ 772	$ 172
Long-term	1,902	—
Total	$ 2,674	$ 172
Financing Lease Liabilities		
Current	$ 3,413	$ 10
Long-term	17,797	162
Total	$ 21,210	$ 172

The Company leased its grain bins in Luverne, Minnesota in October 2020 through a short-term operating lease agreement which expired in July 2021. Rental income for the years ended December 31, 2021, 2020 and 2019 totaled $0.2 million, $0.1 million and $0, respectively.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

The following table presents the (i) costs by lease category and (ii) other quantitative information relating to the Company’s leases for the years ended December 31, 2021, 2020 and 2019 (in thousands):

	Years Ended December 31,		
	2021	2020	2019
Lease cost			
Financing lease cost			
Amortization of right-of-use assets (1)	$ 1,396	$ 5	$ —
Interest on lease liabilities (2)	906	—	—
Operating lease cost	240	605	1,554
Short-term lease cost	1,378	307	66
Variable lease cost (3)	260	144	119
Total lease cost	$ 4,180	$ 1,061	$ 1,739

(1) Amortization of right-of-use assets of $1.4 million was capitalized as part of "Construction in progress" during the year ended December 31, 2021 ($0 during the years ended December 31, 2020 and 2019) and included in "Property, plant and equipment, net" in the Consolidated Balance Sheets as the related Gevo RNG facilities are still under construction.
(2) Interest on lease liabilities of $0.9 million was capitalized as part of "Construction in progress" during the year ended December 31, 2021 (none during the years ended December 31, 2020 and 2019) and included in "Property, plant and equipment, net" in the Consolidated Balance Sheets as the related Gevo RNG facilities are still under construction.
(3) Represents amounts incurred in excess of minimum payments, including payments for common area expenses under our office and research facility lease, and additional amounts due under our Gevo RNG leases based on the number of cows maintained by the owners of the respective facilities.

	Years Ended December 31,		
	2021	2020	2019
Other Information			
Cash paid for the measurement of lease liabilities			
Operating cash flows from finance lease	$ 906	$ 6	$ —
Operating cash flows from operating leases	240	605	1,554
Finance cash flows from finance lease	7,189	2	—
Right-of-use asset obtained in exchange for new finance lease liabilities	28,514	—	—
Right-to-use assets obtained in exchange for new operating lease liabilities	2,593	192	280
Weighted-average remaining lease term, financing lease (months)	219	224	—
Weighted-average remaining lease term, operating leases (months)	70	7	21
Weighted-average discount rate - financing lease (4)	5%	13%	—%
Weighted-average discount rate - operating leases (5)	5%	12%	12%

(4)The discount rate used for the finance lease was based on the Company's incremental borrowing rate at the date the Company entered into the lease. The Company estimated the incremental borrowing rate based on collateralized borrowings for similar terms and payments.
(5)The discount rate used for operating leases is based on the Company's incremental borrowing rate at the date the Company entered into the lease. The Company estimated the incremental borrowing rate based on collateralized borrowings for similar terms and payments.

The table below shows the future minimum payments under financing leases and non-cancelable operating leases as of December 31, 2021 (in thousands):

Year Ending December 31,	Financing Leases	Operating Leases	Total
2022	$ 4,397	$ 881	$ 5,278
2023	1,713	528	2,241
2024	1,729	305	2,034
2025	1,743	315	2,058
2026	1,759	324	2,083
Thereafter	19,814	706	20,520
Total	31,155	3,059	34,214
Less: Amounts representing present value discounts	(9,945)	(385)	(10,330)
Total lease liabilities	21,210	2,674	23,884
Less: current portion	(3,413)	(772)	(4,185)
Long-term portion	$ 17,797	$ 1,902	$ 19,699

10. Inventories

The following table sets forth the components of the Company's inventory balances (in thousands):

	December 31,	
	2021	2020
Raw materials		
Corn	$ 301	$ —
Enzymes and other inputs	183	133
Nutrients	3	1
Palladium	265	235
Finished goods		
SAF, Isooctane and Isooctene	335	756
Isobutanol	223	—
Ethanol	96	—
Work in process		
Agri-Energy	83	—
Gevo	—	5
Spare parts	1,262	1,361
Total inventories	$ 2,751	$ 2,491

Work in process inventory includes unfinished SAF, isooctane and isooctene inventory. The Company recorded an expense for the write down to net realizable value for the year ended December 31, 2021 totaling $5.2 million as a result of restarted production of isobutanol. During the years ended December 31, 2020 and 2019, the Company recorded an expense for the write down to net realizable value of $1.2 and $0.2 million, respectively, due to the suspension of production in the first quarter 2020. These charges are included in "Cost of goods sold" in the Consolidated Statements of Operations.

11. Property, Plant and Equipment

The following table sets forth the Company's property, plant and equipment by classification (in thousands):

	Useful Life (in years)	December 31, 2021	December 31, 2020
Luverne Facility retrofit asset	20	$ 70,820	$ 70,820
Plant machinery and equipment	10	17,949	17,374
Site improvements	10	7,157	7,157
Lab equipment, furniture and fixtures and vehicles	5	6,811	6,396
Demonstration plant	2	3,597	3,597
Leasehold improvements, pilot plant, land and support equipment	2 to 7	2,802	2,523
Buildings	10	2,543	2,543
Computer, office equipment and software	3 to 6	2,332	1,983
Construction in progress	—	88,989	13,132
Total Property, plant and equipment		203,000	125,525
Less accumulated depreciation and amortization		(63,859)	(59,117)
Property, plant and equipment, net		$ 139,141	$ 66,408

The Company recorded depreciation and amortization expense related to property, plant and equipment as follows (in thousands):

	Year Ended December 31, 2021	2020	2019
Cost of goods sold	$ 4,457	$ 5,669	$ 6,282
Operating expenses			
Research and development expense	250	160	152
Selling, general and administrative expense	75	54	57
	325	214	209
Total	$ 4,782	$ 5,883	$ 6,491

12. Embedded Derivatives

Derivative Warrant Liability

The Company has warrants outstanding as of December 31, 2021 representing 97,734 shares of Gevo's common stock, which expire at various dates through July 6, 2025. The exercise prices of the warrants range from $0.60 to $2.00 as of December 31, 2021. Based on the terms of the warrant agreements, the Company has determined that all warrants issued between 2013 and 2019 qualify as derivatives and, as such, are included in "Accounts payable and accrued liabilities" on the Consolidated Balance Sheets and recorded at fair value each reporting period. The decrease (increase) in the estimated fair value of the warrants outstanding as of December 31, 2021, 2020 and 2019 represents an unrealized gain (loss) which has been included in "Other income (expense)" in the Consolidated Statements of Operations.

The following table sets forth information pertaining to shares issued upon the exercise of such warrants as of December 31, 2021:

	Issuance Date	Expiration Date	Exercise Price as of December 31, 2021	Shares Underlying Warrants on Issuance Date	Shares Issued Upon Warrant Exercises as of December 31, 2021	Shares Underlying Warrants as of December 31, 2021
Series K Warrants	February 17, 2017	February 17, 2022	$ 2.00	315,986	308,860	7,126
Series 2020-A Warrants (1)	July 6, 2020	July 6, 2025	$ 0.60	30,000,000	29,909,392	90,608
				30,315,986	30,218,252	97,734

(1) The Series 2020-A Warrants are equity-classified warrants.

The agreements governing the above warrants include the following terms:

- certain warrants have exercise prices which are subject to adjustment for certain events, including the issuance of stock dividends on the Company’s common stock and, in certain instances, the issuance of the Company’s common stock or instruments convertible into the Company’s common stock at a price per share less than the exercise price of the respective warrants;
- warrant holders may exercise the warrants through a cashless exercise if, and only if, the Company does not have an effective registration statement then available for the issuance of the shares of its common stock. If an effective registration statement is available for the issuance of its common stock a holder may only exercise the warrants through a cash exercise;
- the exercise price and the number and type of securities purchasable upon exercise of the warrants are subject to adjustment upon certain corporate events, including certain combinations, consolidations, liquidations, mergers, recapitalizations, reclassifications, reorganizations, stock dividends and stock splits, a sale of all or substantially all of the Company’s assets and certain other events; and
- in the event of an "extraordinary transaction" or a "fundamental transaction" (as such terms are defined in the respective warrant agreements), generally including any merger with or into another entity, sale of all or substantially all of the Company’s assets, tender offer or exchange offer, or reclassification of its common stock, in which the successor entity (as defined in the respective warrant agreements) that assumes the successor entity is not a publicly traded company, the Company or any successor entity will pay the warrant holder, at such holder’s option, exercisable at any time concurrently with or within 30 days after the consummation of the extraordinary transaction or fundamental transaction, an amount of cash equal to the value of such holder’s warrants as determined in accordance with the Black-Scholes option pricing model and the terms of the respective warrant agreement. In some circumstances, the Company or successor entity may be obligated to make such payments regardless of whether the successor entity that assumes the warrants is a publicly traded company.

During the year ended December 31, 2021, common stock was issued as a result of exercise of warrants as shown below (dollars in thousands):

	Common Stock Issued	Proceeds
Series K Warrants	200	$ 1
Series 2020-C Warrants	1,866,558	1,120
	1,866,758	$ 1,121

The following warrants were sold by the Company during the year ended December 31, 2020:

- In July 2020, the Company sold Series 2020-A Warrants to purchase 30,000,000 shares of the Company's common stock and Series 2020-B Warrants to purchase 9,103,334 shares of the Company's common stock, pursuant to an underwritten public offering.
- In August 2020, the Company sold Series 2020-C Warrants to purchase 16,532,232 shares of the Company's common stock, pursuant to a registered direct offering.

The Series 2020-A Warrants, Series 2020-B Warrants and Series 2020-C Warrants issued during 2020 are classified as component of permanent equity because they are freestanding financial instruments that are legally detachable and separately exercisable from the shares of common stock with which they were issued, are immediately exercisable, do not embody an obligation for the Company to repurchase its shares and permit the holders to receive a fixed number of shares of common stock upon exercise. In addition, the Warrants do not provide any guarantee of value or return. The Company valued the Series 2020-A Warrants, the Series 2020-B Warrants and the Series 2020-C Warrants at issuance using the Black-Scholes option pricing model and determined the fair value of the Series 2020-A Warrants, the Series 2020-B Warrants and the Series 2020-C Warrants to purchase the Company’s common stock at $8.3 million, $2.9 million and $21.4 million, respectively. The key inputs to the valuation model included a weighted average volatility of 130% to 141%, risk-free rate of 0.30% to 0.31% and an expected term of five years.

During the year ended December 31, 2020, common stock was issued as a result of exercise of warrants as described below (dollars in thousands):

	Common Stock Issued	Proceeds
Series 2020-A Warrants	28,042,834	$ 16,826
Series 2020-B Warrants	9,103,334	91
Series 2020-C Warrants	16,532,232	165
	53,678,400	$ 17,082

13. Accounts Payable and Accrued Liabilities

The following table sets forth the components of the Company's accounts payable and accrued liabilities in the Consolidated Balance Sheets (in thousands):

	December 31, 2021	December 31, 2020
Account payable - trade	$ 4,868	$ 897
Gevo RNG accrued project costs	11,000	—
Accrued employee compensation	4,678	1,960
Net-Zero 1 accrued project costs	5,010	—
Other accrued liabilities	2,732	1,086
Total accounts payable and accrued liabilities	$ 28,288	$ 3,943

14. Debt

2021 Bond Issuance

On April 15, 2021, 2021 Bonds were issued totaling $68,155,000. The 2021 Bonds initially bear interest at the rate of 1.50% per annum during the Initial Term Rate Period (as defined in the hereinafter defined Indenture), payable semi-annually on January 1 and July 1 of each year, commencing on July 1, 2021. The 2021 Bonds mature on April 1, 2042, are callable and remarketable on or after October 1, 2022, and are also subject to mandatory tender for purchase on April 1, 2024, pursuant to the terms of the Indenture (as defined below). The 2021 Bonds were issued at a premium of $0.8 million. Debt issuance costs totaled $3.0 million.

