UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 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, 2022

OR

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO

Advent Technologies Holdings, Inc.
(Exact name of Registrant as specified in its Charter)

Delaware	**001-38742**	**83-0982969**
(State or other jurisdiction of incorporation)	(Commission File Number)	(IRS Employer Identification No.)

500 Rutherford Avenue
Suite 102
Boston, MA 02129
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: **(617) 655-6000**

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.0001 per share	ADN	The Nasdaq Capital Market
Warrants to purchase one share of common stock, each at an exercise price of $11.50	ADNWW	The 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 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, smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and “emerging growth company” in Rule 12b-2 of the Exchange Act.

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

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

Indicate by check mark whether the registrant 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. ☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant’s executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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 the Registrant’s shares of common stock outstanding, other than shares held by persons who may be deemed affiliates of the Registrant, at June 30, 2022, was approximately $99.3 million.

As of March 31, 2023, the registrant had 52,261,643 shares of common stock, par value $0.0001 per share, issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

None.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K and the information incorporated herein by reference may constitute "forward-looking statements", which reflect our current views with respect to, among other things, our operations and financial performance. All statements other than statements of historical facts contained in this Annual Report on Form 10-K, including statements regarding our future results of operations and financial position, business strategy and plans and our objectives for future operations, are forward-looking statements. The words "believe," "may," "will," "estimate," "continue," "anticipate," "intend," "expect," "should," "could," "target," "predict," "seek" and similar expressions are intended to identify forward-looking statements. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy, short- and long-term business operations and objectives, and financial needs. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described in "Item 1.A Risk Factors" in this Annual Report on Form 10-K. Moreover, we operate in a very competitive and rapidly changing environment and new risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this Annual Report on Form 10-K may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements.

Some of the key factors that could cause actual results to differ from our expectations include:

- our ability to maintain the listing of our shares of common stock and warrants on Nasdaq;
- our ability to raise financing in the future;
- our success in retaining or recruiting officers, key employees or directors;
- factors relating to our business, operations and financial performance, including:
  - our ability to control the costs associated with our operations;
  - our ability to grow and manage growth profitably;
  - our reliance on complex machinery for our operations and production;
  - the market's willingness to adopt our technology;
  - our ability to maintain relationships with customers;
  - the potential impact of product recalls;
  - our ability to compete within our industry;
  - increases in costs, disruption of supply or shortage of raw materials;
  - risks associated with strategic alliances or acquisitions;
  - the impact of unfavorable changes in U.S. and international regulations;
  - the availability of and our ability to meet the terms and conditions for government grants and economic incentives; and
  - our ability to protect our intellectual property rights;

- market conditions and global and economic factors beyond our control;
- volatility of our stock price and potential share dilution;
- future exchange and interest rates; and
- other factors detailed herein under the section entitled "Risk Factors."

The forward-looking statements included in this Annual Report on Form 10-K are made only as of the date of this Annual Report. You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. Moreover, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this Annual Report on Form 10-K to conform these statements to actual results or to changes in our expectations.

As a result of a number of known and unknown risks and uncertainties, our actual results or performance may be materially different from those expressed or implied by these forward-looking statements. For a discussion of the risks involved in our business and investing in our common stock, see the section entitled "Risk Factors."

Should one or more of these risks or uncertainties materialize, or should any of the underlying assumptions prove incorrect, actual results may vary in material respects from those expressed or implied by these forward-looking statements. You should not place undue reliance on these forward-looking statements.

PART I

References in this annual report to "we," "us," "Advent," "company," or "our company" are to Advent Technologies Holdings, Inc., a Delaware corporation, and its consolidated subsidiaries. References to "management" or our "management team" are to our officers and directors.

Item 1. Business.

Overview

We are an advanced materials and technology development company operating in the fuel cell and hydrogen technology space. We develop, manufacture, and assemble complete fuel cell systems and the critical components that determine the performance of hydrogen fuel cells and other energy systems.

We develop and manufacture high-temperature proton exchange membranes ("HT-PEM" or "HT-PEMs") and fuel cell systems for the off-grid and portable power markets and plan to expand into the mobility market. Select applications are telecom towers (5G and older), energy infrastructure (methane emissions mitigation for the oil and gas industry), and portable power for defense or emergency response units. Our mission is to become a leading provider of fuel cell systems, HT-PEMs, fuel cells, and HT-PEM based membrane electrode assemblies ("MEA" or "MEAs"), which are critical components used in fuel cells, and other electrochemical applications such as electrolyzers and flow batteries. We develop the core chemistry components, the MEAs, that enable fuel cells to operate at high temperatures and also provide these MEAs to third-party fuel cell manufacturers. HT-PEM fuel cells have the advantage of operating with multiple low-carbon fuels (in addition to hydrogen) and under extreme conditions.

Our current revenue is derived from the sale of fuel cell systems and from the sale of MEAs, membranes, and electrodes for specific applications in the fuel cell and energy storage (flow battery) markets. While fuel cell systems sales and associated revenue is expected to provide the majority of our income in the near future, the MEA innovation is expected to facilitate strategic partnerships between us and Tier 1 suppliers and original equipment manufacturers ("OEMs") as these downstream manufacturers develop their own white-labelled HT-PEM products.

We have our headquarters in Boston, Massachusetts, which includes a product development and research and development facility, and have MEA fabrication and system production facilities in Livermore, California; Achern, Germany; Aalborg, Denmark; and Patras, Greece. We plan to scale-up U.S. and European production and its global sales operations to handle future demand. Our investment priorities are increasing MEA production volumes, executing on new product development initiatives (next-generation fuel cell systems and MEAs), and optimizing production operations to improve unit costs.

Our principal focus is on the total fuel cell market, from components to complete systems, and we plan to use our products and technology to address pressing global climate needs. Fuel cell and hydrogen technology is expected to play a critical role in global decarbonization. In order to meet the targets established in the Paris Climate Accords, which seek to mitigate climate change and maintain global temperature less than 1.5°C-2.0°C above pre-industrial levels, the global community will need to accelerate the adoption of technologies like our fuel cells, that reduce or eliminate emissions of carbon dioxide and other greenhouse gases. We believe that fuel cells will be a key component of the future energy generation platform given that:

- Fuel cells generate electricity and heat from hydrogen-based fuels, thereby substantially reducing emissions of carbon dioxide and other pollutants generated by the combustion process in internal combustion engines ("ICE" or "ICEs") and diesel generators. Fuel cells can be powered autonomously for hours or days where the fuel comes from a discrete source, or for longer where there is a pipeline or other large available source of fuel such as a tank.

- Fuel cells utilize fuels with a high energy density relative to lithium-ion batteries and other battery technology (according to ARPA-E power densities, hydrogen contains 40,000 Wh/kg while lithium-ion batteries carry only about 260Wh/kg). This makes fuel cell technology well-suited for use in mobility and off-grid energy generation applications where battery technology faces limitations such as lifespan, self-discharge, weight (fuel cells are between 3 to 25 times lighter than batteries providing equivalent power), operation under almost any weather conditions, and recharge times.

- We expect that hydrogen will also be used to create liquid, synthetic fuels (eFuels like eMethanol, made by combining hydrogen with carbon dioxide for a net-zero liquid fuel) that have the advantage of lower transportation costs and network infrastructure investment relative to hydrogen gas. Fuels like methanol have become subject to an increasing interest in Asia because they are currently available. We believe methanol has the potential to become a leading zero-emissions liquid fuel that can leverage the current global infrastructure from gas stations to fuel tankers and trucks. Given the urgency to decarbonize power generation, and the challenges the investment requirement poses for developing countries, we expect methanol to have an increasingly significant role as a liquid hydrogen carrier and a low/no carbon dioxide emission alternative to oil.

The Fuel Cell Industry

Fuel cell and hydrogen technology is expected to play a critical role in global decarbonization given the clean nature of emissions from hydrogen and hydrogen-carrier fuels relative to fossil fuels. In addition, the challenges associated with existing battery technology limit it from mass adoption across industries. Globally, an average of $38 billion per annum is expected to be invested in the hydrogen and fuel cell sector between 2020 and 2040 with the goal of significantly increasing production capacity while lowering the cost of production. While the availability of hydrogen limited the fuel cell industry in the past, it is now expected to become an opportunity for growth, particularly in sectors such as industrials, power generation and automotive.

Within the fuel cell market, our products have significant advantages relative to its competitors that are focused on low-temperature proton exchange membrane technology (“LT-PEM” or “LT-PEMs”). We believe these advantages will help us secure commercial opportunities in the fuel cell market and help drive wide-spread adoption of fuel cell technology. The benefits of our HT-PEMs relative to LT-PEMs include:

- We have developed our products under the principle of *“Any Fuel. Anywhere.”* which can be distilled into the two components:

  - *Any Fuel:* While LT-PEMs require high-purity hydrogen to operate, our HT-PEMs can utilize low cost and abundant hydrogen-carrier fuels, including methanol, natural gas, e-fuels, liquid organic hydrogen carriers, dimethyl ether, and renewable biofuels. The infrastructure required for clean energy powered solely by high-purity hydrogen would cost trillions of dollars. In contrast, many of the hydrogen-carrier fuels can use existing or in-development infrastructure and have a much lower transport cost than hydrogen. This key technology differentiator bypasses the need to commit to a specific energy distribution network and leverages existing infrastructure. Most importantly, it provides an immediately serviceable market today, while we believe many LT-PEM competitors may have to wait another decade for the availability of green, high-purity, inexpensive hydrogen, and potentially longer for the maturity of hydrogen transportation and storage networks. Given the urgency to decarbonize power generation, and the investment challenges faced by developing countries, we expect methanol to have an increasingly significant role as a liquid hydrogen carrier and a low or no carbon dioxide emission alternative to oil.

  - *Anywhere:* Our HT-PEM fuel cells have the ability to operate in a variety of practical conditions, including a wide range of geographies, weather, ambient temperatures (as low as $-20^{o}C$ and up to $+55^{o}C$), and in humid or polluted environments. LT-PEM fuel cells, on the other hand, tend to struggle in the heat, can be damaged by dry climates, or polluted air, and cannot handle impurities of the hydrogen supply. LT-PEM technology is intolerant to CO damage (with performance degradation at levels as low as 10 ppm), while HT-PEM can withstand 1-4% CO concentrations, depending on temperature and operation. For example, readily available low-cost hydrogen can be made with 1-2% carbon monoxide (20,000ppm), which works well with HT- PEMs. LT-PEM loses performance with only 10ppm of carbon monoxide. The relative durability of our products in a range of environments also provides a longer life of operation relative to LT-PEM fuel cells.

- Our HT-PEM technology significantly reduces the balance of plant requirements of a fuel cell system relative to LT-PEM fuel cells. This means that fuel cells using our HT-PEMs have simplified requirements for supporting components and auxiliary systems, which enables reduced cost and increases application range for the end-user. It does this through two methods:

  - Superior Heat Management: HT-PEM fuel cells operate at high temperatures (between 160°C and 220°C, with next-generation MEA-based fuel cells operating between 80°C and 240°C). Therefore, the temperature differential between a HT-PEM fuel cell and the outside environment is large. As a result, only a small radiator, similar or smaller than the radiator in an ICE vehicle, is needed to transfer heat away from the fuel cell stack. Conversely, because LT-PEM fuel cells run relatively cooler (under 85°C), a significantly larger radiator is required to effectively maintain suitable operating temperatures and conditions for an LT-PEM fuel cell.

  - Water Management Issues: HT-PEM fuel cells use phosphoric acid as an electrolyte rather than water-assisted membranes. Therefore, they reduce the need for water balance and other compensating engineering systems.

Our Solution

Our core product offering include:

1. Systems: Fuel cells for portable and stationary applications of power generation, in the range of 20W to 20kW. These fuel cells have applications in the telecom tower (e.g. 5G, 4G) power, surveillance, defense (and other portable power applications), energy (and other critical) infrastructure, and auxiliary power (marine, leisure) markets. Our fuel cells are manufactured in the U.S., Denmark, and Germany. Fuel cell systems provide the majority of our current revenue.

2. The next generation of our fuel cells, in the 15kW to 1MW range, is expected to target the mobility sector (*e.g.*, heavy-duty automotive, mining equipment, marine, aerospace, and unmanned aerial vehicles ("UAV")). We are planning to enter into joint development agreements with Tier 1 suppliers and OEMs to bring HT-PEM fuel cells to the mobility market. We intend to be a provider of MEAs and core technology via licensing, rather than producing end-products for the mobility industry. Revenue from joint development agreements may include engineering fees during the 1-3 year initial development cycle, MEA sales, and on-going licensing fees.

3. We are a developer of the key component of the fuel cell, the MEA. The operation of the MEA is key to the functionality and characteristics of a fuel cell system. Our MEA enables a robust, long-lasting, and ultimately low-cost fuel cell product, relative to LT-PEM technologies. In addition to our fuel cell system offerings, our MEA is also a discrete product offering to third-party fuel cell manufacturers. MEA sales are expected to be a rapidly growing market in the future as more and more fuel cells are deployed globally by third parties, especially in the mobility space.

Our Business Outlook

In 2021, we became publicly listed on NASDAQ. We also acquired UltraCell LLC ("UltraCell"), which spearheaded our product offering in the portable and defense markets. In the defense sector, we deliver human portable systems. In addition, the UltraCell portable system is being repurposed to provide remote power to oil and gas wellheads (Advent M-ZERØ family of products) and to address the critical problem of methane emissions in Canada and the U.S. Furthermore, the Company has continued with delivery of MEAs to fuel cell manufacturers in Asia and with delivery of electrodes to the high-growth redox flow-battery market.