The 2021 Bonds were issued under a Trust Indenture, dated as of April 1, 2021 (the “Indenture”), between the Authority and Citibank, N.A., as trustee (the "Trustee"). The principal of and the interest on the 2021 Bonds is payable solely from (i) payments to be made by Gevo RNG to the Trustee pursuant to a separate financing agreement, dated as of April 1, 2021 (the "Bond Financing Agreement"), between Gevo RNG and the Authority, (ii) all moneys received by the Authority or the Trustee in respect of payment of the loan of the proceeds of the 2021 Bonds from the Authority to Gevo RNG pursuant to the Bond Financing Agreement, (iii) all moneys and investments in the "Bond Fund" established and maintained by the Trustee pursuant to the Indenture, including without limitation moneys received by the Trustee pursuant to the Letter of Credit (as defined below), (iv) all moneys and investments in the “Project Fund” established and maintained by the Trustee pursuant to the Indenture from proceeds of the sale of the 2021 Bonds, and (v) all income and profit from the investment of the foregoing moneys, excluding any payments received by the Authority pursuant to rights of the Authority to receive certain additional payments and reimbursements of expenses as set forth in the Bond Financing Agreement. Pursuant to the Bond Financing Agreement, the proceeds of the 2021 Bonds will be loaned to Gevo RNG (1) to finance in part the construction of the biogas facility to be developed, designed, constructed, owned and operated by or on behalf of Gevo RNG, which is comprised of (A) three anaerobic digesters and related equipment situated on dairy farms located in Northwest Iowa that will produce partially conditioned raw biogas from cow manure, (B) gathering pipelines to transport biogas to a centrally located gas upgrade system, (C) a centrally located gas upgrade system located in Doon, Iowa that will upgrade biogas to pipeline quality natural gas and interconnect to Northern Natural Gas’ interstate pipeline, and (D) other related improvements, (2) to capitalize a portion of the interest due on the 2021 Bonds during the Initial Term Rate Period to be used to reimburse the Credit Facility Provider (as defined below) for interest draws on the Letter of Credit during such period, and (3) to pay a portion of the costs of issuing the 2021 Bonds.

On April 15, 2021, Gevo obtained a letter of credit for $71.2 million (the “Letter of Credit”) from the Credit Facility Provider, pursuant to the terms of a letter of credit reimbursement agreement dated as of April 1, 2021 (the "Reimbursement Agreement"), between Gevo and the Credit Facility Provider. The Letter of Credit will permit the Trustee to draw thereon in accordance with its terms in amounts sufficient to pay the principal and purchase price of the 2021 Bonds and up to 203 days’ interest on the 2021 Bonds. Pursuant to the terms of the Reimbursement Agreement, Gevo is obligated to reimburse the Credit Facility Provider for amounts drawn under the Letter of Credit. It is expected that payments of the principal and interest on the 2021 Bonds, and the purchase price of 2021 Bonds that are tendered for mandatory purchase and not remarketed, will be made by draws on the Letter of Credit. Gevo has pledged and assigned restricted cash to the Credit Facility Provider as security for the reimbursement obligations of Gevo pursuant to the Reimbursement Agreement in an amount equal to the principal amount of the 2021 Bonds plus three years of interest payments on the 2021 Bonds.

Gevo anticipates remarketing the 2021 Bonds under revised terms that will include a long-term maturity date and be non-recourse to Gevo. Upon a successful remarketing, Gevo anticipates that the Letter of Credit, the Reimbursement Agreement and the associated pledge of cash will be terminated.

Loans Payable - Other

The equipment loans are secured by the related equipment.

In April 2020, the Company and Agri-Energy each entered into a loan agreement with Live Oak Banking Company, pursuant to which the Company and Agri-Energy obtained loans from the SBA PPP totaling $1.0 million in the aggregate (the "SBA Loans").

On April 15, 2021, the Small Business Administration forgave the entire balance of $0.5 million of the Company's and $0.1 million of Agri-Energy's loans and accrued interest obtained through the SBA PPP. The remaining SBA Loan for Agri-Energy totals $0.3 million, bears interest at 1.0% and matures in April 2025. Monthly payments of $8,000, including interest, began on June 5, 2021 and are payable through April 2025.

The SBA Loans are treated as debt on the Consolidated Balance Sheets and classified as "Loans payable – other (current)" and "Loans payable – other (long-term)". The Consolidated Statements of Operations classifies the interest as "Interest expense" and the loan forgiveness as "Gain on forgiveness of SBA Loans".

The summary of the 2021 Bonds and Loans payable - other at December 31, 2021 and 2020 are as follows (in thousands):

			Years Ended December 31,	
	Interest Rate	Maturity Date	2021	2020
2021 Bonds	1.5%	January 2042	$ 66,486	$ —
SBA Loans	1.0%	April 2025	320	1,006
Equipment	4% to 5%	February 2022 to December 2024	156	248
			66,962	1,254
Less current portion			(158)	(807)
Long-term portion			$ 66,804	$ 447

Included in the 2021 Bonds above is Bond Premium of $0.6 million and Debt Issuance Costs of $2.3 million in the principal portion as of December 31, 2021. Total interest of $2.4 million, $2.1 million and $2.7 million was incurred during the years ended December 31, 2021, 2020 and 2019, respectively. Interest of $1.2 million and nil relating to our borrowings, and interest of $0.9 million and nil relating to certain of our finance leases, was capitalized as part of "Construction in progress" and included in "Property, plant and equipment" in the Consolidated Balance Sheets for the years ended December 31, 2021 and 2020, respectively.

Future payments for the Company's long-term debt are as follows (in thousands):

Year Ending December 31,	Amount
2022	$ 158
2023	159
2024	66,616
2025	29
	$ 66,962

2020/2021 Notes

The following table sets forth information pertaining to the 2020/21 Notes which is included in the Company’s Consolidated Balance Sheets (in thousands):

	Principal Amount of 2020 Notes	Principal Amount of 2020/21 Notes	Debt Discount	Debt Issue Costs	Total Notes	2020 Notes Embedded Derivative	Total 2020 Notes and 2020/21 Notes Embedded Derivative
Balance, December 31, 2019	$ 14,053	$ —	$ (123)	$ (30)	$ 13,900	$ —	$ 13,900
Amortization of debt discount	—	—	405	—	405	—	405
Amortization of debt issue costs	—	—	—	30	30	—	30
Paid-in-kind interest	47	269	—	—	316	—	316
Exchange of 2020 Notes for 2020/21 Notes	(14,100)	14,100	—	—	—	—	—
Conversion of 2020/21 Notes into common Stock	—	(14,651)	—	—	(14,651)	—	(14,651)
Original issue discount paid with 2020/21 Notes	—	282	(282)	—	—	—	—
Fair value of 2020/21 embedded derivative liability upon issuance	—	—	—	—	—	2,848	2,848
Increase in fair value of 2020/21 Notes embedded derivative liability prior to conversion of 2020/21 Notes	—	—	—	—	—	5,759	5,759
Decrease in fair value of 2020/21 Notes embedded derivative liability upon conversion to common stock	—	—	—	—	—	(8,607)	(8,607)
Balance, December 31,2020	$ —	$ —	$ —	$ —	$ —	$ —	$ —

On April 19, 2017, the Company entered into an Exchange and Purchase Agreement (the "2017 Purchase Agreement") with WB Gevo, LTD (the "2017 Holder") the holder of the Company's 12% convertible senior secured notes due 2017 (the "2017 Notes"), which were issued under that certain Indenture dated as of June 6, 2014, by and among the Company, the guarantors party thereto, and Wilmington Savings Fund Society ("FSB"), as trustee and as collateral trustee (as supplemented, the "2017 Notes Indenture"), and Whitebox Advisors LLC ("Whitebox"), in its capacity as representative of the 2017 Holder. Pursuant to the terms of the 2017 Purchase Agreement, the 2017 Holder, subject to certain conditions, including approval of the transaction by the Company's stockholders (which was received on June 15, 2017), agreed to exchange all of the outstanding principal amount of the 2017 Notes for an equal principal amount of the 2020 Notes, plus an amount in cash equal to the accrued and unpaid interest (other than interest paid in kind) on the 2017 Notes (the "2017 Exchange"). On June 20, 2017, the Company completed the 2017 Exchange, terminated the 2017 Notes Indenture and cancelled the 2017 Notes.

The 2020 Notes had a maturity date of March 15, 2020 and were secured by a first lien on substantially all of our assets. The 2020 Notes had an interest rate equal to 12% per annum (with 2% potentially payable as PIK Interest (as defined and described below) at our option), payable on March 31, June 30, September 30 and December 31 of each year. To the extent that the Company paid any portion of the interest due on the 2020 Notes as PIK Interest, the maximum aggregate principal amount of 2020 Notes that would have been convertible into shares of the Company's common stock increased.

Under certain circumstances, the Company had the option to pay a portion of the interest due on the 2020 Notes by either (a) increasing the principal amount of the 2020 Notes by the amount of interest then due or (b) issuing additional 2020 Notes with a principal amount equal to the amount of interest then due (interest paid in the manner set forth in (a) or (b) being referred to as "PIK Interest").

Additional shares of the Company's common stock could also have become issuable pursuant to the 2020 Notes in the event the Company was required to make certain make-whole payments as provided in the 2020 Notes Indenture.

The 2020 Notes were convertible into shares of the Company's common stock, subject to certain terms and conditions. The initial conversion price of the 2020 Notes was equal to $14.72 per share of common stock, or 0.0679 shares of common stock per $1 principal amount of 2020 Notes.

2020/21 Notes

On January 10, 2020, the Company entered into an Exchange and Purchase Agreement (the "2020/21 Purchase Agreement") with the guarantors party thereto, the 2017 Holder and Whitebox, in its capacity as representative of the 2017 Holder. Pursuant to the terms of the 2020/21 Purchase Agreement, the 2017 Holder, subject to certain conditions, agreed to exchange all of the outstanding principal amount of the 2020 Notes, which was approximately $14.1 million including unpaid accrued interest, for approximately $14.4 million in aggregate principal amount of the Company's newly created 12% Convertible Senior Notes due 2020/21 (the "2020/21 Notes") (the "2020/21 Exchange"). On January 10, 2020, the Company completed the 2020/21 Exchange, terminated the 2017 Notes Indenture and cancelled the 2020 Notes. In addition, the Company entered into an Indenture by and among the Company, the guarantors named therein (the "2020/21 Notes Guarantors") and FSB, as trustee and as collateral trustee (the "2020/21 Notes Indenture"), pursuant to which the Company issued the 2020/21 Notes.

The 2020/21 Notes matured on December 31, 2020. The 2020/21 Notes bore interest at a rate equal to 12% per annum (with 4% payable as PIK Interest (as defined and described above)), payable on March 31, June 30, September 30 and December 31 of each year. In the event the Company pays any portion of the interest due on the 2020/21 Notes as PIK Interest, the maximum aggregate principal amount of 2020/21 Notes that could be convertible into shares of the Company's common stock will be increased.