In September 2021, we completed the acquisition of SerEnergy A/S ("SerEnergy") and fischer eco solutions GmbH ("FES"), a leading manufacturer of fuel cell systems, with thousands of systems shipped in recent years. SerEnergy is located in Denmark and FES is located in Germany. The acquisition effectively doubled our team to over 170 people, and we believe the acquired business will be a strong pillar of its potential growth strategy. SerEnergy and FES have significant production capabilities, are expected to benefit significantly from our next-generation MEAs and are expected to provide a very strong foothold in the off-grid market. SerEnergy systems, primarily in the 5kW range, target the telecoms industry (especially the growing 5G tower demand) and other diesel generator replacement off-grid markets.

On June 16, 2022, we announced the receipt of a notification from the Greek State informing the Company that one of the Important Projects of Common European Interests (“IPCEIs”), Green HiPo, was submitted for ratification by the European Union (“EU”) for funding of €782.1 million, spread over six years. On July 15, 2022, we received official ratification from the European Commission of the EU. The Green HiPo project is designed to bring the development, design, and manufacture of HT-PEM fuel cells and electrolysers for the production of power and green hydrogen to the Western Macedonia region of Greece.

Our growth strategy is focused on targeting the following four sectors:

- The stationary off-grid market, expected to be a growing market.
- The human-portable defense, surveillance, energy infrastructure, and leisure market based on UltraCell’s innovative products.
- The development of next-generation MEA and fuel cell solutions for the mobility market.
- The large-scale fuel cell systems market (power generation and power to gas).

Business Strengths

Simplified balance of plant technology: Our HT-PEM technology significantly reduces the balance of plant requirements of a fuel cell system relative to LT-PEM fuel cells. Fuel cells utilizing our technology have simplified requirements for supporting components and auxiliary systems because they reduce the complexity of water management systems. Our technology enables advanced, low-cost and simplified cooling technology, and increases the application range for the end-user. This is especially important for air, heavy-duty transportation, and marine applications.

Leveraging existing fuel infrastructure: Given the fuel-flexible nature of our technology, we are able to leverage the existing fuel delivery infrastructure – *e.g*. around 3 million miles of natural gas pipelines connecting production, storage and distribution systems in the U.S. – to deliver power to a wide range of customers and markets today. Our plug-and-play dynamic enables swift “time-to-market” capabilities. By contrast, the infrastructure investment required for a high-purity hydrogen economy is expected to be significant – approximately $15 trillion between now and 2050 globally.

Experienced management team with proven track record: The team that we have recruited to bring innovation to the fuel cell industry is highly experienced with a long pedigree in R&D and world-class manufacturing. Our team has been developing MEA components since 2006 and is led by Dr. Emory De Castro (CTO) who has significant industrial experience. In addition, we initiated in 2021 a joint development effort under the U.S. Department of Energy (“DoE”) umbrella to commercialize next-generation MEAs and ultra-low platinum catalyst solutions developed by Los Alamos, NREL Laboratories, and Brookhaven Laboratories in the U.S. We were selected as the scale-up and commercialization partner of the DoE and are working closely with the highly-skilled R&D teams of top U.S. labs.

Following the acquisitions of UltraCell, SerEnergy and FES, and our ongoing recruiting and development in the U.S., we have significantly increased our product, system integration, manufacturing, and testing capabilities. UltraCell brings Silicon Valley-type innovation, while SerEnergy’s expertise and world-class reputation in the stationary fuel cell industry is well established. Our team now numbers over 175 people, many with more than a decade of hands-on expertise in the HT-PEM market. Our investment plan reflects its strategic goal to assemble significant global know-how of the HT-PEM industry. We expect that HT-PEM, with technology initially developed decades after LT-PEM, is in early stages of growth as compared to LT-PEM, a technology initially developed during the 1960s.

Technology

Our fuel cells can use “Any Fuel. Anywhere.” because of the HT-PEM technology that we have pioneered since 2006. High-temperature fuel cells currently operate at high temperatures (between 160°C and 220°C) and have the potential to operate between 80°C and 240°C, unlike typical LT-PEM fuel cells that are limited to below 100°C. This temperature advantage allows the fuel cell to work with other fuels and to have reliable operation at extreme conditions, which we believe is a significant competitive advantage for the stationary power generation market.

Enhanced market opportunity: The multi-fuel capability enables us to have a very strong position in the off-grid and portable power market in select applications like telecom towers and critical infrastructure power needs. In these applications, diesel generators are primed for replacement for environmental and cost reasons, batteries are unable to provide a long-term year-round solution, and hydrogen presents difficult logistical concerns. We believe fuels like methanol are a more compelling choice and that our HT-PEM fuel cells are highly suitable for these applications. We believe decreasing fuel cell costs, due to technology innovation and manufacturing scale-up, can provide us with an opportunity to grow in the power generation market and potentially displace diesel generators in applications with a clear total cost of ownership value proposition, in addition to the environmental mandate.

The next-generation of our fuel cells is being developed in collaboration with the U.S. DoE after we were awarded the L'Innovator commercialization program. Under this program, we are working closely with the Los Alamos National Laboratory (LANL), Brookhaven National Laboratory (BNL), and National Renewable Energy Laboratory (NREL), to commercialize the decade-long materials advancements in the field of MEA development. We expect that these next-generation MEAs ("Advanced MEA") will bring the HT-PEM technology into the mobility area by enabling fuel cells to be lightweight with high-power density. The Advanced MEA is also anticipated to deliver as much as three times the power output of its current MEA product. While we are already projecting being able to pass through substantial cost benefits to its customers through economies of scale as it increases MEA production, the successful development of the Advanced MEA will be an important factor in delivering the required improvement in cost effective performance to our customers.

Based on the several critical advantages offered by our HT-PEM technology over batteries and LT-PEM technology, we expect to be highly competitive in numerous applications. In particular, our HT-PEM fuel cells and MEAs are well-suited to off-grid power, portable power applications, combined heat and power, and mobility (*e.g.*, heavy-duty automotive, aviation, mining equipment, marine, and UAV). Our goal is to partner with Tier 1 suppliers and OEMs in these new markets, focusing on the fuel cell technology development, licensing, and the mass production of the next-generation MEAs.

1. Off-Grid Power: We have a growing presence in the off-grid power market, with its acquired SerEnergy subsidiary having shipped thousands of systems worldwide to telecommunications providers for back-up power systems and stationary power sectors. Methanol is easier and cheaper to deliver to remote locations compared to pure hydrogen, providing our HT-PEM technology with an advantage in the off-grid market. Off-grid fuel cell solutions can use methanol already available at some remote industrial sites, like wellheads. Additionally, methanol can be found in products already present at some remote sites, such as certain windshield washer fluids. These products could be repurposed as a fuel source for the fuel cell. Fuel cells in these applications produce significantly less of the greenhouse gases compared to ICE generators and produce power without ICEs' attendant high levels of nitrogen oxides, sulfur oxides or particulate emissions. Off-grid power solutions have the potential to run full-time, 365 days a year, 24 hours per day. Our launch of the M-ZERØ methanol-fueled low-power system targets the power generation needs of remote oil and gas locations. The current method of powering such equipment results in significant methane emissions that are equivalent to millions of cars' emissions per year.

2. Portable Power: Our acquisition of Silicon Valley-based UltraCell provided us with complete system technology for the portable power and defense markets. Electrification is one of the key initiatives in the defense industry as the needs for mobility and power on demand are increasing dramatically. Our fuel cells have already been deployed by the US Department of Defense ("DoD"), in the XX-55 portable power system, while the next-generation "Honey Badger" product, a wearable fuel cell designed to provide soldiers with on the go power, is currently in the DoD's demonstration/validation program.

   The above markets define our current products, while the markets below constitute its largest opportunities for growth in the future:

3. Combined Heat and Power ("CHP"): By virtue of their high temperature operation, HT-PEM fuel cells are well suited for delivering heat in addition to power to large commercial buildings and single or multi-family homes. The CHP efficiency is at the 85%-90% range, making HT-PEM fuel cells extremely efficient for such uses. HT-PEM fuel cells can be supplied by existing natural gas infrastructure and eventually by a future hydrogen-blend or pure-hydrogen pipeline network.

4. Automotive: By charging electric vehicles' batteries on-board through the conversion of high-purity hydrogen or hydrogen-carrier fuels into electricity, our fuel cells solve the range and recharging issues that battery-only electric vehicles currently face. This issue is a particular challenge in heavy-duty and commercial vehicles. Since our fuel cells can use hydrogen-carrier fuels such as natural gas, methanol and biofuels, fuels that are of growing in importance in China, India, and Western Europe, we believe that our technology will be critical in accelerating the mass adoption of electric vehicles and the shift away from ICEs. Existing battery and LT-PEM technology are unable to meet the needs of heavy-duty transportation which require long-range, heavy payloads, fast refill times, and the ability to operate in diverse environments. For example, LT-PEM fuel cells are unable to operate in hot environments because the radiator required to cool the MEA to the appropriate temperature range would be too large and therefore impractical. The use of battery-only technology has the added disadvantage of insufficient power capacity without a substantial volume and weight of batteries, which results in a significant reduction in cargo capacity.

5. Aviation: Our fuel cells can deliver much longer range (autonomy) and better utilization (through faster time to refill and greater payload) for commercial drones, eVTOLs, and auxiliary power for traditional aircraft than battery power alone can deliver. Existing commercial drones based on battery-only technology have a limited flight time given the power limitations of the lightweight requirements of flight. Compared to battery powered flights, aircrafts powered by fuel cells using next generation HT-PEMs and ultra-lightweight non-metal plates could increase range, payload/passenger capacity, and the number of trips made on one charge or fill-up. HT-PEM aircraft have the potential to refuel significantly faster than an equivalent battery could recharge. The high-purity hydrogen currently required by LT-PEM is considered unsafe for widespread commercial use, while our HT-PEM provides sufficient range using safer liquid fuels and the Company believes it is key to efficient real-world flight usage. Hydrogen gas and dimethyl ether are suitable for use as fuel for aviation fuel cells, and both work well with HT-PEM technology. Additionally, high-temperature operation in aviation is essential, given heat exchange issues. Fuel cells have shown that drones can stay airborne for longer periods of time, which enhances their value proposition and business applications. We expect drone prototypes based on our technology to be available as soon as 2023.

6. Marine: In the marine industry, neither compressed hydrogen nor batteries are a viable option for commercial shipping. The industry is evaluating alternative fuels to replace bunker fuel, and methanol appears to be among the most likely hydrogen carriers positioned to meet the European Union's 2050 decarbonization objectives. Our fuel cells are well-suited for methanol use, as the high-temperature operation can use low-grade hydrogen (converted from methanol via reformation) that does not work with current LT-PEM fuel cells. Applications in the marine industry are likely to develop initially in auxiliary power and smaller ships, and eventually scale to the multi-MW range main propulsion market. Our fuel cells promise fuel flexibility with hydrogen gas, liquid organic hydrogen carriers, methanol, and natural gas, and operate at high temperatures through proprietary chemistry. Marine applications could be scalable for divergent load requirements and applications such as powering the entire propulsion system or, alternatively, providing auxiliary power to a differently powered primary propulsion system. Marine fuel cell usage could offer long range and a fast refill; unlike battery power, and longer routes and larger vessels can be powered by fuel cells as compared to batteries. In addition, fuel cells can be used in a hybrid structure in conjunction with battery power. We are planning our initial focus on applications for auxiliary marine power, and then plans to focus on vessels' main power.

We have been issued, acquired, licensed, or applied for approximately 200 international and United States patents, with a concentration in membranes, electrodes, and MEAs, which support its product offerings. In the MEA sector, our products include two existing membrane technologies: "TPS®", which we have exclusive rights to use and was obtained through patents filed by its founders and technical staff, and "PBI" technology, of which we are a selective licensee, and provides exclusive rights to us for commercial sale of MEAs using PBI technology. Leveraging our membrane technologies, we also have intellectual property for lightweight stacks made through advances in bipolar plate materials, which supports water-cooled systems. This results in a simpler and more compact balance-of-plant design. Our own investments in developing leading next-generation fuel cell technology are supported by being able to leverage the research and development efforts of its strategic partners. We are planning next generation prototypes for fuel stacks, with pilot production expected as soon as 2023 and mass production expected as soon as 2024.

Our rights to commercialize the next-generation HT-PEM materials technology from the DoE L'Innovator Program also includes rights to a portfolio of patents supporting this advanced technology. We were selected through a highly competitive bidding process by virtue of our management team's track record in taking laboratory inventions and processes through to a fully-scaled and manufactured product. We expect that this technology will reduce production costs of its MEAs significantly through a 3-fold increase in power output per unit area of membrane, and will provide longer operating lifetime and a wider temperature operating range as well as substantially lower platinum content. We expect these advantages will enable us to reduce the cost to end-users of fuel cells and encourage a wider market adoption. We anticipate commercialization and mass manufacture of this product by 2023. This and other partnerships, joint ventures, and joint development agreements, including with DoE, NASA (through Advent's affiliation with Northeastern University) and the European Space Agency, are expected to assist Advent in the mobility and off-grid power markets.

Our products and technology are currently being used in the marketplace to generate electricity for commercial applications, and we are developing partnerships with Tier 1 suppliers, OEMs, and system integrators to further drive commercial adoption and use in an increasing number of applications and end markets. To date, more than 300,000 TPS® and PBI MEAs have been sold (by us and others) for use in defense, micro-combined heat and power (µCHP) systems, battery range extenders for fuel cell battery hybrid vehicles, remote power for telecom and auxiliary power in remote locations, demonstrating strong early-stage adoption of our existing product line. To date, we have shipped thousands of systems for defense, off-grid and remote/portable power markets.