The 2020/21 Notes were convertible into shares of the Company's common stock voluntarily by the 2017 Holder at the conversion price, subject to certain terms and conditions. The initial conversion price of the 2020/21 Notes was equal to $2.442 per share of the Company's common stock (the "2020/21 Notes Conversion Price"), or 0.4095 shares of the Company's common stock per $1 principal amount of 2020/21 Notes. The Company and the 2017 Holder may also mutually agree on other conversions of the 2020/21 Notes into shares of the Company's common stock on a monthly basis (a "Contractual Conversion") pursuant to the terms of the 2020/21 Notes Indenture. The 2020/21 Notes Conversion Price in a Contractual Conversion will be reduced to the lesser of the then-applicable 2020/21 Notes Conversion Price or a 10% discount to the average of the daily volume weighted average price of the Company's common stock for the three forward trading days prior to the date of the Contractual Conversion.

Each 2017 Holder has agreed not to convert its 2020/21 Notes into shares of the Company's common stock to the extent that, after giving effect to such conversion, the number of shares of the Company's common stock beneficially owned by such 2017 Holder and its affiliates would exceed 4.99% of the Company's common stock outstanding at the time of such conversion (the "4.99% Ownership Limitation"); provided that a 2017 Holder may, at its option and upon 61 days' prior notice to the Company, increase such threshold to 9.99% (the "9.99% Ownership Limitation"). If a conversion of 2020/21 Notes by a 2017 Holder would exceed the 4.99% Ownership Limitation or the 9.99% Ownership Limitation, as applicable, the 2020/21 Purchase Agreement contains a provision granting the 2017 Holder a fully funded prepaid warrant for such common stock with a term of nine months, subject to a six-month extension, which it can draw down from time to time.

The 2020/21 Notes did not contain any anti-dilution adjustments for future equity issuances that were below the 2020/21 Notes Conversion Price, and adjustments to the 2020/21 Notes Conversion Price would only generally be made in the event that there is a dividend or distribution paid on shares of the Company's common stock, a subdivision, combination or reclassification of the Company's common stock, or at the discretion of the Board of Directors of the Company in limited circumstances and subject to certain conditions.

The 2020/21 Notes were secured by a lien on substantially all of the assets of the Company and the 2020/21 Notes Guarantors, including intellectual property and real property, and were guaranteed by the Company's existing subsidiaries.

Under certain circumstances, the Company may file one or more registration statements on Form S-3 or amend filings in order to register shares of common stock for sale or resale, as necessary in connection with the 2020/21 Notes.

Conversion of 2020/21 Notes

On July 10, 2020, certain holders of the 2020/21 Notes converted $2.0 million in the aggregate principal amount of 2020/21 Notes (including the conversion of an additional $0.3 million for make-whole payment) into 4,169,426 shares of common stock pursuant to the terms of the indenture. In December 2020, certain holders of the 2020/21 Notes converted the remaining $12.7 million in aggregate principal amount of 2020/21 Notes (including the conversion of an additional $1.2 million for make-whole payment) into an aggregate of 5,672,654 shares of common stock pursuant to the terms of the 2020/21 Notes related Indenture. As a result, as of December 31, 2020, all obligations under the 2020/2021 Notes had been fully paid and satisfied, and the 2020/2021 Notes related indenture had been terminated in accordance with its terms at maturity on December 31, 2020. During the year ended December 31, 2020, the Company recognized an approximately $1.9 million loss on the conversion of the 2020/21 Notes into common stock within the Consolidated Statements of Operations as a result of the make-whole payments.

15. Equity Incentive Plans

2010 Stock Incentive Plan. In February 2011, the Company's stockholders approved the Gevo, Inc. 2010 Stock Incentive Plan (as amended and restated, the "2010 Plan"). The 2010 Plan provides for the grant of non-qualified stock options, incentive stock options, stock appreciation rights, restricted stock awards, restricted stock units and other equity awards to employees and directors of the Company. On June 9, 2021, with the approval of the shareholders, the 2010 Plan was amended and restated, which increased the number of shares of common stock reserved for issuance to a total of 22,980,074 shares. At December 31, 2021, 8,672,529 shares were available for future issuance under the 2010 Plan.

Restricted common stock activity during the year ended December 31, 2021 consisted of the following:

Period	Total Number of Restricted Shares Issued		Total Number of Non-Qualified Stock Options Granted		Vesting Periods Years		
January 1, 2021 to March 31, 2021	(121,499)	(1)	—			N/A	
April 1, 2021 to June 30, 2021	(89,673)	(2)(3)	—		0	to	4
July 1, 2021 to September 30, 2021	3,915,502	(2)(4)(6)	4,668,727	(5)(7)	2	to	3
October 1, 2021 to December 31, 2021	108,685	(2)(6)(8)	76,089	(7)(9)	2	to	4
Total	3,813,015		4,744,816				

(1)Includes shares of common stock cancelled related to unvested restricted stock awards of a director and an employee who resigned.
(2)Includes shares withheld from employees to cover tax withholding obligations upon the vesting of restricted stock awards.
(3)Includes restricted stock awards granted to employees April 7, 2021, May 3, 2021 and June 7, 2021.
(4)Includes restricted stock awards granted to employees and directors on August 20, 2021.
(5)Includes non-qualified stock options granted to employees and directors on August 20, 2021.
(6)Includes shares of common stock cancelled related to the unvested restricted stock awards of certain employees.
(7)Includes non-qualified stock options canceled related to unvested stock option awards granted to employees.
(8)Includes restricted stock awards granted to employees on December 10, 2021, December 13, 2021, December 16, 2021 and December 30, 2021.
(9)Includes non-qualified stock options granted to employees on December 10, 2021, December 13, 2021, December 16, 2021 and December 30,2021.

Employee Stock Purchase Plan. In February 2011, the Company's stockholders approved the ESPP. The offering periods for the ESPP are from January 1 to June 30 and from July 1 to December 31 of each calendar year. The Company has reserved 190 shares of common stock for issuance under the ESPP, of which 190 shares as of December 31, 2021 are available for future issuance. The purchase price of the common stock under the ESPP is 85% of the lower of the fair market value of a share of common stock on the first or last day of the purchase period. There were no purchases of common stock under the ESPP during 2021.

16. Stock-Based Compensation

Stock-Based Compensation Expense. The Company records stock-based compensation expense during the requisite service period for share-based payment awards granted to employees and non-employees.

The following table sets forth the Company's stock-based compensation expense (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Equity Classified Awards			
Stock options			
Cost of goods sold	$ 16	$ —	$ —
Research and development	681	—	—
Selling, general and administrative	1,990	—	—
Restricted stock awards			
Cost of goods sold	27	—	—
Research and development	1,345	481	228
Selling, general and administrative	3,641	1,620	993
Total equity classified awards	7,700	2,101	1,221
Liability Classified Awards			
Restricted stock			
Selling, general and administrative	2,165	—	—
Stock appreciation rights			
Research and Development	9	137	66
Selling, general and administrative	—	(113)	62
Total liability classified awards	2,174	24	128
Total stock-based compensation	$ 9,874	$ 2,125	$ 1,349

Stock Option Award Activity. Stock option activity under the Company's option plans at December 31, 2021 and changes during the year ended December 31, 2021 were as follows.

	Number of Options	Weighted-Average Exercise Price (1)	Weighted-Average Remaining Contractual Term (years)	Aggregate Intrinsic Value
Options outstanding at December 31, 2020	1,552	$ 556.13	5.6	$ —
Granted	4,762,004	$ 4.63		
Canceled or forfeited	(17,188)	$ 5,693.43		
Exercised	—	$ —		
Options outstanding at December 31, 2021	4,746,368	$ 5.11	9.6	$ —
Options exercisable at December 31, 2021	1,515	$ 429.54	4.6	$ —
Options vested and expected to vest at December 31, 2021	4,746,368	$ 5.11	9.6	$ —

(1) Exercise price of options outstanding range from $4 to $56,460 as of December 31, 2021.

The aggregate intrinsic values in the table above represent the total pretax intrinsic values (the difference between the closing price of Gevo's common stock on the last trading day of the 2021 calendar year and the exercise price, multiplied by the number of in-the-money stock option shares) that would have been received by the option holders had all in-the-money outstanding stock options been exercised on December 31, 2021.

No stock options vested during the year ended December 31, 2021. As of December 31, 2021, the total unrecognized compensation expense, net of estimated forfeitures, relating to stock options was $19.1 million, which is expected to be recognized over the remaining weighted-average period of approximately 2.6 years.

The following table sets forth the minimum and maximum Black-Scholes option pricing model assumptions and resulting grant date fair value for the stock options granted during the year ended December 31, 2021:

	Grant Date (1)		
Exercise price	$ 4.42	to	$ 5.38
Risk-free interest rate	0.87%	to	1.36 %
Expected dividend yield	—	to	—
Expected volatility factor	141%	to	142 %
Expected option life (years)	5.75	to	6.0
Weighted-average fair value	$ 4.06		$ 4.95

(1) There were no grants of stock options during the years ended December 31, 2020 and 2019.

There is a maximum contractual term of ten years for the share options. The Company settles stock option exercises with newly issued common shares. No tax benefits were realized by the Company in connection with these exercises as the Company maintains net operating loss carryforwards and has established a valuation allowance against the entire tax benefit.

Restricted Stock. The Company periodically grants restricted stock awards to employees and directors. The vesting period for restricted stock awards granted may be based upon a service period or based upon the attainment of performance objectives. The Company recognizes stock-based compensation over the vesting period, generally two to three years, for awards that vest based upon a service period.

Non-vested restricted stock awards at December 31, 2021 and changes during the year ended December 31, 2021 were as follows.

	Number of Shares	Weighted-Average Grant-Date Fair Value
Non-vested at December 31, 2020	4,701,556	$ 0.79
Granted	4,955,693	$ 5.08
Vested	(2,625,259)	$ 1.04
Canceled or forfeited	(149,488)	$ 1.31
Non-vested at December 31, 2021	6,882,502	$ 3.77

The total fair value of restricted stock that vested during the years ended December 31, 2021, 2020 and 2019 was $2.8 million, $1.5 million and $0.7 million, respectively. As of December 31, 2021, the total unrecognized compensation expense, net of estimated forfeitures, relating to restricted stock awards was $22.5 million, which is expected to be recognized over the remaining weighted-average period of approximately 2.4 years.

Stock Appreciation Rights. The Company granted 67,739 stock appreciation rights valued at an aggregate of $0.6 million on the respective dates of grant during the year ended December 31, 2018. The vesting period for stock appreciation rights granted are based upon a service period. The stock appreciation rights have the potential to be cash settled in the event there are insufficient shares available from the 2010 Plan and are therefore classified as a liability and remeasured at each reporting period based on the price of the Company's common stock.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

17. Income Taxes

As of December 31, 2021, the Company has a federal and state net operating loss (“NOL”) carryover of approximately $122.5 million and $64.3 million, respectively, available to offset future income for income tax reporting purposes. The Company’s ability to use the carryover net operating loss may be substantially limited or eliminated pursuant to Internal Revenue Code Section 382. A limitation may apply to the use of the net operation loss and credit carryforwards, under provisions of the Internal Revenue Code that are applicable if we experience an “ownership change”. That may occur, for example, as a result of trading in our stock by significant investors as well as issuance of new equity. Should these limitations apply, the carryforwards would be subject to an annual limitation resulting in a substantial reduction in the gross deferred tax.

We periodically evaluate our NOL carryforwards and whether certain changes in ownership have occurred that would limit our ability to utilize a portion of our NOL and tax credit carryforwards. We have evaluated whether we experienced an ownership change, as defined under Section 382, and determined that an ownership change did occur as of July 9, 2020 and January 22, 2021. NOL carryovers of approximately $66.2 million subject to the July 9, 2020 ownership change date are subject to a base $0.1 million annual limitation for each year following said ownership change. The Company will be able to utilize the annual limitation of the net operating loss carryforwards to offset future taxable incomes. NOL carryovers of approximately $17.9 million that occurred between the July 9, 2020 and January 22, 2021 ownership change dates are subject to a base $11.9 million annual limitation for each year following said ownership change.

The following table sets forth the tax effects of temporary differences that give rise to significant portions of the Company’s net deferred tax assets (in thousands):

	December 31,	
	2021	**2020**
Deferred tax assets, net:		
Net operating loss carryforwards	$ 29,277	$ 15,406
Operating lease assets	(7,881)	(82)
Operating lease liabilities	8,086	88
Depreciation	3,840	3,427
Restricted stock	1,146	992
Business interest expense	1,165	1,441
Other temporary differences	886	321
Deferred tax assets	36,519	21,593
Valuation allowance	(36,519)	(21,593)
Net deferred tax assets	$ —	$ —

The Company recognizes uncertain tax positions net, against any operating losses or applicable research credits as they arise. Currently, there are no uncertain tax positions recognized at December 31, 2021 and 2020, respectively.

ASC 740, *Income Taxes*, provides for the recognition of deferred tax assets if realization of such assets is more likely than not to occur. Based on management’s review of both the positive and negative evidence, which includes our historical operating performance, reported cumulative net losses since inception and difficulty in accurately forecasting results, we have concluded that it is not more likely than not that we will be able to realize all of our U.S. deferred tax assets. Therefore, we have provided a full valuation allowance against deferred tax assets at December 31, 2021 and 2020, respectively.

The following table sets forth reconciling items from income tax computed at the statutory federal rate:

	Year Ended December 31,		
	2021	**2020**	**2019**
Federal income tax at statutory rate	21.0%	21.0%	21.0%
State income taxes, net of federal benefits	3.8%	4.1%	7.0%
Impact of change in statutory tax rates	—	(0.8%)	(0.2%)
Impact of NOL write-offs	—	(250.4%)	—
Impact of Research and Development credit write-off	—	(8.7%)	—
Permanent deductions	0.3%	(5.3%)	(0.1%)
Valuation allowance	(25.2)%	240.1%	(27.7%)
Effective tax rate	—%	—%	—%

Accounting literature regarding liabilities for unrecognized tax benefits provides guidance for the recognition and measurement in financial statements of uncertain tax positions taken or expected to be taken in a tax return. The Company's evaluation was performed for the tax periods from inception to December 31, 2021. The Company is subject to examination by major tax jurisdictions for the years ended December 31, 2016 to 2021.

18. Employee Benefit Plan

The Company's employees participate in the Gevo, Inc. 401(k) Plan (the "401(k) Plan"). Subject to certain eligibility requirements, the 401(k) Plan covers substantially all employees after three months of service with quarterly entry dates. Employee contributions are deposited by the Company into the 401(k) Plan and may not exceed the maximum statutory contribution amount. The Company may make matching and/or discretionary contributions to the 401(k) Plan. The Company did not provide an employer match during the years ended December 31, 2021, 2020 or 2019.

19. Commitments and Contingencies

Legal Matters. From time to time, the Company has been and may again become involved in legal proceedings arising in the ordinary course of its business. The Company is not aware of any pending or threatened litigation against the Company that it believes could have a material adverse effect on its business, operating results, financial condition or cash flows.

Indemnifications. In the ordinary course of its business, the Company makes certain indemnities under which it may be required to make payments in relation to certain transactions. As of December 31, 2021 and 2020, the Company did not have any liabilities associated with indemnities.

In addition, the Company, as permitted under Delaware law and in accordance with its certificate of incorporation and bylaws, in each case, as amended to date, indemnifies its officers and directors for certain events or occurrences, subject to certain limits, while the officer or director is or was serving at the Company's request in such capacity. The duration of these indemnifications, commitments, and guarantees varies and, in certain cases, is indefinite. The maximum amount of potential future indemnification is unlimited; however, the Company has a director and officer insurance policy that may enable it to recover a portion of any future amounts paid. The Company accrues for losses for any known contingent liability, including those that may arise from indemnification provisions, when future payment is probable. No such losses have been recorded to date.

Environmental Liabilities. The Company's operations are subject to environmental laws and regulations adopted by various governmental authorities in the jurisdictions in which it operates. These laws require the Company to investigate and remediate the effects of the release or disposal of materials at its locations. Accordingly, the Company has adopted policies, practices and procedures in the areas of pollution control, occupational health and the production, handling, storage and use of hazardous materials to prevent material environmental or other damage, and to limit the financial liability which could result from such events. Environmental liabilities are recorded when the Company's liability is probable, and the costs can be reasonably estimated. No environmental liabilities have been recorded as of December 31, 2021.

20. Fair Value Measurements and Fair Value of Financial Instruments

The carrying value and fair value, by fair value hierarchy, of the Company's financial instruments at December 31, 2021 and 2020 are as follows (in thousands):

		Fair Value Measurements at December 31, 2021		
	Fair Value at December 31, 2021	**Quoted Prices in Active Markets for Identical Assets (Level 1)**	**Significant Other Observable Inputs (Level 2)**	**Significant Unobservable Inputs (Level 3)**
Recurring				
Marketable securities				
U.S. Treasury notes	$ 225,792	$ 225,792	$ —	$ —
U.S. Government sponsored enterprise securities	113,944	113,944	—	—
Other				
Liability-classified restricted stock awards	702	702	—	—
Total recurring	$ 340,438	$ 340,438	$ —	$ —
Nonrecurring				
Corn and palladium inventory	$ 566	$ 566	$ —	$ —

		Fair Value Measurements at December 31, 2020		
	Fair Value at December 31, 2020	**Quoted Prices in Active Markets for Identical Assets (Level 1)**	**Significant Other Observable Inputs (Level 2)**	**Significant Unobservable Inputs (Level 3)**
Nonrecurring				
Finished goods inventory	$ 866	$ 235	$ 631	$ —

The following table summarizes the Company's investments in marketable securities as of December 31, 2021 (none at December 31, 2020) (in thousands):

	Maturity	Amortized Cost Basis	Gross Unrealized Losses	Fair Value
Short-term marketable securities				
U.S. Treasury notes	Within one year	$ 226,136	$ (344)	$ 225,792
U.S. Government-sponsored enterprise securities	Within one year	49,618	(70)	49,548
Total		$ 275,754	$ (414)	$ 275,340
Long-term marketable securities				
U.S. Government-sponsored enterprise securities	Within two years	$ 64,596	$ (200)	$ 64,396

There were no transfers between Level 1 and Level 2 inputs. There were no transfers in or out of Level 3 inputs. There were no issuances, purchases, sales or settlements of Level 3 inputs during the year ended December 31, 2021 or 2020.

For the 2021 Bonds, the fair values are estimated using the Black-Derman-Toy interest rate lattice framework. The carrying values and estimated fair values of the 2021 bonds as of December 31, 2021 are summarized as follows:

	Carrying Value	Estimated Fair Value
2021 Bonds	$ 68,155	$ 68,380

Fair Value Methodology

Inventories. The Company records its corn and palladium inventory at net realizable value only when the Company’s cost of corn and palladium purchased exceeds the market value for corn. The Company determines the market value of corn and palladium based upon Level 1 inputs using quoted market prices.

Marketable Securities. The Company's investments in marketable securities are stated at fair value and are available-for-sale.

The Company has not elected the fair value option for any of its instruments.

While the Company believes that its valuation methods are appropriate and consistent with other market participants, it recognizes that the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different estimate of fair value at the reporting date.

21. Segments

The Company's chief operating decision maker is provided with and reviews a monthly executive package which separately identifies its business segments based on the nature of the products and services offered through each of its consolidated legal entities. In January 2021, the Company began to separately identify the Renewal Natural Gas segment and Net-Zero segment in the monthly executive package. As such, the Company has determined that it has four operating segments: (i) Gevo segment; (ii) Agri-Energy segment; (iii) Renewable Natural Gas segment; and (iv) Net-Zero segment. Transactions between segments are eliminated in consolidation.

Gevo Segment. The Gevo segment is responsible for all research and development activities related to the future production of renewable hydrocarbons, including the development of our proprietary biocatalysts, the production and sale of SAF and the next generation of chemicals and biofuels that will be based on the Company's isobutanol technology. The Gevo segment also develops, maintains and protects its intellectual property portfolio, develops future markets for its renewable hydrocarbons and provides corporate oversight services.

Agri-Energy Segment. The Agri-Energy segment is currently responsible for the operation of the Company's Luverne Facility and the current production of isobutanol, ethanol and related products. Isobutanol production will be used as a feedstock for us to produce SAF and renewable premium gasoline to fulfill existing sales contracts.

Renewable Natural Gas Segment. The Renewable Natural Gas segment is nearing completion of its construction and commissioning and is expected to produce low-carbon methane from the manure of cows and pigs for the production of energy.

Net-Zero Segment. The Net-Zero segment will be responsible for the production of energy dense liquid hydrocarbons using renewable energy and proprietary technology at Gevo's Net Zero Projects.

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

The Company's chief operating decision maker is provided with and reviews the financial results of each of the Company's consolidated legal entities, Gevo, Inc., Gevo Asset, LLC, Gevo RNG Holdco, LLC, Gevo NW Iowa RNG, LLC, Gevo Net-Zero Holdco, LLC, Gevo Net-Zero 1, LLC and Agri-Energy, LLC. The Company organizes its business segments based on the nature of the products and services offered through each of its consolidated legal entities. All revenue is earned and all assets are held in the U.S.

	Year Ended December 31,		
	2021	2020	2019
		(In thousands)	
Revenues from external customers			
Gevo	$ 483	$ 1,650	$ 2,338
Agri-Energy	228	3,886	22,149
Renewable Natural Gas	—	—	—
Net-Zero	—	—	—
Consolidated	$ 711	$ 5,536	$ 24,487
Loss from operations			
Gevo	$ (33,080)	$ (13,215)	$ (12,360)
Agri-Energy	(16,605)	(12,047)	(13,995)
Renewable Natural Gas	(1,153)	(1,294)	—
Net-Zero	(9,252)	(405)	—
Consolidated	$ (60,090)	$ (26,961)	$ (26,355)
Interest expense			
Gevo	$ 67	$ 2,075	$ 2,738
Agri-Energy	17	19	—
Renewable Natural Gas	167	—	—
Net-Zero	—	—	—
Consolidated	$ 251	$ 2,094	$ 2,738
Depreciation and amortization expense			
Gevo	$ 650	$ 214	$ 210
Agri-Energy	4,475	5,690	6,446
Renewable Natural Gas	3	—	—
Net-Zero	—	—	—
Consolidated	$ 5,128	$ 5,904	$ 6,656
Acquisitions of licenses, patents, plant, property and equipment			
Gevo	$ 10,799	$ 4,501	$ 130
Agri-Energy	5,716	1,716	6,367
Renewable Natural Gas	52,470	—	—
Net-Zero	25,796	—	—
Consolidated	$ 94,781	$ 6,217	$ 6,497
Revenue by geographic area			
United States	$ 322	$ 4,082	$ 22,149
Other	389	1,454	2,338
Consolidated	$ 711	$ 5,536	$ 24,487

GEVO, INC.
Notes to Consolidated Financial Statements (Continued)

	December 31, 2021	December 31, 2020
Construction in Process		
Gevo	$ 442	$ 8
Agri-Energy	9,122	8,645
Renewable Natural Gas	56,879	4,479
Net-Zero	22,546	—
Consolidated	$ 88,989	$ 13,132

	December 31, 2021	December 31, 2020
Total assets		
Gevo	$ 555,877	$ 152,177
Agri-Energy	153,494	131,893
Renewable Natural Gas	116,644	—
Net-Zero	44,763	—
Intercompany eliminations (1)	(204,302)	(131,971)
Consolidated (2)	$ 666,476	$ 152,099

(1) Includes intercompany sales of nil and $0.1 million during the years ended December 31, 2021 and 2020, respectively, for hydrocarbon sales.
(2) All other significant non-cash items relate to the activities of Gevo.