As our business ramps up to mass-production, we plan to pursue a revenue model that includes engineering fees, MEA sales and hardware-technology licensing fees through the life of product development. Our customer relationship is split into two phases: 1) partner with OEMs to co-develop customized fuel cell systems based on our MEAs, for which we earn engineering and licensing fees, and 2) produce and sell proprietary MEAs directly to OEMs while earning licensing fees on fuel cells produced by customers using our technology. We expect high-margin licensing fees to become a larger component of our revenue mix over time as our customers scale to mass manufacturing of fuel cells and other products.

We were founded and are managed by a team of world-class electrochemists, material scientists, and fuel cell specialists with significant industry and manufacturing expertise. We have received numerous R&D funds from the DoE and the European Union and are considered a pioneer with years of experience in clean energy technology innovation. We have our headquarters and a production facility in Boston, Massachusetts and operations in California, Greece, Germany, Denmark, and the Philippines. In 2023, we opened our production facility in Boston, Massachusetts offering research and development facilities and additional production capacity. For additional capacity, we intend to utilize existing U.S.-based toll-manufacturing for the membrane and electrode production to scale-up its production levels without significant capital expenditure. Our Patras, Greece based production of membranes, electrodes, and MEAs benefits from labor cost and skill availability advantages.

We intend to direct the majority of our near-term funding requirements to operating expenses and capital expenses for product development and plan to make substantial investments over the next several years, among others, in new production equipment and warehousing, systems assembly line, MEA assembly automation, aeronautical stacks and U.S. facility expansion.

Acquisitions

Business Combination of AMCI Acquisition Corp. and Advent Technologies

In February 2021, we closed our business combination with AMCI Acquisition Corp. The business combination has provided us with a sustainable funding base for the next phase of our expansion efforts to respond to significant and immediate market opportunities. Our shareholders opted to roll 100% of their equity and, as of the completion of the business combination, owned 54% of the pro-forma equity base.

UltraCell

On February 18, 2021, we acquired UltraCell, formerly a fuel cell division of Bren-Tronics, Inc. Prior to the acquisition, we had a mutually beneficial partnership, having worked together for several years. UltraCell is a leader in lightweight fuel cells for the portable power market, including small-scale fuel cell technology for the defense industry, and has sold thousands of battery pack charger systems built around Advent MEAs to four NATO militaries, including those of the U.S. and the U.K. UltraCell systems have been deployed with excellent performance in stringent and challenging conditions and climates. UltraCell's technology uses hydrogen or liquid fuels to deliver reliable power at a fraction of the weight of batteries. Traditional LT-PEM fuel cell technology cannot be used in this type of remote environment fuel cell product due to the issues with compressed high-purity hydrogen. Our fuel flexibility allows for the use of methanol in its fuel cell application, which is stable in liquid form, cheaper, and more accessible than hydrogen. With our technology powering UltraCell products like the "Honey Badger", a portable fuel cell which is in advanced testing with the U.S. military, multi-day military missions that generally required over 100 pounds of batteries can substitute a fuel cell and methanol canister with a total weight of 25 pounds. UltraCell's fuel cell innovations are expected to complement the development of our next-generation lightweight systems for the mobility market, with an emphasis on the commercial drone, aviation, and heavy-duty automotive industries. UltraCell produces the only made in the U.S. NATO approved fuel cell products and is one of only two manufacturers of NATO approved fuel cell products manufacturing in a NATO country. Since the acquisition, we have retained current UltraCell operations in the Livermore, California area, in parallel to its Boston operations, and plan to continue to do so, with the possibility of expansion in the future.

SerEnergy and FES

On September 1, 2021, we completed our acquisition (the "Fischer Acquisition") of SerEnergy and FES from F.E.R. fischer Edelstahlrohre GmbH ("Fischer"). SerEnergy and FES currently market and build standalone systems and critical fuel cell components. These products are complementary to the mobile systems produced by Advent. The Fischer Acquisition is well aligned to the "Any Fuel. Anywhere." strategy, and is expected to accelerate our growing revenue base in fuel cell stacks and systems. The Fischer Acquisition also increased our patent and trademark portfolio with new intellectual property and increased our labor force by approximately 90 employees, many of whom are highly-skilled manufacturing and sales professionals experienced in the fuel cell industry. SerEnergy has deployed hundreds of standalone telecom remote self-maintaining power systems, including sales to Smart Communications, a leading telecommunications provider in the Philippines. These systems can operate in both high humidity and high temperature environments and offer remote monitoring. We believe that the combined HT-PEM fuel cell production capacity and operations in international markets, currently consisting of Germany, Denmark and the Philippines, will support our expansion into international customer segments, in particular the Asian and European markets.

Specific Product Offerings

Honey Badger: The Reformed Methanol Wearable Fuel Cell Power System, or "Honey Badger" is an offering marketed by our subsidiary UltraCell. On June 7, 2021, the U.S. DoD, through the U.S. Army DEVCOM Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center, with funding through the Project Manager Integrated Visual Augmentation System (PM IVAS), has entered into a contract with us to complete the MIL-STD certification of the cutting edge "Honey Badger". "Honey Badger" is placed on a soldier worn plate carrier and provides on the move battery charging in the field. It has been selected by the DoD's National Defense Center for Energy and Environment (NDCEE) to take part in its 2021 demonstration/validation program and is the only fuel cell to take part in this program. The NDCEE is a DoD program that addresses high-priority environmental, safety, occupational health, and energy technological challenges that are demonstrated and validated at active installations for military application. The product is offered at 20W and 50W power versions, and both are in testing and certification stages. Its core technology has completed successful field trials in Army Expeditionary Warrior Experiments and high-altitude tests in California's Sierra Nevada. UltraCell's "Honey Badger 50" (the 50W power version) fuel cell is the only fuel cell that is part of this program that supports the U.S. Army's goal of having a technology-enabled force by 2028.

On August 4, 2022, we announced the launch of our HB50 power system, a compact portable fuel cell system and quiet power supply for use in off-grid field applications such as military and rescue operations. The launch of Advent's portable power system coincided with the Company's fulfilment of its first shipment order from the U.S. Department of Defense. The HB50 power system can be fueled by biodegradable methanol, allowing near silent generation of up to 50W of continuous power with clean emissions. Designed for covert operations, HB50 can easily power radio and satellite communications gear, remote fixed and mobile surveillance systems, and laptop computers along with more general battery charging needs. HB50 is a unique technology that can provide 65% of weight savings versus batteries over a typical 72-hour mission. The weight savings benefit increases further for longer missions.

HB50's unique design allows it to be used in soldier-worn configurations or operated inside a portable backpack or vehicle while charging batteries and powering soldier systems, while its thermal features allow it to operate within an ambient temperature range of -20°C to +55°C. Aside from its optimized compatibility with Integrated Visual Augmentation System ("IVAS"), HB50 can also power devices such as high frequency radios like the model 117G, as well as B-GAN and StarLink terminals. HB50's durability allows it to be easily deployed in challenging conditions and climates while supporting mission mobility for three to seven days without the need to re-supply.

Since Honey Badger's fuel cell technology can run on hydrogen or liquid fuels, the system can operate at a fraction of the weight of traditional military-grade batteries to meet the U.S. Department of Defense's continuously evolving needs for 'on-the-go' electronics needs. As military adoption and use of IVAS equipment continues to evolve, the highly portable lightweight power solutions like Honey Badger and HB50 will become a mission critical necessity.

SereneU: Our line of Serene solutions includes the core SereneU unit which is a 5kW fourth generation methanol powered hydrogen fuel cell that can be configured and/or stacked to meet energy needs up to 250kW. The SereneU is based on our proprietary MEA and HT-PEM, which together not only allow for higher efficiency and performance in extreme temperatures, but also for a lower total cost of ownership and start-up time, while offering true fuel flexibility. There are currently more than 1,000 SereneU based installations worldwide serving multiple purposes, covering the need for reliable green power from telecom towers and emergency networks as well as industrial and marine based requirements.

M-ZERØ: Our M-ZERØ line of products are designed to generate power in remote environments. Their use significantly reduces methane emissions where they replace older, less efficient technology. The current M-ZERØ products are 50W and 150W systems, with systems featuring up to 400W of power expected to be released by the end of 2022. We have entered into agreements to trial ten 50W systems in Canada starting in the third quarter of 2021. If the trials are successful, this could result in mass deployment of M-ZERØ systems during 2023. The products, which are not expected to require extensive servicing or refueling schedules, can work throughout the year, including in extreme cold. Traditional green remote power options of solar plus battery storage do not function well in either extreme cold or in hard-to-reach areas. Widespread adoption of M-ZERØ technology at all of the wellheads in the U.S. and Canada will result in a substantial reduction of carbon dioxide emissions.

Important Projects of Common European Interest ("IPCEI")

Green HiPo: On June 16, 2022, we announced the receipt of a notification from the Greek State informing the Company that the IPCEI Green HiPo was submitted for ratification by the EU for funding of €782.1 million, spread over the six years. On July 15, 2022, we received official ratification from the European Commission of the EU. Green HiPo is an IPCEI which will allow us to develop, design, and manufacture fully scalable HT-PEM fuel cells and electrolysers for the production of power and green hydrogen, respectively.

Intellectual Property

Our intellectual property portfolio covers among other things: membranes, electrodes, MEAs, and systems exploiting the unique operating characteristics of its materials. In general, our employees are party to agreements providing that all inventions, whether patented or not, made or conceived while being an Advent employee, which are related to or result from work or research that the Company performs, will remain our sole and exclusive property.

We have been issued, acquired, licensed, or applied for approximately 200 international patents (including the intellectual property from the Fischer Acquisition), the vast majority in membranes, electrodes, and MEAs, which support our product offerings. Additionally, we have approximately eighteen trademarks registered with the USPTO and various international trademark offices, with additional trademark applications pending.

Competition

The market for alternative fuel and energy storage systems is still in the early stages of growth and is characterized by well-established battery and LT-PEM products. We believe the principal competitive factors in the markets in which it operates include, but are not limited to, the size, weight, lifetime, durability, and total cost of ownership of these systems to the end-user. We believe that our HT-PEM technology competes with these other technologies across a number of new and existing applications in the alternative energy fuel market, especially in the realm of fuel flexibility and heat management. We believe the total addressable market opportunity could be over $72 billion by the year 2030.

Employees and Human Capital Resources

Our employees are critical to our success. As of December 31, 2022, we had approximately 175 employees, including part-time and contractors. We occasionally rely on additional independent contractors to support our operations. To date, we have not experienced any work stoppages and consider our relationship with our employees to be in good standing. None of our employees are represented by a labor organization or are a party to any collective bargaining arrangement.

We believe that developing a diverse, equitable and inclusive culture is critical to continuing to attract and retain the top talent necessary for our long-term success and strategy. We value diversity at all levels.

We strive to create a collaborative environment where our colleagues feel respected and valued. We provide our employees with competitive compensation, opportunities for equity ownership and a robust employment package, including health care, retirement benefits and paid time off. In addition, we regularly interact with our employees to gauge employee satisfaction and identify areas of focus.

Available Information

Our Internet address is https://www.advent.energy. Our website and the information contained on, or that can be accessed through, the website will not be deemed to be incorporated by reference in, and are not considered part of, this Annual Report on Form 10-K. Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, including exhibits, proxy and information statements and amendments to those reports filed or furnished pursuant to Sections 13(a), 14, and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, are available through the "Investors" portion of our website free of charge as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, our filings with the SEC may be accessed through the SEC's Interactive Data Electronic Applications system at *http://www.sec.gov*. All statements made in any of our securities filings, including all forward-looking statements or information, are made as of the date of the document in which the statement is included, and we do not assume or undertake any obligation to update any of those statements or documents unless we are required to do so by law.

Item 1A. Risk Factors.

An investment in our common stock involves a high degree of risks. You should consider carefully the risks described below as well as the other information contained in this Annual Report on Form 10-K before investing in our common stock. The risks described below are those that we believe are the material risks that we face. If any of the following risks actually occurs, our business, prospects, operating results and financial condition could suffer materially, the trading price of our common stock could decline and you could lose all or part of your investment. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business. See "Forward-Looking Statements" in this Annual Report on Form 10-K.

Risk Factors Relating to Our Operations and Business

We have incurred losses since inception and we expect that we will continue to incur losses for the foreseeable future.

We have not been profitable since operations commenced, and we may never achieve or sustain profitability. We expect to continue to incur net losses and generate negative cash flows until we can produce sufficient revenues and gross profit to cover our costs. We may never become profitable. Even if we do achieve profitability, we may be unable to sustain or increase our profitability in the future. We will require significant additional capital to continue operations and to implement our business strategy. We cannot estimate with reasonable certainty the actual amounts necessary to successfully complete the development, manufacture and commercialization of our products and there is no certainty that we will be able to raise the necessary capital on reasonable terms or at all.

We may be unable to adequately control the costs associated with our operations.

We will require significant capital to develop and grow our business, including developing and manufacturing our fuel cells and building Advent's brand. We expect to incur significant expenses which will impact our profitability, including research and development expenses, raw material procurement costs, sales and distribution expenses as we build Advent's brand and market our fuel cells, and general and administrative expenses as we scale our operations. Our ability to become profitable in the future will not only depend on our ability to successfully market our fuel cells and other products and services, but also to control our costs. If we are unable to cost efficiently design, manufacture, market, sell, distribute and service our fuel cells, our margins, profitability and prospects would be materially and adversely affected.

We may need to raise additional funds and these funds may not be available to us when we need them. If we cannot raise additional funds when we need them, our operations and prospects could be negatively affected.