22. Subsequent Events

On January 27, 2022, the Company’s stockholders voted approved to amend the Certificate of Incorporation to increase the total number of authorized shares of common stock from 250,000,000 shares to 500,000,000 shares.

On February 7, 2022, an incident occurred at one of the anaerobic digesters that is part of Gevo's RNG project that resulted in the accidental discharge of a mixture of water and manure into the environment. The Company promptly notified the Iowa Department of Natural Resources (the "DNR") and began mitigation work to minimize the impact of the discharge. The DNR has issued Gevo a notice of violation in connection with the discharge. There is a possibility that the Iowa Department of Natural Resources will initiate an enforcement action that could result in a monetary sanction against Gevo for the accidental discharge. Gevo does not believe that any such monetary sanction would be material or exceed $300,000.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures, as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, that are designed to provide reasonable assurance that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC rules and regulations, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Principal Financial Officer, as appropriate, to allow timely decisions regarding required financial disclosures. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Based on their evaluation as of December 31, 2021, our Chief Executive Officer and our Chief Financial Officer concluded that our disclosure controls and procedures were effective as of December 31, 2021.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act. Our internal control over financial reporting is a process 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. Our internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Under the supervision and with the participation of our management, including our Chief Executive Officer and our Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework set forth in *Internal Control—Integrated Framework* (2013 framework) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based upon the results of the evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2021.

The effectiveness of our internal control over financial reporting as of December 31, 2021 has been audited by Grant Thornton LLP, an independent registered public accounting firm, as stated in its attestation report which is included herein.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting during the quarter ended December 31, 2021 that have materially affected, or reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders
Gevo, Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Gevo, Inc. (a Delaware corporation) and subsidiaries (the "Company") as of December 31, 2021, based on criteria established in the 2013 Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on criteria established in the 2013 Internal Control—Integrated Framework issued by COSO.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated financial statements of the Company as of and for the year ended December 31, 2021, and our report dated February 24, 2022 expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process 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. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ GRANT THORNTON LLP

Denver, Colorado
February 24, 2022

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this item is incorporated by reference to our definitive proxy statement for the 2022 annual meeting of stockholders to be filed with the SEC within 120 days after our fiscal year ended December 31, 2021.

We have a written code of business conduct and ethics in place that applies to all of our directors, officers and employees, including our principal executive officer and principal financial officer. A copy of our code of ethics is available on our website: https://investors.gevo.com/corporate/corporate-governance/. We are required to disclose certain changes to, or waivers from, that code for our senior financial officers. We intend to use our website as a method of disseminating any change to, or waiver from, our code of ethics as permitted by applicable SEC rules.

Item 11. Executive Compensation

The information required by this item is incorporated by reference to our definitive proxy statement for the 2022 annual meeting of stockholders to be filed with the SEC within 120 days after our fiscal year ended December 31, 2021.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this item is incorporated by reference to our definitive proxy statement for the 2022 annual meeting of stockholders to be filed with the SEC within 120 days after our fiscal year ended December 31, 2021.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this item is incorporated by reference to our definitive proxy statement for the 2022 annual meeting of stockholders to be filed with the SEC within 120 days after our fiscal year ended December 31, 2021.

Item 14. Principal Accountant Fees and Services

The information required by this item is incorporated by reference to our definitive proxy statement for the 2022 annual meeting of stockholders to be filed with the SEC within 120 days after our fiscal year ended December 31, 2021.

PART IV

Item 15. Exhibits, Financial Statement Schedules

(a)(1) Financial Statements

The following Consolidated Financial Statements are included:

(a)(2) Financial Statement Schedules

All financial statement schedules have been omitted because they are not applicable or are not required, or because the information required to be set forth therein is included in the Consolidated Financial Statements or notes thereto.

(a)(3) Exhibits

Exhibit No.	Description	Incorporated by Reference Form	File No.	Filing Date	Exhibit	Filed Herewith
3.1	Amended and Restated Certificate of Incorporation of Gevo, Inc.					X
3.2	Second Amended and Restated Bylaws of Gevo, Inc.	8-K	001-35073	November 24, 2021	3.1	
4.1	Form of Gevo, Inc. Common Stock Certificate.	S-1	333-168792	January 19, 2011	4.1	
4.2	Form of Series 2020-A Warrant.	8-K	001-35073	July 8, 2020	4.1	
4.3	Description of Securities.					X
10.1†	License Agreement, dated July 12, 2005, by and between Gevo, Inc. and the California Institute of Technology.	S-1	333-168792	November 4, 2010	10.6	
10.2†	Amendment No. 4, dated October 1, 2010, to the License Agreement, by and between Gevo, Inc. and the California Institute of Technology, dated July 12, 2005.	S-1	333-168792	October 21, 2010	10.10	
10.3#	Gevo, Inc. Amended and Restated 2010 Stock Incentive Plan.	8-K	001-35073	June 11, 2021	10.1	
10.4#	Form of Restricted Stock Unit Agreement under the Amended and Restated 2010 Stock Incentive Plan.	S-1	333-168792	January 19, 2011	10.15	
10.5#	Form of Restricted Shares Award Agreement under the Amended and Restated 2010 Stock Incentive Plan.	10-Q	001-35073	August 8, 2018	10.7	
10.6#	Form of Stock Option Award Agreement under the Amended and Restated 2010 Stock Incentive Plan.	10-Q	001-35073	August 8, 2018	10.6	

Exhibit No.	Description	Incorporated by Reference Form	File No.	Filing Date	Exhibit	Filed Herewith
10.7#	Form of Stock Appreciation Rights Award Agreement under the Amended and Restated 2010 Stock Incentive Plan.	10-Q	001-35073	August 8, 2018	10.8	
10.8#	Gevo, Inc. Employee Stock Purchase Plan.	S-8	333-172771	March 11, 2011	4.7	
10.9#	Gevo, Inc. Executive Health Management Plan.	10-Q	001-35073	November 2, 2011	10.1	
10.10#	Form of Indemnification Agreement between Gevo, Inc. and its directors and officers.	S-1	333-168792	January 19, 2011	10.33	
10.11#	Employment Agreement, dated June 4, 2010, by and between Gevo, Inc. and Patrick Gruber.	S-1	333-168792	November 4, 2010	10.14	
10.12#	Amendment Agreement, dated December 21, 2011, by and between and Patrick Gruber.	8-K	001-35073	December 27, 2011	10.1	
10.13#	Second Amendment Agreement, dated February 16, 2015, by and between Gevo, Inc. and Patrick Gruber.	8-K	001-35073	February 17, 2015	10.1	
10.14#	Employment Agreement, dated June 4, 2010, by and between Gevo, Inc. and Christopher Ryan.	S-1	333-168792	November 4, 2010	10.16	
10.15#	Offer of Employment Letter, dated December 21,2015, by and between Gevo, Inc. and Geoffrey T. Williams, Jr.	10-Q	001-35073	May 9, 2017	10.1	
10.16#	Change of Control Agreement for Geoffrey T. Williams, Jr., dated February 18, 2016.	10-Q	001-35073	May 9, 2017	10.2	
10.17#	Offer Letter, dated November 9, 2019, by and between Gevo, Inc. and L. Lynn Smull.	8-K	001-35073	November 15, 2019	10.1	

Exhibit No.	Description	Incorporated by Reference Form	File No.	Filing Date	Exhibit	Filed Herewith
10.18#	Offer Letter dated February 22, 2018 by and between Gevo, Inc. and Timothy J. Cesarek	10-Q	001-35073	May 13, 2020	10.1	
10.19#	Offer Letter, dated February 16, 2021, by and between Gevo Inc. and Paul Bloom.	10-Q	001-35073	May 14, 2021	10.6	
10.20†	Price Risk Management, Origination and Merchandising and between Agri-Energy, LLC and FCStone Merchant Services, LLC	10-Q	001-35073	August 7, 2015	10.3	
10.21 ‡	Unsecured Guaranty Agreement, dated June 1, 2015, by Gevo, Inc. in favor of FCStone Merchant Services, LLC.	10-Q	001-35073	August 7, 2015	10.5	
10.22+†	Fuel Sales Agreement, dated October 28, 2019, by and between Gevo, Inc. and Scandinavian Airlines System.	8-K	001-35073	February 22, 2021	10.1	
10.23+†	Amendment No. 1 to Fuel Sales Agreement, dated February 16, 2021, by and between Gevo, Inc. and Scandinavian Airlines System.	8-K	001-35073	February 22, 2021	10.2	
10.24†	First Amendment to Price Risk Management, Origination and Merchandising Agreement, dated December 21, 2017, Agri-Energy, LLC and FCStone Merchant Services, LLC.	10-K	001-35073	March 28, 2018	10.28	
10.25†	Settlement Agreement and Mutual Release, dated August 22, 2015, by and among Gevo, Inc., Butamax Advanced Biofuels, LLC, E.I. du Pont de Nemours & Company and BP Biofuels North America LLC.	10-Q	001-35073	November 5, 2015	10.2	
10.26†	Patent Cross-License Agreement, dated August 22, 2015, by and between Gevo, Inc. and Butamax Advanced Biofuels LLC.	10-Q	001-35073	November 5, 2015	10.3	
10.27	Joint Development Agreement, dated April 4, 2019, by and between Gevo, Inc. and Praj Industries Ltd.	8-K	001-35073	April 9, 2019	10.2	
10.28+	Development License Agreement, dated April 4, 2019, by and between Gevo, Inc. and Praj Industries Ltd.	8-K	001-35073	April 9, 2019	10.3	
10.29†	Renewable Isooctane Purchase and Sale Agreement, dated February 21, 2019 by and between Gevo, Inc. and HCS Group GmbH.	8-K	001-35073	February 27, 2019	10.1	

Exhibit No.	Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Filing Date	Exhibit	
10.30†	At-The-Market Offering Agreement, dated February 13, 2018, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	February 13, 2018	1.1	
10.31	Amendment to At-The-Market Offering Agreement and Engagement Agreement, dated June 20, 2018, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	June 20, 2018	1.2	
10.32†	Amendment to At-The-Market Offering Agreement, dated June 25, 2018, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	June 25, 2018	1.3	
10.33	Amendment to At-The-Market Offering Agreement and Engagement Agreement, dated June 28, 2018, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	June 28, 2018	1.4	
10.34	Amendment to At-The-Market Offering Agreement and Engagement Agreement, dated August 15, 2019, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	August 15, 2019	1.5	
10.35	Amendment to At-The-Market Offering Agreement, dated December 30, 2020, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	December 30, 2020	10.1	
10.36	Amendment to At-The-Market Offering Agreement, dated September 9, 2021, between Gevo, Inc. and H.C. Wainwright & Co., LLC.	8-K	001-35073	September 9, 2021	10.1	
10.37+	Renewable ATJ Purchase and Sale Agreement, effective July 26, 2019, by and between Gevo, Inc. and Air Total International, S.A.	8-K	001-35073	August 13, 2019	10.1	
10.38+	Fuel Sales Agreement, dated as of December 11, 2019, by and between Gevo, Inc. and Delta Air Lines, Inc.	8-K	001-35073	December 17, 2019	10.1	
10.39+	Amendment No. 1 to Fuel Sales Agreement, dated as of April 22, 2020, by and between the Company and Delta Air Lines, Inc.	8-K	001-35073	April 28, 2020	10.1	
10.40+	Master Framework Agreement, dated August 13, 2020, by and between Gevo, Inc. and Praj Industries Ltd.	8-K	001-35073	August 18, 2020	10.1	

Exhibit No.	Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Filing Date	Exhibit	
10.41+	Renewable Hydrocarbons Purchase and Sale Agreement, dated August 14, 2020, by and between Gevo, Inc. and Trafigura Trading LLC.	8-K	001-35073	August 20, 2020	10.1	
10.42+	Base Contract for Sale and Purchase of Natural Gas, dated July 22, 2021, by and between Gevo NW Iowa RNG, LLC, BP Canada Energy Marketing Corp. and BP Products North America Inc.	8-K	001-35073	August 9, 2021	10.1	
10.43+	Special Provisions Attached to and Forming Part of the Base Contract for Sale and Purchase of Natural Gas dated July 22, 2021, by and between Gevo NW Iowa RNG, LLC, BP Canada Energy Marketing Corp. and BP Products North America Inc.	8-K	001-35073	August 9, 2021	10.2	
10.44+	Biogas Supply Addendum – Vehicle Fuel Segment-Supply Side, dated July 22, 2021, by and between Gevo NW Iowa RNG, LLC, BP Canada Energy Marketing Corp. and BP Products North America Inc.	8-K	001-35073	August 9, 2021	10.3	
10.56+	Transaction Confirmation relating to the Base Contract, by and between Gevo NW Iowa RNG, LLC and BP Canada Energy Marketing Corp.	8-K	001-35073	August 9, 2021	10.4	
10.46+††	Asset Purchase Agreement, date September 21, 2021, between Butamax Advanced Biofuels LLC and Danisco US Inc., and Gevo, Inc.	8-K	001-35073	September 23, 2021	10.1	
10.47	Amendment No. 1 to Renewable Hydrocarbons Purchase and Sale Agreement, date August 14, 2020, between Gevo, Inc. and Trafigura Trading LLC	8-K	001-35073	October 6, 2021	10.2	
10.48+	Fuel Supply Agreement, dated December 2, 2021, by and between Gevo, Inc. and Kolmar Americas, Inc.	8-K	001-35073	December 7, 2021	10.1	
10.49	Bond Financing Agreement, dated as of April 1, 2021, by and between Gevo NW Iowa RNG, LLC and the Iowa Finance Authority.	8-K	001-35073	April 15, 2021	10.1	
10.50++	Letter of Credit Reimbursement Agreement, dated as of April 1, 2021, by and between Gevo, Inc. and Citibank, N.A.	8-K	001-35073	April 15, 2021	10.2	

Exhibit No.	Description	Incorporated by Reference: Form	File No.	Filing Date	Exhibit	Filed Herewith
21.1	List of Subsidiaries.					X
23.1	Consent of Grant Thornton LLP.					X
31.1	Section 302 Certification of the Principal Executive Officer.					X
31.1	Section 302 Certification of the Principal Financial Officer.					X
32.1 *	Section 906 Certifications of the Principal Executive Officer and the Principal Financial Officer.					X *
101	Interactive Data Files Pursuant to Rule 405 of Regulation S-T: (i) Consolidated Balance Sheets at December 31, 2021 and December 31, 2020, (ii) Consolidated Statements of Operations for each of the three years in the period ended December 31, 2021, (iii) Consolidated Statements of Comprehensive Income (Loss) for the three years in the period ended December 31, 2021, (iv) Consolidated Statements of Stockholders' Equity for each of the three years in the period ended December 31, 2021, (v) Consolidated Statements of Cash Flows for each of the three years in the period ended December 31, 2021; and (xi) Notes to the Consolidated Financial Statements. The cover page XBRL tags are embedded within the Inline XBRL document.					X
104	Cover Page Interactive Data File (embedded within the Inline XBRL and contained in Exhibit 101)					

† Certain portions have been omitted pursuant to a confidential treatment request. Omitted information has been filed separately with the SEC.

\+ Certain portions of the exhibit have been omitted pursuant to Rule 601(b)(10) of Regulation S-K. The omitted information is (i) not material and (ii) would likely cause competitive harm to the Company if publicly disclosed.

++ Confidential portions of the exhibit have been redacted from the filed version of the exhibit and are marked with a ***

†† Schedules have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The Company hereby undertakes to supplementally furnish copies of any omitted schedules to the Securities and Exchange Commission upon request.

\# Indicates a management contract or compensatory plan or arrangement.

* Furnished herewith

(b) Exhibits

See Item 15(a)(3) above.

(c) Financial Statement Schedules

See Item 15(a)(2) above.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) 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.

GEVO, INC.

By: /s/ Carolyn M. Romero
Carolyn M. Romero, CPA
Chief Accounting Officer
Principal Accounting Officer

Date: February 24, 2022

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated:

Signatures	Title	Date
/s/ PATRICK R. GRUBER **Patrick R. Gruber, Ph.D.**	Chief Executive Officer (Principal Executive Officer) and Director	February 24, 2022
/s/ L. LYNN SMULL **L. Lynn Smull**	Chief Financial Officer (Principal Financial Officer)	February 24, 2022
/s/ CAROLYN M. ROMERO **Carolyn M. Romero, CPA**	Chief Accounting Officer (Principal Accounting Officer)	February 24, 2022
/s/ RUTH I. DREESSEN **Ruth I. Dreessen**	Chairperson of the Board of Directors	February 24, 2022
/s/ GARY W. MIZE **Gary W. Mize**	Director	February 24, 2022
/s/ ANDREW J. MARSH **Andrew J. Marsh**	Director	February 24, 2022
/s/ WILLIAM H. BAUM **William H. Baum**	Director	February 24, 2022
/s/ JAIME GUILLEN **Jaime Guillen**	Director	February 24, 2022

Exhibit 3.1

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION

OF

GEVO, INC.

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware, does hereby certify as follows:

1. The name of the corporation is Gevo, Inc.

2. The date of filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was June 9, 2005 under the name of Methanotech, Inc.

3. The Amended and Restated Certificate of Incorporation of this corporation is hereby amended and restated to read as follows:

FIRST: The name of the corporation is Gevo, Inc. (hereinafter referred to as the "Corporation").

SECOND: The address of the registered office of the Corporation in the State of Delaware is 160 Greentree Drive, Suite 101, City of Dover, County of Kent, Delaware 19904. The name of the registered agent of the Corporation at that address is National Registered Agents, Inc.

THIRD: The purpose of the Corporation is to engage in any lawful act or activity for which a corporation may be organized under the General Corporation Law of the State of Delaware (the "Delaware General Corporation Law").

FOURTH: The Corporation is authorized to issue two classes of stock to be designated, respectively, "Common Stock" and "Preferred Stock." The total number of shares of all classes of capital stock which the Corporation shall have authority to issue is 105,000,000, of which 100,000,000 shares shall be Common Stock, having a par value of $0.01 per share (the "Common Stock"), and 5,000,000 shares shall be Preferred Stock, having a par value of $0.01 per share (the "Preferred Stock").

A. The board of directors or any authorized committee thereof is authorized, to the fullest extent permitted by law, to provide for the issuance of shares of Preferred Stock in series, and by filing a certificate pursuant to the applicable law of the State of Delaware (such certificate being hereinafter referred to as a "Preferred Stock Designation"), to establish from time to time the number of shares to be included in each such series and the designation of such series, to fix the voting powers (if any) of the shares of such series, and to fix any other powers, preferences and rights of the shares of each such series and any qualifications, limitations or restrictions thereof. The powers, preferences and relative, participating, optional and other special rights of each series of Preferred Stock, and the qualifications, limitations or restrictions thereof, if any, may differ from those of any and all other series at any time outstanding. Except as otherwise provided in any Preferred Stock Designation, the number of authorized shares of Common Stock or Preferred Stock may from time to time be increased or decreased (but not below the number of shares of such class outstanding) by the affirmative vote of a majority in voting power of the outstanding capital stock of the Corporation entitled to vote thereon, irrespective of the provisions of Section 242(b)(2) of the Delaware General Corporation Law (or any successor provision thereto), and no vote of the holders of either the Common Stock or the Preferred Stock voting separately as a class shall be required therefor.

B. Each outstanding share of Common Stock shall entitle the holder thereof to one vote on each matter properly submitted to the stockholders of the Corporation for their vote; *provided*, *however*, that, except as otherwise required by law, holders of Common Stock shall not be entitled to vote on any amendment to this Amended and Restated Certificate of Incorporation (including any Preferred Stock Designation) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon pursuant to this Amended and Restated Certificate of Incorporation (including any Preferred Stock Designation) or pursuant to the Delaware General Corporation Law.

<u>FIFTH</u>: The following provisions are inserted for the management of the business and the conduct of the affairs of the Corporation, and for further definition, limitation and regulation of the powers of the Corporation and of its directors and stockholders:

A. The business and affairs of the Corporation shall be managed by or under the direction of the board of directors.

B. The directors of the Corporation need not be elected by written ballot unless the Corporation's Bylaws so provide.

C. Subject to the rights of the holders of any series of Preferred Stock, any action required or permitted to be taken by the stockholders of the Corporation must be effected at a duly called annual or special meeting of stockholders of the Corporation and may not be effected by any consent in writing by such stockholders.

D. Special meetings of stockholders of the Corporation may be called only by the board of directors acting pursuant to a resolution adopted by a majority of the directors then in office.

E. Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee of the Corporation to the Corporation or the Corporation's stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, or (iv) any action asserting a claim governed by the internal affairs doctrine, in each case subject to said Court of Chancery having personal jurisdiction over the indispensible parties named as defendants therein. Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the Corporation shall be deemed to have notice of and consented to the provisions of this Article FIFTH, Section E.

SIXTH: A. Subject to the rights of the holders of any series of Preferred Stock to elect additional directors under specified circumstances, the number of directors shall be fixed from time to time exclusively by the board of directors pursuant to a resolution adopted by a majority of the directors then in office. The date, time and place, if any, of the annual meeting of stockholders for the purpose of electing directors shall be determined solely by resolution of the board of directors in its sole and absolute discretion. The board of directors, other than those directors who may be elected by the holders of any series of Preferred Stock under specified circumstances, shall be divided into three classes, designated as Class I, Class II and Class III, respectively. The board of directors is authorized to assign members of the board already in office to each class in accordance with a resolution or resolutions that has been or will be adopted by a majority of the directors then in office. Each class shall consist, as nearly as may be possible, of one-third of the total number of directors constituting the entire board of directors. The Class I directors shall initially serve until the Corporation's first annual meeting of stockholders held after the closing of the Corporation's initial public offering; the Class II directors shall initially serve until the Corporation's second annual meeting of stockholders held after the closing of the Corporation's initial public offering; and the Class III directors shall initially serve until the Corporation's third annual meeting of stockholders held after the closing of the Corporation's initial public offering, with each director to hold office until his or her successor shall have been duly elected and qualified. Commencing with the first annual meeting of stockholders held after the closing of the Corporation's initial public offering, directors of each class the term of which shall then expire shall be elected for a term of office ending at the third annual meeting of stockholders following such persons' election, with each director to hold office until his or her successor shall have been duly elected and qualified. In case of any increase or decrease, from time to time, in the number of directors (other than directors elected by the holders of any series of Preferred Stock), the number of directors in each class shall be apportioned as nearly equal as possible.