The scale-up of production of our fuel cells, membranes and electrodes, together with the associated investment in our assembly line and product development activities, will consume capital. While we expect that we will have sufficient capital to fund our planned operations through to breakeven, we may need to raise additional funds through the issuance of equity, equity related or debt securities, or through obtaining credit from government or financial institutions. This capital will be necessary to fund our ongoing operations, continue research, development and design efforts, improve infrastructure, and introduce new technologies. We cannot be certain that additional funds will be available to us on favorable terms when required, or at all. If we cannot raise additional funds when we need them, our financial condition, results of operations, business and prospects could be materially adversely affected.

Our audited financial statements included a statement that there is a substantial doubt about our ability to continue as a going concern and a continuation of negative financial trends could result in our inability to continue as a going concern.

Our audited financial statements as of and for the year ended December 31, 2022 were prepared on the assumption that we would continue as a going concern. Our audited financial statements as of and for the year ended December 31, 2022 did not include any adjustments that might result from the outcome of this uncertainty. Our management has determined that there is a substantial doubt about our ability to continue as a going concern over the next twelve months based on the insufficient amount of cash and cash equivalents as of the financial statement filing date and our independent auditors have included a "going concern" explanatory paragraph in their report on our financial statements as of and for the year ended December 31, 2022. In July 2022, we received official ratification from the European Commission of the European Union for one of the Important Projects of Common European Interest ("IPCEI"), Green HiPo. This project provides for the availability of funding of €782.1 million over the next six years. As of the issuance date of the consolidated financial statements, we have not received an agreement which provides the terms of the funding. In addition to Green HiPo, management will pursue an additional capital raise in the second quarter of 2023. We cannot provide assurance that we will be able to obtain additional funding on acceptable terms, if at all. If we are unable to obtain sufficient funding, we could be required to delay our development efforts, limit activities and reduce research and development costs, which could adversely affect its business prospects. The reaction of investors to the inclusion of a going concern statement by our independent auditors, and our potential inability to continue as a going concern, could materially adversely affect the price of our common stock.

We continue to generate a low level of revenue from our core products.

Based on conversations with existing customers and incoming inquiries from new customers, we anticipate substantial increased demand for our MEAs and fuel cell systems from a wide range of customers as we scale up our production facilities and testing capabilities, and as the awareness our MEA capabilities become widely known in the industry. We expect both existing customers to increase order volume, and to generate substantial new orders from major organizations, with some of whom we are already in discussions regarding prospective commercial partnerships and joint development agreements. As of December 31, 2022, we were still generating a low level of revenues compared to our future projections and have not made any commercial sales to major organizations.

If we fail to manage our future growth effectively, we may not be able to market and sell our fuel cells successfully.

Any failure to manage our growth effectively could materially and adversely affect our business, prospects, operating results and financial condition. We intend to expand our operations significantly. Our future expansion will include:

- training new personnel;
- forecasting production and revenue;
- geographic expansion;
- controlling expenses and investments in anticipation of expanded operations;
- entry into new material contracts;
- establishing or expanding design, production, licensing and sales; and
- implementing and enhancing administrative infrastructure, systems and processes.

We intend to hire additional personnel, including design and production personnel. Because our technologies are different from traditional electric vehicle battery technology, individuals with sufficient training in alternative fuel and electric vehicles may not be available to hire, and as a result, we will need to expend significant time and expense training the employees we do hire. Competition for individuals with experience designing and manufacturing hydrogen fuel cells is high, and we may not be able to attract, integrate, train, motivate or retain additional highly qualified personnel in the future. The failure to attract, integrate, train, motivate and retain these additional employees could seriously harm our business and prospects.

We will rely on complex machinery for our operations and production involves a significant degree of risk and uncertainty in terms of operational performance and costs.

We will rely heavily on complex machinery for our operations and our production will involve a significant degree of uncertainty and risk in terms of operational performance and costs. Our membrane and fuel cell production plant will consist of large-scale machinery combining many components. The production plant components are likely to suffer unexpected malfunctions from time to time and will depend on repairs and spare parts to resume operations, which may not be available when needed. Unexpected malfunctions of the production plant components may significantly affect the intended operational efficiency. Operational performance and costs can be difficult to predict and are often influenced by factors outside of our control, such as, but not limited to, scarcity of natural resources, environmental hazards and remediation, costs associated with decommissioning of machines, labor disputes and strikes, difficulty or delays in obtaining governmental permits, damages or defects in electronic systems, industrial accidents, fire, and seismic activity and natural disasters. Should operational risks materialize, it may result in the personal injury to or death of workers, the loss of production equipment, damage to manufacturing facilities, monetary losses, delays and unanticipated fluctuations in production, environmental damage, administrative fines, increased insurance costs and potential legal liabilities, all which could have a material adverse effect on our business, results of operations, cash flows, financial condition or prospects.

Our future growth is dependent upon the market's willingness to adopt our hydrogen-powered fuel cell and membrane technology.

Our growth is highly dependent upon the adoption by the automotive, aerospace, power and energy industries. If the market for our fuel cells and membranes does not develop at the rate or to the extent that we expect, our business, prospects, financial condition and operating results will be harmed. The market for alternative fuel and energy storage systems is still new and is characterized by rapidly changing technologies, price competition, numerous competitors, evolving government regulation and industry standards and uncertain customer demands and behaviors.

Factors that may influence the adoption of our fuel cell and membrane technology include:

- perceptions about safety, design, performance and cost, especially if adverse events or accidents occur that are linked to the quality or safety of alternative fuel or electric vehicles;
- improvements in the fuel economy of internal combustion engines and battery powered vehicles;
- the availability of service for alternative fuel vehicles;
- volatility in the cost of energy, oil, gasoline and hydrogen;
- government regulations and economic incentives promoting fuel efficiency, alternate forms of energy, and regulations banning internal combustion engines;
- the availability of tax and other governmental incentives to sell hydrogen;
- volatility in the cost of energy, oil, gasoline and hydrogen;
- government regulations and economic incentives promoting fuel efficiency, alternate forms of energy, and regulations banning internal combustion engines;
- the availability of tax and other governmental incentives to sell hydrogen;
- perceptions about and the actual cost of alternative fuel; and
- macroeconomic factors.

Future product recalls could materially adversely affect our business, prospects, operating results and financial condition.

Any product recall in the future may result in adverse publicity, damage our brand and materially adversely affect our business, prospects, operating results and financial condition. In the future, we may voluntarily or involuntarily, initiate a recall if any of our fuel cells or membranes prove to be defective. Such recalls involve significant expense and diversion of management attention and other resources, which could adversely affect our brand image in our target markets, as well as our business, prospects, financial condition and results of operations.

If we are unable to attract and retain key employees and hire qualified management, technical and fuel cell and system engineering personnel, our ability to compete could be harmed.

Our success depends, in part, on our ability to retain our key personnel. The unexpected loss of or failure to retain one or more of our key employees could adversely affect our business. Our success also depends, in part, on our continuing ability to identify, hire, attract, train and develop other highly qualified personnel.

Competition for these employees can be intense, and our ability to hire, attract and retain them depends on our ability to provide competitive compensation. We may not be able to attract, assimilate, develop or retain qualified personnel in the future, and our failure to do so could adversely affect our business, including the execution of our global business strategy. Any failure by our management team to perform as expected may have a material adverse effect on our business, prospects, financial condition and results of operations.

Increases in costs, disruption of supply or shortage of raw materials could harm our business.

Once we increase production, we may experience increases in the cost or a sustained interruption in the supply or shortage of raw materials. Any such increase or supply interruption could materially negatively impact our business, prospects, financial condition and operating results. We use various raw materials including precious group metals such as platinum; carbon black; polymer precursors, reactants, and solvents; as well as carbon cloth and carbon fiber paper. The prices for these raw materials fluctuate depending on market conditions and global demand and could adversely affect our business and operating results.

We are or may be subject to risks associated with strategic alliances or acquisitions.

We have entered into, and may in the future enter into additional, strategic alliances, including joint ventures or minority equity investments with various third parties to further our business purpose. These alliances could subject us to a number of risks, including risks associated with sharing proprietary information, non-performance by the third party and increased expenses in establishing new strategic alliances, any of which may materially and adversely affect our business. We may have limited ability to monitor or control the actions of these third parties and, to the extent any of these strategic third parties suffers negative publicity or harm to their reputation from events relating to their business, we may also suffer negative publicity or harm to our reputation by virtue of our association with any such third party.

When appropriate opportunities arise, we may acquire additional assets, products, technologies or businesses that are complementary to our existing business. In addition to possible stockholder approval, we may need approvals and licenses from relevant government authorities for the acquisitions and to comply with any applicable laws and regulations, which could result in increased delay and costs, and may disrupt our business strategy if we fail to do so. Furthermore, acquisitions and the subsequent integration of new assets and businesses into our own require significant attention from our management and could result in a diversion of resources from our existing business, which in turn could have an adverse effect on our operations. Acquired assets or businesses may not generate the financial results we expect. Acquisitions could result in the use of substantial amounts of cash, potentially dilutive issuances of equity securities and exposure to potential unknown liabilities of the acquired business. Moreover, the costs of identifying and consummating acquisitions may be significant.

We may experience difficulties integrating the operations of acquired companies into our business and in realizing the expected benefits of these acquisitions.

We completed the acquisition of SerEnergy and FES on August 31, 2021. Acquisitions involve numerous risks, any of which could harm our business and negatively affect our financial condition and results of operations. The success of our acquisition of FES and SerEnergy will depend in part on our ability to realize the anticipated business opportunities from combining their and our operations in an efficient and effective manner. These integration processes could take longer than anticipated and could result in the loss of key employees, the disruption of each company’s ongoing businesses, tax costs or inefficiencies, or inconsistencies in standards, controls, information technology systems, procedures and policies, any of which could adversely affect our ability to maintain relationships with customers, employees or other third parties, or our ability to achieve the anticipated benefits of the acquisitions, and could harm our financial performance. If we are unable to successfully or timely integrate the operations of FES and SerEnergy with our business, we may incur unanticipated liabilities and be unable to realize the revenue growth, synergies and other anticipated benefits resulting from the acquisitions, or fully offset the costs of the acquisition, and our business, results of operations and financial condition could be materially and adversely affected.

We are subject to substantial regulation and unfavorable changes to, or failure by us to comply with, these regulations could substantially harm our business and operating results.

Our fuel cells and membranes are subject to substantial regulation under international, federal, state, and local laws. We expect to incur significant costs in complying with these regulations. Regulations related to alternative energy are currently evolving and we face risks associated with changes to these regulations, including but not limited to:

- increased subsidies for corn and ethanol production, which could reduce the operating cost of vehicles that use ethanol or a combination of ethanol and gasoline; and

- increased sensitivity by regulators to the needs of established automobile manufacturers with large employment bases, high fixed costs and business models based on the internal combustion engine, which could lead them to pass regulations that could reduce the compliance costs of such established manufacturers or mitigate the effects of government efforts to promote alternative fuel vehicles. Compliance with changing regulations could be burdensome, time consuming, and expensive. To the extent compliance with new regulations is cost prohibitive, our business, prospects, financial condition and operating results would be adversely affected.

We face risks associated with our international operations, including unfavorable regulatory, political, tax and labor conditions, which could harm our business.

We face risks associated with our international operations, including possible unfavorable regulatory, political, tax and labor conditions, which could harm our business. We have international operations in Europe and Asia that are subject to the legal, political, regulatory and social requirements and economic conditions in these jurisdictions. We are subject to a number of risks associated with international business activities that may increase our costs, impact our ability to sell our fuel cells and membranes and require significant management attention. These risks include:

- difficulty in staffing and managing foreign operations;
- foreign government taxes, regulations and permit requirements, including foreign taxes that we may not be able to offset against taxes imposed upon us in the U.S., and foreign tax and other laws limiting our ability to repatriate funds to the U.S.;
- fluctuations in foreign currency exchange rates and interest rates;
- increased inflation rates and cost of goods;
- U.S. and foreign government trade restrictions, tariffs and price or exchange controls;
- foreign labor laws, regulations and restrictions;
- changes in diplomatic and trade relationships;
- political instability, natural disasters, war, or events of terrorism;
- the escalation or continuation of armed conflict, hostilities or economic sanctions between countries or regions, including the current conflict between Russia and Ukraine;
- the strength of international economies and economic relations between countries or regions; and
- economic uncertainties and potential disruptions include a slow-down in the general economy.

If we fail to successfully address these risks, our business, prospects, operating results and financial condition could be materially harmed.

The unavailability, reduction or elimination of government and economic incentives could have a material adverse effect on our business, prospects, financial condition and operating results.

Any reduction, elimination or discriminatory application of government subsidies and economic incentives because of policy changes, the reduced need for such subsidies and incentives due to the perceived success of alternative energies or other reasons may result in the diminished competitiveness of the alternative fuel industry generally. This could materially and adversely affect the growth of the alternative fuel automotive markets and our business, prospects, financial condition and operating results.

While certain tax credits and other incentives for alternative energy production and alternative fuel vehicles have been available in the past, there is no guarantee these programs will be available in the future. If current tax incentives are not available in the future, our financial position could be harmed.

We may not be able to obtain or agree on acceptable terms and conditions for all or a significant portion of the government grants, loans and other incentives for which we may apply in the future. As a result, our business and prospects may be adversely affected.

We anticipate continuing to apply for federal and state grants, loans and tax incentives under government programs designed to stimulate the economy and support the production of alternative fuel vehicles and related technologies. We anticipate that in the future there will be new opportunities for us to apply for grants, loans and other incentives from the U.S., state and foreign governments. Our ability to obtain funds or incentives from government sources is subject to the availability of funds under applicable government programs and approval of our applications to participate in such programs. The application process for these funds and other incentives will likely be highly competitive. We cannot assure you that we will be successful in obtaining any of these additional grants, loans and other incentives. If we are not successful in obtaining any of these additional incentives and we are unable to find alternative sources of funding to meet our planned capital needs, our business and prospects could be materially adversely affected.

We may need to defend ourselves against patent or trademark infringement claims, which may be time-consuming and cause us to incur substantial costs.

Companies, organizations or individuals, including our competitors, may own or obtain patents, trademarks or other proprietary rights that would prevent or limit our ability to make, use, develop, license or sell our fuel cell and membrane technologies, which could make it more difficult for us to operate our business. We may receive inquiries from patent or trademark owners inquiring whether we infringe their proprietary rights. Companies owning patents or other intellectual property rights relating to fuel cells may allege infringement of such rights. In response to a determination that we have infringed upon a third party's intellectual property rights, we may be required to do one or more of the following:

- cease development, sales, license or use of fuel cells or membranes that incorporate the asserted intellectual property;

- pay substantial damages;

- obtain a license from the owner of the asserted intellectual property right, which license may not be available on reasonable terms or at all; or

- redesign one or more aspects or systems of our fuel cells or membranes.

A successful claim of infringement against us could materially adversely affect our business, prospects, operating results and financial condition. Any litigation or claims, whether valid or invalid, could result in substantial costs and diversion of resources.

We also plan to license patents and other intellectual property from third parties and we may face claims that our use of this in-licensed technology infringes the intellectual property rights of others. In such cases, we will seek indemnification from our licensors. However, our rights to indemnification may be unavailable or insufficient to cover our costs and losses.

Our business may be adversely affected if we are unable to protect our intellectual property rights from unauthorized use by third parties.

Failure to adequately protect our intellectual property rights could result in our competitors offering similar products, potentially resulting in the loss of some of our competitive advantage and a decrease in our revenue, which would adversely affect our business, prospects, financial condition and operating results. Our success depends, at least in part, on our ability to protect our core technology and intellectual property. To accomplish this, we will rely on a combination of patents, trade secrets (including know-how), employee and third-party nondisclosure agreements, copyright, trademarks, intellectual property licenses and other contractual rights to establish and protect our rights in our technology.

The protection of our intellectual property rights will be important to our future business opportunities. However, the measures we take to protect our intellectual property from unauthorized use by others may not be effective for various reasons, including the following:

- any patent applications we submit may not result in the issuance of patents;
- the scope of our issued patents may not be broad enough to protect our proprietary rights;
- our issued patents may be challenged and/or invalidated by our competitors;
- the costs associated with enforcing patents, confidentiality and invention agreements or other intellectual property rights may make aggressive enforcement impracticable;
- current and future competitors may circumvent our patents; and
- our in-licensed patents may be invalidated, or the owners of these patents may breach our license arrangements.

Patent, trademark, and trade secret laws vary significantly throughout the world. Some foreign countries do not protect intellectual property rights to the same extent as do the laws of the U.S. Further, policing the unauthorized use of our intellectual property in foreign jurisdictions may be difficult. Therefore, our intellectual property rights may not be as strong or as easily enforced outside of the U.S.

Our patent applications may not issue as patents, which may have a material adverse effect on our ability to prevent others from commercially exploiting products similar to ours.

We cannot be certain that we are the first inventor of the subject matter to which we have filed a particular patent application, or if we are the first party to file such a patent application. If another party has filed a patent application to the same subject matter as we have, we may not be entitled to the protection sought by the patent application. Further, the scope of protection of issued patent claims is often difficult to determine. As a result, we cannot be certain that the patent applications that we file will issue, or that our issued patents will afford protection against competitors with similar technology. In addition, our competitors may design around our issued patents, which may adversely affect our business, prospects, financial condition or operating results.

Our management team has limited experience managing a public company.

Most members of our management team have limited experience managing a publicly-traded company, interacting with public company investors and complying with the increasingly complex laws pertaining to public companies. Our management team may not successfully or efficiently manage our transition to being a public company subject to significant regulatory oversight and reporting obligations under the federal securities laws and the scrutiny of securities analysts and investors. These new obligations and constituents will require significant attention from our management team and could divert their attention away from the day-to-day management of our business, which could materially and adversely affect our business, financial condition, operating results, cash flows and prospects.

The restatement of our financial statements in May 2021 has subjected us to additional risks and uncertainties, including increased professional costs and the increased possibility of legal proceedings.

As a result of the restatement of our financial statements in May 2021, we have become subject to additional risks and uncertainties, including, among others, increased professional fees and expenses and time commitment that may be required to address matters related to the restatement, and scrutiny of the SEC and other regulatory bodies which could cause investors to lose confidence in the Company’s reported financial information and could subject us to civil or criminal penalties or shareholder litigation. We could face monetary judgments, penalties or other sanctions that could have a material adverse effect on the Company’s business, financial condition and results of operations and could cause its stock price to decline.

Certain of our warrants are accounted for as a warrant liability and are recorded at fair value upon issuance with changes in fair value each period to be reported in earnings, which may have an adverse effect on the market price of our common stock.

Following the restatement in May 2021 of our historical financial statements, we account for certain of our warrants as a warrant liability and record at fair value. Any changes in fair value each period are reported in earnings as determined by the Company based upon a valuation report obtained from its independent third party valuation firm. The impact of changes in fair value on earnings may have an adverse effect on the market price of our common stock.

Obtaining the MIL-STD certification for the Honey Badger and advancing it for U.S. army integration is subject to risks and uncertainty.

Obtaining the MIL-STD certification for the Honey Badger and advancing it for U.S. army integration is subject to risks and uncertainty, and may not be completed on the timeline we expect, or at all.

Cybersecurity risks and attacks, security incidents, and data breaches could compromise our intellectual property or other proprietary information, could disrupt our electronic infrastructure, operations and manufacturing, and could impact our competitive position, reputation, results of operations, financial condition, and cash flows.

We rely upon our information technology and electronic infrastructure and its capacity, reliability, and security in connection with various and critical aspects of our business activities. We also rely on our ability to expand and continually update these technologies and related infrastructure in response to the changing needs of our business and the risks presented. We face challenges related to supporting our older technologies and implementing necessary upgrades and the hardening of current technologies. In addition, some of these technologies are managed by third-party service providers and are not under our direct control. If we experience a problem with a critical technology, including during upgrades or new technology implementations, any resulting disruptions could have an adverse effect on our business operations and our performance.

Our business operations rely upon our electronic infrastructure and that of our third-party vendors, including to handle information and data such as intellectual property, personal information, protected information, financial information and other confidential and proprietary information related to our business and our employees, prospects, customers, suppliers and other business partners. While we maintain certain administrative, technical, and physical safeguards and take preventive and proactive measures to combat known and unknown cybersecurity risks, our work and processes to build out and mature our electronic infrastructure, controls, policies and safeguards is ongoing. There is no assurance that our current controls and our ongoing efforts will be sufficient to eliminate security risks.

Cyberattacks are increasing in frequency and evolving in nature. We and our third-party providers are at risk of attack through use of increasingly sophisticated methods, including malware, phishing, ransomware, and the deployment of technologies to find and exploit vulnerabilities. Like many organizations, we have been targeted by phishing attacks, for example. Our electronic infrastructure, and information technology systems maintained by our third-party providers, have been in the past, and may be in the future, subjected to attempts to gain unauthorized access, disable, destroy, maliciously control or cause other business disruptions. In some cases, it is difficult to anticipate or to detect immediately such incidents and any damage caused. While these types of incidents have not had a material impact on our business to-date, future incidents involving access to or improper use of our systems, or those of our third-parties, could compromise confidential, proprietary or otherwise sensitive information.

In addition, cyberattacks could negatively impact our reputation and our competitive position and could result in litigation with third parties, regulatory action, significant remediation costs, and loss of business and customers relationships, any of which could adversely impact our business, our financial condition, and our operating results. Although we maintain some insurance coverage, we cannot be certain that coverage would apply to cyber risks, that it may be adequate for liabilities incurred, or that any insurer will not accept or deny coverage of future claims.

We may experience problems with the operation of our electronic infrastructure or the technology systems of third parties on which we rely, as well as the development and deployment of new electronic infrastructure, that could adversely affect, or even disrupt, all or a portion of our operations until resolved. In addition, as a result of the COVID-19 pandemic a large percentage of our salaried employees continue to work remotely full or part-time. This remote working environment may pose a heightened risk for security breaches or other disruptions of our information technology environment.

Our global operations are subject to data privacy laws and regulations that impose significant compliance costs and create reputational and legal risk.

Due to the international scope of our operations, we may be subject to a complex system of regulatory requirements regarding data privacy, such as the European Union General Data Protection Regulation and California's Consumer Privacy Act and its amendments.

Our numerous foreign operations are governed by laws, rules and business practices that differ from those of the U.S. We cannot predict now our future data privacy risks or the nature, scope or effect of future regulatory requirements to which our operations might be subject or the manner in which existing laws might be administered or interpreted.

A write-off of all or part of our goodwill or other intangible assets could adversely affect our operating results and net worth.

Goodwill and other intangible assets are a component of our assets. As a part of our acquisition of SerEnergy and FES on August 31, 2021, we recognized $29.4 million in goodwill and $19.8 million in other intangible assets. In the year ended December 31, 2022, we recognized an impairment charge related to goodwill and certain intangible assets of $38.9 million. As of December 31, 2022, goodwill was $5.7 million and other intangible assets were $6.1 million of our total assets of $89.6 million. We may have to write off all or part of our remaining goodwill or other intangible assets if their value becomes impaired. Although this write-off would be a non-cash charge, it could reduce our earnings and our financial condition.

Adverse developments affecting the financial services industry, such as actual events or concerns involving liquidity, defaults, or non-performance by financial institutions or transactional counterparties, could adversely affect the Company's current and projected business operations and its financial condition and results of operations.

Actual events involving limited liquidity, defaults, non-performance or other adverse developments that affect financial institutions, transactional counterparties or other companies in the financial services industry or the financial services industry generally, or concerns or rumors about any events of these kinds or other similar risks, have in the past and may in the future lead to market-wide liquidity problems. For example, on March 10, 2023, Silicon Valley Bank (SVB) was closed by the California Department of Financial Protection and Innovation, which appointed the Federal Deposit Insurance Corporation (FDIC) as receiver. Similarly, on March 12, 2023, Signature Bank and Silvergate Capital Corp. were each swept into receivership. Although a statement by the Department of the Treasury, the Federal Reserve and the FDIC indicated that all depositors of SVB would have access to all of their money after only one business day of closure, including funds held in uninsured deposit accounts, borrowers under credit agreements, letters of credit and certain other financial instruments with SVB, Signature Bank or any other financial institution that is placed into receivership by the FDIC may be unable to access undrawn amounts thereunder. Although we are not a borrower or party to any such instruments with SVB, Signature or any other financial institution currently in receivership, if any of our lenders or counterparties to any such instruments were to be placed into receivership, we may be unable to access such funds. In addition, if any of our customers, suppliers or other parties with whom we conduct business are unable to access funds pursuant to such instruments or lending arrangements with such a financial institution, such parties' ability to pay their obligations to us or to enter into new commercial arrangements requiring additional payments to us could be adversely affected. In this regard, counterparties to SVB credit agreements and arrangements, and third parties such as beneficiaries of letters of credit (among others), may experience direct impacts from the closure of SVB and uncertainty remains over liquidity concerns in the broader financial services industry. Similar impacts have occurred in the past, such as during the 2008-2010 financial crisis. We hold no deposits or securities with SVB, Signature Bank or Silvergate Capital.

Risks Related to Ownership of Our Common Stock and Warrants

Delaware law and our second amended and restated certificate of incorporation and second amended and restated bylaws contain certain provisions, including anti-takeover provisions, that limit the ability of stockholders to take certain actions and could delay or discourage takeover attempts that stockholders may consider favorable.

Our second amended and restated certificate of incorporation and our amended and restated bylaws, and the Delaware General Corporation Law ("DGCL"), contain provisions that could have the effect of rendering more difficult, delaying, or preventing an acquisition deemed undesirable by our board of directors and therefore depress the trading price of our common stock. These provisions could also make it difficult for stockholders to take certain actions, including electing directors or taking other corporate actions, including effecting changes in our management. Among other things, our second amended and restated certificate of incorporation and amended and restated bylaws include provisions regarding:

- a classified board of directors with three-year staggered terms, which could delay the ability of stockholders to change the membership of a majority of our board of directors;

- the ability of our board of directors to issue shares of preferred stock, including "blank check" preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;

- the limitation of the liability of, and the indemnification of, our directors and officers;

- the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of our board of directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our board of directors;

- the requirement that directors may only be removed from our board of directors for cause;

- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of stockholders and could delay the ability of stockholders to force consideration of a stockholder proposal or to take action, including the removal of directors;

- the requirement that a special meeting of stockholders may be called only by our board of directors, the chairperson of our board of directors, our chief executive officer or our president (in the absence of a chief executive officer), which could delay the ability of stockholders to force consideration of a proposal or to take action, including the removal of directors;

- controlling the procedures for the conduct and scheduling of board of directors and stockholder meetings;

- the requirement for the affirmative vote of holders of at least 65% of the voting power of all of the then outstanding shares of the voting stock, voting together as a single class, to amend, alter, change or repeal any provision of the second amended and restated certificate of incorporation or amended and restated bylaws, which could preclude stockholders from bringing matters before annual or special meetings of stockholders and delay changes in our board of directors and also may inhibit the ability of an acquirer to effect such amendments to facilitate an unsolicited takeover attempt;

- the ability of our board of directors to amend the amended and restated bylaws, which may allow our board of directors to take additional actions to prevent an unsolicited takeover and inhibit the ability of an acquirer to amend the amended and restated bylaws to facilitate an unsolicited takeover attempt; and

- advance notice procedures with which stockholders must comply to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which could preclude stockholders from bringing matters before annual or special meetings of stockholders and delay changes in our board of directors and also may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of surviving entity.