B. Subject to the rights of the holders of any series of Preferred Stock then outstanding, any and all vacancies in the board of directors, however occurring, including, without limitation, newly-created directorships by reason of an increase in the size of the board of directors, or the death, resignation, disqualification or removal of a director, shall, unless otherwise required by law or by resolution of the board of directors, be filled only by a majority vote of the remaining directors then in office, even if less than a quorum (and not by stockholders), and directors so chosen shall serve for a term expiring at the annual meeting of stockholders at which the term of office of the class to which they have been chosen expires or until such directors' successors shall have been duly elected and qualified. No decrease in the authorized number of directors shall shorten the term of any incumbent director. In the event of a vacancy in the board of directors, the remaining directors then in office, except as otherwise provided by law, shall exercise the powers of the full board of directors until the vacancy is filled.

C. Advance notice of stockholder nominations for the election of directors and of business to be brought by stockholders before any meeting of the stockholders of the Corporation shall be given in the manner provided in the Bylaws of the Corporation.

D. Subject to the rights of the holders of any series of Preferred Stock then outstanding, any director, or the entire board of directors, may be removed from office at any time, but only for cause and only by the affirmative vote of the holders of at least a majority of the voting power of all of the then-outstanding shares of capital stock of the Corporation then entitled to vote at an election of directors, voting together as a single class.

SEVENTH: In furtherance and not in limitation of the powers conferred by law, the board of directors is expressly empowered to adopt, amend or repeal the Bylaws of the Corporation. Any adoption, amendment or repeal of the Bylaws of the Corporation by the board of directors shall require the approval of a majority of the directors then in office. The stockholders shall also have power to adopt, amend or repeal the Bylaws of the Corporation; *provided, however*, that, in addition to any vote of the holders of any class or series of stock of the Corporation required by law or by this Amended and Restated Certificate of Incorporation, the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all of the then-outstanding shares of the capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class, shall be required to adopt, amend or repeal any provision of the Bylaws of the Corporation.

EIGHTH: A director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director, except for liability: (i) for any breach of the director's duty of loyalty to the Corporation or its stockholders; (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law; (iii) under Section 174 of the Delaware General Corporation Law; or (iv) for any transaction from which the director derived an improper personal benefit. If the Delaware General Corporation Law is amended after the effective date of this Amended and Restated Certificate of Incorporation to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended.

Neither any amendment nor repeal nor modification of this Article EIGHTH, nor the adoption of any provision of this Amended and Restated Certificate of Incorporation inconsistent with this Article EIGHTH, shall eliminate, reduce or otherwise adversely affect any limitation on the personal liability of a director of the Corporation existing at the time of such amendment, repeal, modification or adoption of such an inconsistent provision with respect to events occurring prior to the date of such amendment, repeal, modification or adoption.

NINTH: The Corporation reserves the right to amend or repeal any provision contained in this Amended and Restated Certificate of Incorporation in the manner prescribed by the laws of the State of Delaware and all rights conferred upon stockholders are granted subject to this reservation; *provided, however*, that, notwithstanding any other provision of this Amended and Restated Certificate of Incorporation or any provision of law that might otherwise permit a lesser vote or no vote, but in addition to any vote of the holders of any class or series of the stock of this Corporation required by law or by this Amended and Restated Certificate of Incorporation, the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all of the then-outstanding shares of the capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class, shall be required to amend or repeal this Article NINTH, Sections C, D or E of Article FIFTH, Article SIXTH, Article SEVENTH, or Article EIGHTH.

****

4. This Amended and Restated Certificate of Incorporation has been duly adopted in accordance with the provisions of Sections 242 and 245 of the General Corporation Law of the State of Delaware by the board of directors and the stockholders of the Corporation.

IN WITNESS WHEREOF, said Corporation has caused this Amended and Restated Certificate of Incorporation to be signed by its duly authorized officer and the foregoing facts stated herein are true and correct.

Dated: February 11, 2011

Gevo, Inc.

By: /s/ Patrick Gruber
Patrick Gruber, CEO

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
GEVO, INC.

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the “Corporation”), does hereby certify as follows:

1. The name of the Corporation is Gevo, Inc.

2. The date on which the Corporation’s original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware was June 9, 2005, under the name Methanotech, Inc.

3. The Corporation’s Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 11, 2011 (the “Amended and Restated Certificate of Incorporation”).

4. The Board of Directors of the Corporation (the “Board”), acting in accordance with the provisions of Sections 141 and 242 of the General Corporation Law of the State of Delaware, adopted resolutions to amend and restate the first paragraph of the FOURTH article of the Amended and Restated Certificate of Incorporation to read in its entirety as follows:

> “The Corporation is authorized to issue two classes of stock to be designated, respectively, “Common Stock” and “Preferred Stock.” The total number of shares of all classes of capital stock which the Corporation shall have authority to issue is 160,000,000, of which 150,000,000 shares shall be Common Stock, having a par value of $0.01 per share (the “Common Stock”), and 10,000,000 shares shall be Preferred Stock, having a par value of $0.01 per share (the “Preferred Stock”).”

5. Thereafter, pursuant to a resolution of the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval, and was duly adopted in accordance with the provisions of Sections 222 and 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, Gevo, Inc. has caused this Certificate of Amendment to be signed by its Chief Financial Officer as of June 7, 2013.

By: /s/ Mark Smith
Mark Smith
Chief Financial Officer

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
GEVO, INC.

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the "Corporation"), does hereby certify as follows:

1. The name of the Corporation is Gevo, Inc.

2. The date on which the Corporation's original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware was June 9, 2005, under the name Methanotech, Inc.

3. The Corporation's Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 11, 2011, and amended on June 7, 2013 (the "Amended and Restated Certificate of Incorporation").

4. The Board of Directors of the Corporation (the "Board"), acting in accordance with the provisions of Sections 141 and 242 of the General Corporation Law of the State of Delaware, adopted resolutions to amend and restate the first paragraph of the FOURTH article of the Amended and Restated Certificate of Incorporation to read in its entirety as follows:

> "The Corporation is authorized to issue two classes of stock to be designated, respectively, "Common Stock" and "Preferred Stock." The total number of shares of all classes of capital stock which the Corporation shall have authority to issue is 260,000,000, of which 250,000,000 shares shall be Common Stock, having a par value of $0.01 per share (the "Common Stock"), and 10,000,000 shares shall be Preferred Stock, having a par value of $0.01 per share (the "Preferred Stock")."

5. Thereafter, pursuant to a resolution of the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval, and was duly adopted in accordance with the provisions of Sections 222 and 242 of the General Corporation Law of the State of Delaware.

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IN WITNESS WHEREOF, Gevo, Inc. has caused this Certificate of Amendment to be signed by its Chief Financial Officer as of July 7, 2014.

By: /s/ Mike Willis

Mike Willis

Chief Financial Officer

**CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
GEVO, INC.**

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the “Corporation”), does hereby certify as follows:

1. The name of the Corporation is Gevo, Inc.

2. The date on which the Corporation’s original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware was June 9, 2005, under the name Methanotech, Inc.

3. The Corporation’s Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 11, 2011, and amended on June 7, 2013 and July 7, 2014 (the “Amended and Restated Certificate of Incorporation”).

4. Effective at 5:00 p.m. Eastern Time on April 20, 2015 (the “Effective Time”), each fifteen (15) shares of the Corporation’s Common Stock, par value $0.01 per share (“Common Stock”), issued and outstanding or held by the Corporation in treasury stock immediately prior to the Effective Time shall automatically be combined into one (1) validly issued, fully paid and non-assessable share of Common Stock without any further action by the Corporation or the holder thereof, subject to the treatment of fractional interests as described below. Notwithstanding the immediately preceding sentence, no fractional shares will be issued in connection with the reverse stock split. Stockholders of record who otherwise would be entitled to receive fractional shares, will be entitled to rounding up of their fractional shares to the nearest whole share. No stockholders will receive cash in lieu of fractional shares. Each certificate that immediately prior to the Effective Time represented shares of Common Stock (“Old Certificates”) shall thereafter represent that number of shares of Common Stock into which the shares of Common Stock represented by the Old Certificate shall have been combined, subject to the adjustment for fractional shares as described above.

5. The foregoing amendment was duly adopted in accordance with Sections 141 and 242 of the General Corporation Law of the State of Delaware.

6. Thereafter, pursuant to a resolution of the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval, and was duly adopted in accordance with the provisions of Sections 222 and 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, Gevo, Inc. has caused this Certificate of Amendment to be executed as of this April 17, 2015.

By:	/s/ Mike Willis
Name:	Mike Willis
Title:	Chief Financial Officer

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
GEVO, INC.

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the "Corporation"), does hereby certify as follows:

1. The name of the Corporation is Gevo, Inc.

2. The date on which the Corporation's original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware was June 9, 2005, under the name Methanotech, Inc.

3. The Corporation's Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 11, 2011, and amended on June 7, 2013, July 7, 2014 and April 17, 2015 (the "Amended and Restated Certificate of Incorporation").

4. Article FOURTH of the Amended and Restated Certificate of Incorporation is amended by adding the following:

    "Effective at 5:00 p.m. Eastern Time on January 5, 2017 (the "Effective Time"), each twenty (20) shares of the Corporation's Common Stock, par value $0.01 per share ("Common Stock"), issued and outstanding or held by the Corporation in treasury stock immediately prior to the Effective Time shall automatically be combined into one (1) validly issued, fully paid and non-assessable share of Common Stock without any further action by the Corporation or the holder thereof, subject to the treatment of fractional interests as described below. Notwithstanding the immediately preceding sentence, no fractional shares will be issued in connection with the reverse stock split. Stockholders of record who otherwise would be entitled to receive fractional shares, will be entitled to rounding up of their fractional share to the nearest whole share. No stockholders will receive cash in lieu of fractional shares. Each certificate that immediately prior to the Effective Time represented shares of Common Stock ("Old Certificates") shall thereafter represent that number of shares of Common Stock into which the shares of Common Stock represented by the Old Certificate shall have been combined, subject to the adjustment for fractional shares as described above."

5. The foregoing amendment was duly adopted in accordance with Sections 141 and 242 of the General Corporation Law of the State of Delaware.

6. Thereafter, pursuant to a resolution of the Board of Directors of the Corporation, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval, and was duly adopted in accordance with the provisions of Sections 222 and 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, Gevo, Inc. has caused this Certificate of Amendment to be executed as of January 4, 2017.

GEVO, INC.

By: /s/ Geoffrey T. Williams, Jr.
Name: Geoffrey T. Williams, Jr.
Title: General Counsel & Secretary

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
GEVO, INC.

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the "Corporation"), does hereby certify as follows:

1. The name of the Corporation is Gevo, Inc.

2. The date on which the Corporation's original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware was June 9, 2005, under the name Methanotech, Inc.

3. The Corporation's Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 11, 2011, and amended on June 7, 2013, July 7, 2014, April 17, 2015 and January 4, 2018 (the "Amended and Restated Certificate of Incorporation").