These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our board of directors or management.

In addition, as a Delaware corporation, we will be subject to provisions of Delaware law, including Section 203 of the DGCL, which may generally prohibit certain stockholders holding 15% or more of our outstanding capital stock from engaging in certain business combinations with us for a specified period of time unless certain conditions are met.

Any provision of the second amended and restated certificate of incorporation, amended and restated bylaws or Delaware law that has the effect of delaying or preventing a change in control could limit the opportunity for stockholders to receive a premium for their shares of our capital stock and could also affect the price that some investors are willing to pay for our common stock.

Our second amended and restated certificate of incorporation designate a state or federal court located within the State of Delaware as the exclusive forum for substantially all disputes between us and our stockholders, and also provide that the federal district courts will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, each of which could limit the ability of our stockholders to choose the judicial forum for disputes with us or our directors, officers, or employees.

The second amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the sole and exclusive forum for (1) any derivative action or proceeding brought on its behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of its directors, officers, or other employees to us or our stockholders, (3) any action arising pursuant to any provision of the Delaware General Corporation Law, or the second amended and restated certificate of incorporation or the amended and restated bylaws or (4) any other action asserting a claim that is governed by the internal affairs doctrine shall be the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, the federal district court for the District of Delaware), in all cases subject to the court having jurisdiction over indispensable parties named as defendants. The second amended and restated certificate of incorporation also provides that the federal district courts of the U.S. will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. The exclusive forum provision is applicable to the fullest extent permitted by applicable law, subject to certain exceptions. Section 27 of the Exchange Act creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. As a result, the exclusive forum provision will not apply to suits brought to enforce any duty or liability created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. We note, however, that there is uncertainty as to whether a court would enforce this provision and that investors cannot waive compliance with the federal securities laws and the rules and regulations thereunder. Section 22 of the Securities Act creates concurrent jurisdiction for state and federal courts over all suits brought to enforce any duty or liability created by the Securities Act or the rules and regulations 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 this provision. 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 be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving the dispute in other jurisdictions, which could harm its results of operations.

An active market for our securities may not develop, which would adversely affect the liquidity and price of our securities.

The price of our securities may vary significantly due to factors specific to our business as well as to general market or economic conditions. Furthermore, an active trading market for our securities may never develop or, if developed, it may not be sustained. You may be unable to sell your securities unless a market can be established and sustained.

NASDAQ may delist our securities from trading on its exchange, which could limit investors' ability to make transactions in our securities and subject us to additional trading restrictions.

Our securities, including common stocks and warrants, are currently listed on the Nasdaq Capital Market. However, we cannot assure you that our securities will continue to be listed on the Nasdaq Capital Market in the future. In order to continue listing our securities on the Nasdaq Capital Market, we must maintain certain financial, distribution and stock price levels. Generally, we must maintain a minimum amount in stockholders' equity (generally $2,500,000) and a minimum number of holders of our securities (generally 300 public holders). Additionally, we are required to demonstrate compliance with other Nasdaq's continued listing requirements in order to continue to maintain the listing of our securities on the Nasdaq Capital Market. For instance, our stock price would generally be required to be at least $1 per share. We cannot assure you that we will be able to meet those continued listing requirements at all times.

If Nasdaq delists our securities from trading on its exchange and we are not able to list our securities on another national securities exchange, we expect our securities could be quoted on an over-the-counter market. If this were to occur, we could face significant material adverse consequences, including:

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

Our common stock price may change significantly and you could lose all or part of your investment as a result.

The trading price of our common stock is likely to be volatile. The stock market recently has experienced extreme volatility. This volatility often has been unrelated or disproportionate to the operating performance of particular companies. You may not be able to resell your shares of our common stock at an attractive price due to a number of factors such as those listed in "*Risk Factors Relating to Our Operations and Business*" and the following:

- results of operations that vary from the expectations of securities analysts and investors;
- results of operations that vary from our competitors;
- changes in expectations as to our future financial performance, including financial estimates and investment recommendations by securities analysts and investors;
- declines in the market prices of stocks generally;
- strategic actions by us or our competitors;
- announcements by us or our competitors of significant contracts, acquisitions, joint ventures, other strategic relationships or capital commitments;
- any significant change in our management;
- changes in general economic or market conditions or trends in our industry or markets;
- changes in business or regulatory conditions, including new laws or regulations or new interpretations of existing laws or regulations applicable to our business;

- future sales of our common stock or other securities;
- investor perceptions of the investment opportunity associated with our common stock relative to other investment alternatives;
- the public's response to press releases or other public announcements by us or third parties, including our filings with the SEC;
- litigation involving us, our industry, or both, or investigations by regulators into our operations or those of our competitors;
- guidance, if any, that we provide to the public, any changes in this guidance or our failure to meet this guidance;
- the development and sustainability of an active trading market for our common stock;
- actions by institutional or activist stockholders;
- changes in accounting standards, policies, guidelines, interpretations or principles; and
- other events or factors, including those resulting from pandemics, natural disasters, war, acts of terrorism or responses to these events.

These broad market and industry fluctuations may adversely affect the market price of our common stock, regardless of our actual operating performance. In addition, price volatility may be greater if the public float and trading volume of our common stock is low.

In the past, following periods of market volatility, stockholders have instituted securities class action litigation. If we were involved in securities litigation, it could have a substantial cost and divert resources and the attention of executive management from our business regardless of the outcome of such litigation.

Because there are no current plans to pay cash dividends on our common stock for the foreseeable future, you may not receive any return on investment unless you sell your common stock at a price greater than what you paid for it.

We intend to retain future earnings, if any, for future operations, expansion and debt repayment and there are no current plans to pay any cash dividends for the foreseeable future. The declaration, amount and payment of any future dividends on shares of common stock will be at the sole discretion of the board of directors. The board of directors may take into account general and economic conditions, our financial condition and results of operations, our available cash and current and anticipated cash needs, capital requirements, contractual, legal, tax and regulatory restrictions, implications of the payment of dividends by us to our stockholders or by its subsidiaries to it and such other factors as the board of directors may deem relevant. As a result, you may not receive any return on an investment in our common stock unless you sell your common stock for a price greater than that which you paid for it.

Our stockholders may experience dilution in the future.

The percentage of shares of our common stock owned by current stockholders may be diluted in the future because of equity issuances for acquisitions, capital market transactions or otherwise, including, without limitation, equity awards that we may grant to its directors, officers and employees, or exercise of warrants. Such issuances may have a dilutive effect on our earnings per share, which could adversely affect the market price of our common stock.

If securities or industry analysts do not publish research or reports about our business, if they change their recommendations regarding our common stock or if our operating results do not meet their expectations, our common stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our businesses. If no securities or industry analysts commence coverage of us or our business, the trading price for our common stock could be negatively impacted. In the event securities or industry analysts initiate coverage, if one or more of the analysts who cover us downgrade our securities or publish unfavorable research about our businesses, or if our operating results do not meet analyst expectations, the trading price of our common stock would likely decline. If one or more of these analysts cease coverage of us or fail to publish reports on us regularly, demand for our common stock could decrease, which might cause our common stock price and trading volume to decline.

Future sales, or the perception of future sales, by us or our stockholders in the public market could cause the market price for our common stock to decline.

The sale of shares of our common stock in the public market, or the perception that such sales could occur, could harm the prevailing market price of shares of our common stock. These sales, or the possibility that these sales may occur, also might make it more difficult for us to sell equity securities in the future at a time and at a price that it deems appropriate.

The shares of Advent's common stock reserved for future issuance under the 2021 Equity Incentive Plan will become eligible for sale in the public market once those shares are issued, subject to any applicable vesting requirements, lockup agreements and other restrictions imposed by law. A total of 6,915,892 shares of common stock have been reserved for future issuance under the 2021 Equity Incentive Plan. We are expected to file one or more registration statements on Form S-8 under the Securities Act to register shares of our common stock or securities convertible into or exchangeable for shares of our common stock issued pursuant to the Equity Incentive Plan. Any such Form S-8 registration statements will automatically become effective upon filing. Accordingly, shares registered under such registration statements will be available for sale in the open market. The initial registration statement on Form S-8 is expected to cover shares of our common stock.

In the future, we may also issue our securities in connection with investments or acquisitions. The amount of shares of our common stock issued in connection with an investment or acquisition could constitute a material portion of the then-outstanding shares of our common stock. Any issuance of additional securities in connection with investments or acquisitions may result in additional dilution to our stockholders.

As a public company, we are subject to additional laws, regulations and stock exchange listing standards, which impose additional costs on us and may strain our resources and divert our management's attention.

Advent previously operated on a private basis and following the Business Combination it became a wholly-owned subsidiary of a public company that is subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, the listing requirements of Nasdaq and other applicable securities laws and regulations. Compliance with these laws and regulations will increase our legal and financial compliance costs and make some activities more difficult, time-consuming or costly, which may strain our resources or divert management's attention.

We are an emerging growth company within the meaning of the Securities Act, and if we take advantage of certain exemptions from disclosure requirements available to emerging growth companies, this could make our securities less attractive to investors and may make it more difficult to compare our performance with other public companies.

We are an "emerging growth company" within the meaning of the Securities Act, as modified by the JOBS Act. We may continue to take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. As a result, our stockholders may not have access to certain information they may deem important. We cannot predict whether investors will find securities issued by us less attractive because we will rely on these exemptions. If some investors find those securities less attractive as a result of its reliance on these exemptions, the trading prices of our securities may be lower than they otherwise would be, there may be a less active trading market for our securities and the trading prices of our securities may be more volatile.

Further, Section 102(b)(1) of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies (that is, those that have not had a Securities Act registration statement declared effective or do not have a class of securities registered under the Exchange Act) are required to comply with the new or revised financial accounting standards. The JOBS Act provides that a company can elect to opt out of the extended transition period and comply with the requirements that apply to non-emerging growth companies but any such election to opt out is irrevocable. We have elected not to opt out of such extended transition period, which means that when a standard is issued or revised and it has different application dates for public or private companies, we, as an emerging growth company, can adopt the new or revised standard at the time private companies adopt the new or revised standard. This may make comparison of our financial statements with another public company that is neither an emerging growth company nor an emerging growth company that has opted out of using the extended transition period difficult or impossible because of the potential differences in accountant standards used.

We may redeem unexpired public warrants prior to their exercise at a time that is disadvantageous for warrant holders.

We will have the ability to redeem outstanding public warrants at any time after they become exercisable and prior to their expiration, at a price of $0.01 per warrant, provided that the last reported sales price of our common stock equals or exceeds $18.00 per share (as adjusted for stock splits, stock dividends, reorganizations, recapitalizations and the like) for any 20 trading days within a 30 trading-day period ending on the third trading day prior to the date we send the notice of redemption to the warrant holders. If and when the public warrants become redeemable by us, we may exercise our redemption right when the registration statement to which this Annual Report forms a part comes into effect with respect to the shares of common stock underlying such warrants. Redemption of the outstanding public warrants could force you to: (1) exercise your warrants and pay the related exercise price at a time when it may be disadvantageous for you to do so; (2) sell your warrants at the then-current market price when you might otherwise wish to hold your warrants; or (3) accept the nominal redemption price which, at the time the outstanding public warrants are called for redemption, is likely to be substantially less than the market value of your warrants. None of the placement warrants or working capital warrants will be redeemable by us for cash so long as they are held by our sponsor or its permitted transferees.

Changes in accounting standards and subjective assumptions, estimates and judgments by management related to complex accounting matters could significantly affect our financial condition and results of operations.

Accounting principles and related pronouncements, implementation guidelines and interpretations we apply to a wide range of matters that are relevant to our business, including, but not limited to, revenue recognition, leases and stock-based compensation, are complex and involve subjective assumptions, estimates and judgments by our management. Changes in accounting pronouncements or their interpretation or changes in underlying assumptions, estimates or judgments by our management could significantly change our reported or expected financial performance.

The exercise of Warrants for our common stock would increase the number of shares eligible for future resale in the public market and result in dilution to our stockholders.

As of December 31, 2022, we had Warrants to purchase an aggregate of 26,369,557 shares of our common stock outstanding. To the extent remaining Warrants are exercised, additional shares of common stock will be issued, which will result in dilution to the then-existing holders of common stock and increase the number of shares eligible for resale in the public market. Sales of substantial numbers of such shares in the public market or the fact that such Warrants may be exercised could adversely affect the market price of our common stock.

The valuation of our Warrants could increase the volatility in our net income (loss) in our consolidated statements of earnings (loss).

The change in fair value of our Warrants is the result of changes in stock price and Warrants outstanding at each reporting period. The Change in Fair Value of Warrant Liabilities represents the mark-to-market fair value adjustments to the outstanding Warrants issued in connection with the initial public offering of ACMI and the concurrent private placement. Significant changes in our stock price or number of Warrants outstanding may adversely affect our net income (loss) in our consolidated statements of earnings (loss).

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

We lease approximately 3,400 square feet of offices located in Patras, Greece. The leases are set to expire on December 31, 2028. Through the Fischer Acquisition, we have leased from Fischer the space, comprising approximately 10,750 square feet, in which FES operates and acquired property containing approximately 8,600 square feet of SerEnergy office, production and laboratory facilities located in Aalborg, Denmark. We also assumed a lease from Fischer in Aalborg, Denmark for approximately 7,000 square meters containing meeting rooms and a warehouse used by SerEnergy, and office, workshop, and warehouse spaces in two locations in Paranaque City, Philippines totaling approximately 12,700 square feet. Through our wholly owned subsidiary, FES, we entered into a lease agreement with fischer group SE & Co. KG in Achern for approximately 1,017 square feet of office space, workspace and outdoor laboratory at 77855 Achern, Im Gewerbegebiet 7 for use by FES. We entered into a lease for 21,401 square feet as a product development and manufacturing center at Hood Park in Charlestown, MA. The lease has a term of eight years and five months, with an option to extend for five years and the contractual lease commencement date was in October 2022. We entered into a lease dated February 5, 2021 for approximately 6,000 square feet of office space at 200 Clarendon Street, Boston, Massachusetts 02116 as the Company's executive offices. The term of the lease is five years (unless sooner terminated as provided in the lease agreement). On January 9, 2023, the Company entered into a sublease agreement for the office space at 200 Clarendon Street. The term of the sublease is three years.

Item 3. Legal Proceedings.

We are from time to time subject to various claims, lawsuits and other legal and administrative proceedings arising in the ordinary course of business. Some of these claims, lawsuits and other proceedings may involve highly complex issues that are subject to substantial uncertainties, and could result in damages, fines, penalties, non-monetary sanctions or relief. However, we do not consider any such claims, lawsuits or proceedings that are currently pending, individually or in the aggregate, to be material to our business or likely to result in a material adverse effect on our future operating results, financial condition or cash flows.

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 Certain Information Regarding the Trading of Our Common Stock

Our common stock and public warrants are listed on the Nasdaq Capital Market under the symbols "ADN" and "ADNW", respectively.

Holders of Our Common Stock

As of March 31, 2023, there were approximately 31 holders of record of shares of our common stock and 2 holders of record of our warrants. Such numbers do not include DTC participants or beneficial owners holding shares through nominee names.

Dividends

We have never declared or paid any dividends on our common stock. We do not anticipate declaring or paying any cash dividends on our capital stock in the foreseeable future. The payment of cash dividends in the future will be dependent upon our revenues and earnings, if any, capital requirements and general financial condition. The payment of any cash dividends will be within the discretion of the board of directors at such time.

Securities authorized for issuance under equity compensation plans

See Part III, Item 12 for information regarding securities authorized for issuance under our equity compensation plans.

Recent sales of unregistered securities

None.

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 consolidated financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K.

Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the Item 1A. "Risk Factors" section of this Annual Report on Form 10-K, our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

This MD&A generally discusses 2022 and 2021 items and year-over-year comparisons between 2022 and 2021. See Note 1 "Basis of Presentation" in the accompanying consolidated financial statements for additional information.

Overview

Advent is an advanced materials and technology development company operating in the fuel cell and hydrogen technology space. Advent develops, manufactures and assembles the critical components that determine the performance of hydrogen fuel cells and other energy systems. Advent's core product offerings are full fuel cell systems and the Membrane Electrode Assembly (MEA) at the center of the fuel cell. The Advent MEA, which derives its key benefits from the properties of Advent's engineered membrane technology, enables a more robust, longer-lasting and ultimately lower-cost fuel cell product.

To date, Advent's principal operations have been to develop and manufacture MEAs, and to design fuel cell stacks and complete fuel cell systems for a range of customers in the stationary power, portable power, automotive, aviation, energy storage and sensor markets. Advent has its headquarters, research and development, and manufacturing facility in Boston, Massachusetts, a product development facility in Livermore, California, and production facilities in Greece, Denmark, and Germany and sales and warehousing facilities in the Philippines.

The majority of Advent's current revenue derives from the sale and servicing of fuel cell systems and MEAs, as well as the sale of membranes and electrodes for specific applications in the iron flow battery and cellphone markets, respectively. While fuel cell systems and MEA sales and associated revenues are expected to provide the majority of Advent's future income, both of these markets remain commercially viable and have the potential to generate material future revenues based on Advent's existing customers. Advent has also secured grant funding for a range of projects from research agencies and other organizations. Advent expects to continue to be eligible for grant funding based on its product development activities over the foreseeable future.

Business Combination and Public Company Costs

On October 12, 2020, Advent Technologies, Inc. ("Legacy Advent") entered into the Merger Agreement with AMCI Acquisition Corp. ("AMCI"), a Delaware corporation, AMCI Merger Sub Corp., a newly-formed Delaware corporation and wholly-owned subsidiary of AMCI ("Merger Sub"), AMCI Sponsor LLC, a Delaware limited liability company ("Sponsor"), solely in the capacity as the representative from and after the effective time of the Business Combination for the stockholders of AMCI, and Vassilios Gregoriou, in the capacity as Seller Representative (the "Seller Representative"), pursuant to which, effective February 4, 2021 (the "Closing"), Merger Sub merged with and into Legacy Advent., with Legacy Advent surviving the Merger as a wholly-owned subsidiary of AMCI and AMCI changed its name to "Advent Technologies Holdings, Inc.". Advent Technologies, Inc. is deemed the accounting predecessor and the combined entity is the successor registrant with the SEC, meaning that Advent Technologies, Inc.'s financial statements for previous periods are and will be disclosed in the company's current and future periodic reports filed with the SEC.

While the legal acquirer in the Merger Agreement is AMCI, for financial accounting and reporting purposes under GAAP, we have determined that Advent Technologies is the accounting acquirer and the Business Combination will be accounted for as a "reverse recapitalization." A reverse recapitalization does not result in a new basis of accounting, and the financial statements of the combined entity represent the continuation of the financial statements of Advent Technologies in many respects. Under this method of accounting, AMCI is treated as the acquired entity whereby Legacy Advent is deemed to have issued common stock for the net assets and equity of AMCI, consisting mainly of cash, accompanied by a simultaneous equity recapitalization of AMCI.

Upon consummation of the Business Combination, the most significant change in Legacy Advent's reported financial position and results was an increase in cash of approximately $141.1 million. Total direct and incremental transaction costs of AMCI and Legacy Advent, along with liabilities of AMCI paid off at the Closing, were approximately $23.6 million.

As a consequence of the Business Combination, Legacy Advent became the successor to an SEC-registered and Nasdaq-listed company which has required and will require Advent to hire additional personnel and implement procedures and processes to address public company regulatory requirements and customary practices. Advent expects to incur additional annual expenses as a public company for, among other things, directors' and officers' liability insurance, director fees and additional internal and external accounting, legal and administrative resources, including increased audit and legal fees.

Additionally, Advent anticipates that its revenue, capital and operating expenditures will increase significantly in connection with its ongoing activities following the Business Combination, as Advent expects to:

- Expand U.S.-based operations to increase capacity for product testing, development projects and associated research and development activities;
- Expand production facilities to increase and automate assembly and production of fuel cell systems and MEAs;

- Develop improved MEA and other products for both existing and new markets, such as ultra-light MEAs designed for aviation applications, to remain at the forefront of the fast-developing hydrogen economy;
- Increase business development and marketing activities;
- Increase headcount in management and head office functions in order to appropriately manage Advent's increased operations;
- Improve its operational, financial and management information systems;
- Obtain, maintain, expand, and protect its intellectual property portfolio; and
- Operate as a public company.

Business Developments

Share Purchase Agreement

On August 31, 2021, pursuant to the Share Purchase Agreement (the "Purchase Agreement"), dated as of June 25, 2021, by and between the Company and F.E.R. fischer Edelstahlrohre GmbH, a limited liability company incorporated under the Laws of Germany (the "Seller"), the Company acquired (the "Acquisition") all of the issued and outstanding equity interests in SerEnergy A/S, a Danish stock corporation and a wholly-owned subsidiary of the Seller ("SerEnergy") and fischer eco solutions GmbH, a German limited liability company and a wholly-owned subsidiary of the Seller ("FES"), together with certain outstanding shareholder loan receivables. As consideration for the transactions contemplated by the Purchase Agreement, the Company paid to the Seller €15.0 million in cash and on August 31, 2021, the Company issued to the Seller 5,124,846 shares of common stock.

Pursuant to the Purchase Agreement, the Company acquired SerEnergy and FES, the fuel cell systems business of fischer Group. SerEnergy is a leading manufacturer of methanol-powered high-temperature polymer electrolyte membrane ("HT-PEM") fuel cells and operates facilities in Aalborg, Denmark and in Manila, Philippines. FES provides fuel-cell stack assembly and testing as well as the production of critical fuel cell components of the SerEnergy HT-PEM fuel cells, including membrane electrode assemblies, bipolar plates and reformers. FES operates a facility on fischer Group's campus in Achern, Germany, and Advent agreed to lease that respective portion of the facility at the closing of the Acquisition.

Green HiPo Project approved by EU

On June 16, 2022, Advent announced the receipt of a notification from the Greek State informing the Company that the IPCEI Green HiPo was submitted for ratification by the EU for funding of €782.1 million, spread over six years. On July 15, 2022, Advent received official ratification from the European Commission of the EU. The Green HiPo project is designed to bring the development, design, and manufacture of HT-PEM fuel cells and electrolysers for the production of power and green hydrogen to the Western Macedonia region of Greece.

New Hood Park Research and Development ("R&D") and Production Facility

In March 2023, Advent announced that it had opened its new R&D and manufacturing facility at Hood Park in Boston, Massachusetts. Located at the heart of one of Boston's newest innovation and R&D communities, the state-of-the-art Hood Park facility will enable Advent to scale-up and deliver on the increasing global demand for electrochemical components in the clean energy sector by including state-of-the-art coating machines to support the seamless transition from prototypes to production runs for advanced membranes and electrodes; a fully analytical facility dedicated to quality control, performance analysis, and improving product lifetime; fuel cell test stations for statistical process control and development of next-generation MEA materials, and, a mechanical engineering lab for developing automated processes for MEAs. One of the products to be manufactured at Hood Park is the ion-pair Advent MEA which is currently being developed within the framework of L'Innovator, the Company's joint development program with the U.S. Department of Energy. Advent intends that its proprietary fuel cell products such as Serene and Honey Badger 50™ will use the ion-pair Advent MEAs beginning in 2024.

Collaboration with the Department of Energy

The efforts with the constellation of Department of Energy National Laboratories (Los Alamos National Laboratory, LANL; Brookhaven National Laboratory, BNL; National Renewable Energy Laboratory, NREL) continue to gain momentum. This group of leading scientists and engineers is working closely with Advent's development and manufacturing teams and are furthering the understanding of breakthrough materials that will advance HT-PEM fuel cells. This next generation HT-PEM appears to be well suited for heavy duty transportation, marine, and aeronautical applications, as well as delivering benefits in cost and lifetime for stationary power systems used in telecom and other remote power markets.

Agreements with Hyundai Motor Company ("Hyundai")

On April 6, 2022, Advent announced the signing of a technology assessment, sales, and development agreement with Hyundai, a leading multinational automotive manufacturer offering a range of world-class vehicles and mobility services in over 200 countries. Advent and Hyundai aim to deliver green energy solutions to current high carbon applications, using fuel cell technology. Under the agreement, Hyundai will provide catalysts to Advent for evaluation in its proprietary MEAs, while Advent intends to support Hyundai in fulfilling its fuel cell project needs, through:

- Developing inks and structures using Hyundai catalysts, which will then be evaluated by Hyundai. Following evaluation, Hyundai will determine whether their own or standard catalysts will be used for this project.

- Supplying MEAs throughout the development/commercialization cycle ("Advent MEAs") for testing, evaluation, and optimization under conditions set by Hyundai.

- Assisting Hyundai with the use and specifications of MEAs as well as their implementation into Hyundai's designs.

On March 23, 2023, Hyundai announced a successful technology assessment with Advent and following its success, Advent and Hyundai have entered into a Joint Development Agreement ("JDA"). Under the agreement, Hyundai and Advent will work together to further develop HMC-Advent Ion Pair™ MEA, establish commercial criteria for MEA supply, and evaluate Advent's advanced fuel cell technology for Hyundai's heavy-duty and/or stationary application. Additionally, the parties will introduce advanced cooling technologies for mobility HT-PEM fuel cell stacks. Advent will work closely as Hyundai evaluates these stack cooling technologies and ensure optimal performance under different operating conditions.

This partnership builds upon a commitment from both companies to develop sustainable energy solutions for carbon-intensive applications. Hyundai aims to accelerate the establishment of a hydrogen-based society based on its vision, Progress for Humanity, and this JDA aligns with that vision. The synergy generated by combining the two companies' advanced technology in this JDA is expected to revolutionize the global MEA market by providing significant improvement in lifetime and an increase in power density versus current HT-PEM MEAs.

Technology Assessment Agreement for Automotive

On May 9, 2022, Advent announced the signing of a second technology assessment agreement with another large global automotive manufacturer. With a common goal of sustainability and the faster decarbonization of the U.S. automotive industry, Advent is supporting efforts to advance innovative fuel cell technology as a sustainable and efficient option for achieving carbon neutrality. More specifically, Advent will provide assistance, through:

- Supplying MEAs for testing, evaluation, and optimization under the collaborator's conditions.

- Providing support on MEA operational parameters while the collaborator supplies feedback to Advent on performance and durability.

- Sharing technical know-how for fuel cell stacks, proprietary HT-PEM technology, and leveraging HT-PEM for advanced cooling systems.

One of the primary objectives will be to conduct a detailed assessment of Advent's proprietary HT-PEM technology and newly launched MEAs for consideration of future opportunities. Contingent upon the successful execution of the first phase of the project, the companies will work to establish a Joint Development Agreement governing specific product requirements, goals, milestones, and plans.

Collaboration with Alpha Laval

On January 10, 2023, Advent announced that it will collaborate with Alfa Laval, a global provider of heat transfer, separation, and fluid handling products, on a project to explore applications of Advent's methanol-powered HT-PEM fuel cells in the marine industry.

Funded by the Danish Energy Technology Development and Demonstration Program ("EUDP"), the project is a joint effort between Advent, Alfa Laval and a group of Danish shipowners. The project will focus on testing Advent's methanol-powered HT-PEM fuel cells as a source of marine auxiliary power. During the course of the project, the fuel cell system will undergo a risk assessment by a leading international classification society.