4. Article FOURTH of the Amended and Restated Certificate of Incorporation is amended by adding the following:
"Effective at 5:00 p.m. Eastern Time on June 1, 2018 (the "Effective Time"), each twenty (20) shares of the Corporation's Common Stock, par value $0.01 per share ("Common Stock"), issued and outstanding or held by the Corporation in treasury stock immediately prior to the Effective Time shall automatically be combined into one (1) validly issued, fully paid and non-assessable share of Common Stock without any further action by the Corporation or the holder thereof, subject to the treatment of fractional interests as described below. Notwithstanding the immediately preceding sentence, no fractional shares will be issued in connection with the reverse stock split. Stockholders of record who otherwise would be entitled to receive fractional shares, will be entitled to rounding up of their fractional share to the nearest whole share. No stockholders will receive cash in lieu of fractional shares. Each certificate that immediately prior to the Effective Time represented shares of Common Stock ("Old Certificates") shall thereafter represent that number of shares of Common Stock into which the shares of Common Stock represented by the Old Certificate shall have been combined, subject to the adjustment for fractional shares as described above."

5. The foregoing amendment was duly adopted in accordance with Sections 141 and 242 of the General Corporation Law of the State of Delaware.

6. Thereafter, pursuant to a resolution of the Board of Directors of the Corporation, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval, and was duly adopted in accordance with the provisions of Sections 222 and 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, Gevo, Inc. has caused this Certificate of Amendment to be executed as of May 31, 2018.

GEVO, INC.

By:	/s/ Geoffrey T Williams, Jr.
Name:	Geoffrey T. Williams, Jr.
Title:	General Counsel & Secretary

CERTIFICATE OF AMENDMENT TO
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
GEVO, INC.

GEVO, INC., a corporation organized and existing under the General Corporation Law of the State of Delaware (the “Corporation”), does hereby certify as follows:

1. The Amended and Restated Certificate of Incorporation of the Corporation is hereby amended by deleting the first paragraph of Article FOURTH in its entirety and inserting the following in lieu thereof:

   “FOURTH: The Corporation is authorized to issue two classes of stock to be designated, respectively, “Common Stock” and “Preferred Stock.” The total number of shares of all classes of capital stock which the Corporation shall have authority to issue is 510,000,000, of which 500,000,000 shares shall be Common Stock, having a par value of $0.01 per share (the “Common Stock”), and 10,000,000 shares shall be Preferred Stock, having a par value of $0.01 per share (the “Preferred Stock”).”

2. The foregoing amendment was duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, Gevo, Inc. has caused this Certificate of Amendment to be executed by its authorized officer as of January 28, 2022.

GEVO, INC.

By: /s/ Geoffrey T. Williams, Jr.
Name: Geoffrey T. Williams, Jr.
Title: Vice President – General Counsel and Secretary

DESCRIPTION OF SECURITIES

The following summary of the terms of the capital stock of Gevo, Inc. (“we,” “our” or “us”) is based upon our amended and restated certificate of incorporation and our second amended and restated bylaws. The summary is not complete and is qualified by reference to our amended and restated certificate of incorporation and our second amended and restated bylaws, each of which is filed as an exhibit to this Annual Report on Form 10-K and incorporated by reference herein. We encourage you to read our amended and restated certificate of incorporation, our second amended and restated bylaws and the applicable provisions of the Delaware General Corporation Law (the “DGCL”) for additional information.

Authorized and Outstanding Capital Stock

Our authorized capital stock consists of 500,000,000 shares of common stock, par value $0.01 per share, and 10,000,000 shares of preferred stock, par value $0.01 per share, issuable in one or more series designated by our board of directors.

Common Stock

The holders of our common stock have one vote per share. Holders of common stock are not entitled to vote cumulatively for the election of directors. Generally, all matters to be voted on by stockholders must be approved by a majority, or, in the case of election of directors, by a plurality, of the votes cast at a meeting at which a quorum is present, voting together as a single class, subject to any voting rights granted to holders of any then outstanding preferred stock. Subject to preferences that may be applicable to any then outstanding preferred stock, holders of our common stock are entitled to participate equally in dividends when and as dividends may be declared by our board of directors out of funds legally available for the payment of dividends. In the event of our voluntary or involuntary liquidation, dissolution or winding up, the prior rights of our creditors and the liquidation preference of any preferred stock then outstanding must first be satisfied. The holders of common stock will be entitled to share in the remaining assets on a pro rata basis. No shares of common stock are subject to redemption or have redemptive rights to purchase additional shares of common stock.

Our common stock is listed on the Nasdaq Capital Market under the symbol “GEVO.”

Preferred Stock

Our amended and restated certificate of incorporation provides that we may issue shares of preferred stock from time to time in one or more series. Our board of directors is authorized to fix the voting rights, if any, designations, powers, preferences, qualifications, limitations and restrictions thereof, applicable to the shares of each series of preferred stock. Our board of directors may, without stockholder approval, issue preferred stock with voting and other rights that could adversely affect the voting power and other rights of the holders of our common stock, including the likelihood that such holders will receive dividend payments and payments upon liquidation, and could have anti-takeover effects, including preferred stock or rights to acquire preferred stock in connection with implementing a stockholder rights plan. The ability of our board of directors to issue preferred stock without stockholder approval could have the effect of delaying, deferring or preventing a change of control or the removal of our existing management. There are currently no shares of preferred stock outstanding.

Anti-Takeover Provisions

The DGCL, our amended and restated certificate of incorporation, and our second amended and restated bylaws contain provisions that could discourage or make more difficult a change in control of us, including an acquisition of us by means of a tender offer, a proxy contest and removal of our incumbent officers and directors, without the support of our board of directors. A summary of these provisions follows.

Statutory Business Combination Provision

We are subject to Section 203 of the DGCL, which, subject to certain exceptions, prohibits a Delaware corporation from engaging in any “business combination” with an “interested stockholder” for a period of three years following the time that such stockholder became an interested stockholder, unless:

- the board of directors of the corporation approves either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder, prior to the time the interested stockholder attained that status;
- upon the closing of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding, for purposes of determining the number of shares outstanding, those shares owned by persons who are directors and also officers and by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- at or subsequent to such time, the business combination is approved by the board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66-2/3% of the outstanding voting stock that is not owned by the interested stockholder.

With certain exceptions, an “interested stockholder” is a person or group who or which owns 15% or more of the corporation’s outstanding voting stock (including any rights to acquire stock pursuant to an option, warrant, agreement, arrangement or understanding, or upon the exercise of conversion or exchange rights, and stock with respect to which the person has voting rights only), or is an affiliate or associate of the corporation and was the owner of 15% or more of such voting stock at any time within the previous three years.

In general, Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

A Delaware corporation may “opt out” of this provision with an express provision in its original certificate of incorporation or an express provision in its amended and restated certificate of incorporation or bylaws resulting from a stockholders’ amendment approved by at least a majority of the outstanding voting shares. However, we have not “opted out” of this provision. Section 203 could prohibit or delay mergers or other takeover or change-in-control attempts and, accordingly, may discourage attempts to acquire us.

Election and Removal of Directors

Our amended and restated certificate of incorporation provides for our board of directors to be divided into three classes, with staggered three-year terms. Only one class of directors is elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Because our stockholders do not have cumulative voting rights, our stockholders holding a majority of the shares of common stock outstanding are able to elect all of our directors. Directors may be removed only with cause by the affirmative vote of the holders of at least a majority of the outstanding shares entitled to vote on such removal.

No Stockholder Action by Written Consent

Our amended and restated certificate of incorporation and our second amended and restated bylaws provide that any action required or permitted to be taken by the holders of common stock at an annual or special meeting of stockholders must be effected at a duly called meeting and may not be taken or effected by written consent of the stockholders.

Stockholder Meetings

Under our amended and restated certificate of incorporation and our second amended and restated bylaws, only our board of directors, acting pursuant to a resolution adopted by a majority of the directors then in office, may call a special meeting of the stockholders, and any business conducted at any special meeting will be limited to the purpose or purposes specified in the notice for such special meeting.

Requirements for Advance Notification of Stockholder Nominations and Proposals

In order for our stockholders to bring nominations or business before an annual meeting properly, they must comply with certain notice requirements as provided by our second amended and restated bylaws. Typically, in order for such notices to be timely, they must be provided to us not earlier than the close of business on the 120th day prior to the one-year anniversary of the preceding year's annual meeting and not later than the close of business on the 90th day prior to the one-year anniversary of the preceding year's annual meeting. For such notices to be timely in the event the annual meeting is advanced more than 30 days prior to or delayed by more than 70 days after the one-year anniversary of the preceding year's annual meeting, notice must be provided to us not earlier than the close of business on the 120th day prior to such annual meeting and not later than the close of business on the later of the 90th day prior to such annual meeting or, if later, the 10th day following the day on which public announcement of the date of such meeting is first made.

Amendment of Charter Provisions

The affirmative vote of the holders of at least 66-2/3% of the voting power of all of the then-outstanding shares of our voting stock, voting together as a single class, is required to, among other things, alter, amend or repeal certain provisions of our amended and restated certificate of incorporation, including those related to the classification of our board of directors, the amendment of our bylaws and certificate of incorporation, restrictions against stockholder actions by written consent, the designated parties entitled to call a special meeting of the stockholders and the indemnification of officers and directors.

Our second amended and restated bylaws may only be amended (or new bylaws adopted) by our board of directors or the affirmative vote of the holders of at least 66-2/3% of the voting power of all of the then-outstanding shares of our voting stock.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company. Its address is 6201 15th Avenue, Brooklyn, New York 11219 and its telephone number is (718) 921-8300.

Exhibit 21.1

Subsidiaries of Gevo, Inc.

Name of Subsidiary	Jurisdiction
Gevo Asset, LLC (fka Gevo Development, LLC)	Delaware
Gevo RNG Holdco, LLC	Delaware
Gevo NW Iowa RNG, LLC	Delaware
Agri-Energy, LLC	Minnesota
Gevo Net-Zero Holdco, LLC	Delaware
Gevo Net-Zero 1, LLC	Delaware

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We have issued our reports dated February 24, 2022, with respect to the consolidated financial statements and internal control over financial reporting included in the Annual Report of Gevo, Inc. and subsidiaries on Form 10-K for the year ended December 31, 2021. We consent to the incorporation by reference of said reports in the Registration Statements of Gevo, Inc. on Forms S-8 (File No. 333-172771, 333-195264, 333-207172, 333-212391, 333-226689, 333-232267, and 333-239275, 333-257971) and on Forms S-3 (File No. 333-252229 and File No. 333-226686).

/s/ Grant Thornton LLP

Denver, Colorado
February 24, 2022

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER

I, Patrick R. Gruber, certify that:

1. I have reviewed this annual report on Form 10-K of Gevo, 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 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 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: February 24, 2022

/s/ Patrick R. Gruber

Patrick R. Gruber
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER

I, Lynn Smull, certify that:

1. I have reviewed this annual report on Form 10-K of Gevo, 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 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 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: February 24, 2022

/s/ L. Lynn Smull

L. Lynn Smull
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATIONS

I, Patrick R. Gruber, Chief Executive Officer of Gevo, Inc. (the “Company”), and I, Lynn Smull, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Annual Report on Form 10-K of the Company for the year ended December 31, 2021, (the “Report”) fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company for the period covered by the Report.

/s/ Patrick R. Gruber

Patrick R. Gruber
Chief Executive Officer
(Principal Executive Officer)

Date: February 24, 2022

/s/ L. Lynn Smull

L. Lynn Smull
Chief Financial Officer
(Principal Financial Officer)

Date: February 24, 2022

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the U.S. Securities and Exchange Commission or its staff upon request.

This certification accompanies the Report to which it relates, is not deemed filed with the U.S. Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, whether made before or after the date of the Report and irrespective of any general incorporation language contained in such filing.