At the same time, the project aims to integrate the next generation of Advent's fuel cells. These fuel cells will be based on Advent's next-generation membrane electrode assembly, which is currently being developed within the framework of L'Innovator, the Company's joint development program with the U.S. Department of Energy's Los Alamos National Laboratory, Brookhaven National Laboratory, and the National Renewable Energy Laboratory. Aiming to meet the ever-growing power requirements of the maritime industry, Advent's next-generation fuel cells are expected to demonstrate a significant increase in lifetime, efficiency, and electrical output.

Advent and Hydrogen Systems, Inc. ("Hydrogen Systems") signed a Memorandum of Understanding ("MoU")

On September 15, 2022, we announced the signing of an MoU with Hydrogen Systems, a hydrogen energy solutions company based in Riyadh, Saudi Arabia, to provide integrated hydrogen solutions and value-added support to industrial and renewable energy markets in the Middle East. Under the MoU, Hydrogen Systems aims to utilize a vast number of its existing relationships in the telecom and hydrogen energy marketplace in the Kingdom of Saudi Arabia, and elsewhere throughout the Middle East to market, sell, distribute, install, and service Advent's full line of HT-PEM fuel cells and hydrogen production products. Simultaneously, Advent and Hydrogen Systems intend to collaborate and explore potential large-scale development opportunities for hydrogen fuel cell power applications across the region.

Advent and BASF New Business GmbH ("BASF") signed an MoU

On December 13, 2021, it was announced that the MoU aims to develop and increase the manufacturing scale of advanced fuel cell membranes designed for long-term operations under extreme conditions. BASF intends to improve the long-term stability of its Celtec® membrane and to increase production capacity with advanced technical capabilities to enable further improved and competitive Advent fuel cell systems and MEAs. Under the agreement the two companies will explore the implementation of high-volume manufacturing for the Celtec® membranes, utilize Advent's fuel cell stack and system testing facilities to assess and qualify the new Celtec® membrane for the SereneU (telecom power), M-ZERØ (methane emissions reduction), and Honey Badger (portable power, defense) Advent product families. Furthermore, BASF supports the realization of large-scale Important Projects of Common European Interests ("IPCEIs"), including Green HiPo, through materials for power generation, hydrogen generation, and power storage. In addition, BASF will also evaluate the producibility of the ion-pair membrane developed in collaboration by Advent and the U.S. Department of Energy. Advent has substantial experience in the development of high-temperature PEM fuel cell systems namely for stationary and portable applications as well as critical components such as MEAs and Gas Diffusion Electrodes ("GDEs"). Advent is working to increase the performance and scope of its products to satisfy the requirements of its customers and to address new applications. BASF has substantial experience in the manufacturing and development of proton-conducting membranes, GDEs, HT-PEM MEAs and the pertinent chemicals, catalysts, and compositions for their application in hydrogen separation and fuel cells. BASF is constantly improving the quality, robustness and performance of its products to support growth in fuel cell systems applications.

Selection of Wearable Fuel Cell for the DOD 2021 Validation Program

On March 31, 2021, we announced that Advent's 50 W Reformed Methanol Wearable Fuel Cell Power System ("Honey Badger") had been selected by the U.S. Department of Defense's ("DOD") National Defense Center for Energy and Environment ("NDCEE") to take part in its demonstration/validation program for 2021. The NDCEE is a DOD program that addresses high-priority environmental, safety, occupational health, and energy technological challenges that are demonstrated and validated at active installations for military application. Advent's Honey Badger 50™ ("HB50") fuel cell is the only fuel cell that is part of this program that supports the U.S. Army's goal of having a technology-enabled force by 2028.

Launch of the Honey Badger 50™ Fuel Cell System

On August 4, 2022, we announced the launch of our HB50 power system, a compact portable fuel cell system and quiet power supply for use in off-grid field applications such as military and rescue operations. The launch of Advent's portable power system coincided with the Company's fulfilment of its first shipment order from the U.S. Department of Defense. The HB50 power system can be fueled by biodegradable methanol, allowing near silent generation of up to 50W of continuous power with clean emissions. Designed for covert operations, HB50 can easily power radio and satellite communications gear, remote fixed and mobile surveillance systems, and laptop computers along with more general battery charging needs. HB50 is a unique technology that can provide 65% of weight savings versus batteries over a typical 72-hour mission. The weight savings benefit increases further for longer missions.

HB50's unique design allows it to be used in soldier-worn configurations or operated inside a portable backpack or vehicle while charging batteries and powering soldier systems, while its thermal features allow it to operate within an ambient temperature range of -20°C to +55°C. Aside from its optimized compatibility with Integrated Visual Augmentation System ("IVAS"), HB50 can also power devices such as high frequency radios like the model 117G, as well as B-GAN and StarLink terminals. HB50's durability allows it to be easily deployed in challenging conditions and climates while supporting mission mobility for three to seven days without the need to re-supply.

Since Honey Badger's fuel cell technology can run on hydrogen or liquid fuels, the system can operate at a fraction of the weight of traditional military-grade batteries to meet the U.S. Department of Defense's continuously evolving needs for 'on-the-go' electronics needs. As military adoption and use of IVAS equipment continues to evolve, the highly portable lightweight power solutions like Honey Badger and HB50 will become a mission critical necessity.

UltraCell Purchase Agreement

On February 18, 2021, Advent Technologies, Inc., entered into the UltraCell Purchase Agreement with Bren-Tronics and UltraCell, a Delaware limited liability company and a direct wholly owned subsidiary of Bren-Tronics. Pursuant to the UltraCell Purchase Agreement, and subject to the terms and conditions therein, on February 18, 2021, Advent acquired 100% of the issued and outstanding membership interests in UltraCell, for $4.0 million and a maximum of $6.0 million upon achievement of certain milestones. Advent also assumed the terms of Bren-Tronics lease for property used in UltraCell's operations in Livermore, California.

Comparability of Financial Information

Advent's results of operations and statements of assets and liabilities may not be comparable between periods as a result of the Business Combination.

Key Factors Affecting Our Results

Advent believes that its performance and future success depend on several factors that present significant opportunities for Advent but also pose risks and challenges, including those discussed below.

Increased Customer Demand

Based on conversations with existing customers and incoming inquiries from new customers, Advent anticipates substantial increased demand for its fuel cell systems and MEAs from a wide range of customers as it scales up its production facilities and testing capabilities, and as the awareness of its MEA capabilities becomes widely known in the industry. Advent expects both its existing customers to increase order volume, and to generate substantial new orders from major organizations, with some of whom it is already in discussions regarding prospective commercial partnerships and joint development agreements. As of December 31, 2022, Advent was still generating a low level of revenues compared to its future projections and has not made any commercial sales to these major organizations.

Successful development of the Advanced MEA product

Advent's future success depends in large part on the increasing integration of the hydrogen fuel cell into the energy transition globally over the next decade. In order to become cost-competitive with existing renewable power generation and energy storage technology and achieve widespread adoption, fuel cells will need to achieve substantial improvement in the cost/kw performance ratio delivered to prospective fuel cell customers, predominantly OEMs, System Integrators and major energy companies. Advent expects to play an important enabling role in the adoption of hydrogen fuel cells, as its MEA technology is the critical determining factor in the cost/kw performance ratio of the fuel cells. In partnership with the Los Alamos National Laboratory, Advent is currently developing its next generation MEA technology ("Advanced MEA") which is anticipated to deliver as much as three times the power output of its current MEA product. While Advent is already projecting being able to pass through cost benefits to its customers through economies of scale as it increases MEA production, the successful development of the Advanced MEA will be an important factor in delivering the required improvement in cost/kw performance to Advent's customers.

Basis of Presentation

Advent's consolidated financial statements have been prepared in accordance with U.S. GAAP. The Company has determined that it operates in one reportable segment. See Note 1 "Basis of Presentation" in the accompanying consolidated financial statements for more information.

Components of Results of Operations

Revenue

Revenues consist of sales of goods (MEAs, membranes, fuel cell stacks, fuel cell systems and electrodes) and servicing of those systems, as well as engineering fees. Advent expects revenues to increase materially and be weighted towards fuel cell systems and MEA sales over time.

Cost of Revenues

Cost of revenues consists of consumables, raw materials, processing costs and direct labor costs associated with the assembly, manufacturing, and servicing of MEAs, membranes, fuel cell stacks and systems and electrodes. Advent expects cost of revenues to increase substantially in line with increased production. Advent recognizes cost of revenues in the period that revenues are recognized.

Income from Grants

Income from grants consists of cash subsidies received from research agencies and other national and international organizations in support of Advent's research and development activities. Advent expects to continue to be eligible for grant income and remains in discussion with a number of prospective grantors in relation to a number of product development activities.

Research and Development Expenses

Research and development expenses consist of costs associated with Advent's research and development activities, such as laboratory costs and sample material costs. Advent expects its research and development activities to increase substantially as it invests in improved technology and products.

Administrative and Selling Expenses

Administrative and selling expenses consist of travel expenses, indirect labor costs, fees paid to consultants, third parties and service providers, taxes and duties, legal and audit fees, depreciation, business development salaries and limited marketing activities, and incentive and stock-based compensation expense. Advent expects administrative and selling expenses to increase in line with production and revenue as the business scales up, and as a result of operating as a public company, including compliance with the rules and regulations of the SEC, legal, audit, additional insurance expenses, investor relations activities and other administrative and professional services. Depreciation is also expected to increase as the Company invests in fixed assets in support of the scale-up of the business.

Other Income / (Expenses), net

Other income / (expenses) consist of additional de minimis incidental income / (expenses) incurred by the business. These income / (expenses) are expected to remain at a de minimis level in the future.

Change in Fair Value of Warrant Liability

Change in fair value of warrant liability amounting to \$9.4 million and \$22.7 million for the year ended December 31, 2022 and 2021, respectively, represents the change in fair value of the Private Placement Warrants and Working Capital Warrants for the year ended December 31, 2022 and for the period February 4, 2021 to December 31, 2021, respectively.

Finance income / (expenses), net

Finance income / (expenses) consist mainly of bank and interest charges.

Foreign Exchange Gains / (Losses), net

Foreign exchange gains / (losses) consists of foreign exchange gains or losses on transactions denominated in foreign currencies and on translation of monetary items denominated in foreign currencies. As the Company scales up, its foreign exchange exposure is likely to increase given its revenues are denominated in both euros and dollars, and a portion of the Company's costs are denominated in euros and Danish krone.

Amortization of intangibles

The intangible assets of \$4.7 million recognized on the acquisition of UltraCell is the Trade Name "UltraCell" (\$0.4 million) and the Patented Technology (\$4.3 million). The Trade Name has an indefinite useful life while the Patented Technology has a useful life of 10 years. Amortization expense of \$0.4 million and \$0.4 million has been recognized for the year ended December 31, 2022 and from the acquisition date of UltraCell to December 31, 2021, respectively.

The intangible assets of \$19.8 million recognized on the acquisition of SerEnergy and FES are the Patents amounting to \$16.9 million, the Process know-how (IPR&D) amounting to \$2.6 million and the Order backlog amounting to \$0.3 million. The Patents have a useful life of 10 years, the Process know-how has a useful life of 6 years and the Order backlog has a useful life of 1 year. Amortization expense of \$2.3 million has been recognized in relation to these intangibles for the year ended December 31, 2022. Amortization expense of \$0.8 million has been recognized for the period from the acquisition date of SerEnergy and FES to December 31, 2021, respectively.

Income taxes

Income tax benefits amounting to $2.0 million for the year ended December 31, 2022, mainly relate to the reversal of the deferred tax liability of the intangible assets recognized upon the acquisition of SerEnergy and FES. During the year ended December 31, 2022, Advent recognized impairment losses related to those intangible assets. Income tax benefits amounting to $0.9 million for the year ended December 31, 2021, mainly relates to current income tax benefit of our subsidiary SerEnergy and deferred income tax benefit on tax losses of our subsidiary FES and on intangible assets recognized upon the acquisition of SerEnergy and FES.

Results of Operations

Comparison of the Years Ended December 31, 2022 and 2021

The following table sets forth a summary of our consolidated results of operations for the years ended December 31, 2022 and 2021, and the changes between periods.

	Years Ended December 31,			
(Amounts in thousands, except share and per share amounts)	**2022**	**2021**	**$ change**	**% change**
Revenue, net	$ 7,837	$ 7,069	$ 768	10.9%
Cost of revenues	(8,581)	(5,406)	(3,175)	58.7%
Gross profit / (loss)	**(744)**	**1,663**	**(2,407)**	**(144.7)%**
Income from grants	1,460	829	631	76.1%
Research and development expenses	(9,796)	(3,541)	(6,255)	176.6%
Administrative and selling expenses	(35,915)	(41,877)	5,962	(14.2)%
Amortization of intangibles	(2,764)	(1,185)	(1,579)	133.2%
Credit loss – customer contracts	(1,116)	-	(1,116)	N/A
Gain from purchase price adjustment	2,370	-	2,370	N/A
Impairment loss - intangible assets and goodwill	(38,922)	-	(38,922)	N/A
Operating loss	**(85,427)**	**(44,111)**	**(41,316)**	**93.7%**
Fair value change of warrant liability	9,375	22,743	(13,368)	(58.8)%
Finance income / (expenses), net	52	(51)	103	(202.0)%
Foreign exchange gains / (losses), net	(91)	(43)	(48)	111.6%
Other income / (expenses), net	(216)	16	(232)	(1,450.0)%
Loss before income tax	**(76,307)**	**(21,446)**	**(54,861)**	**255.8%**
Income tax	1,970	923	1,047	N/A
Net loss	**$ (74,337)**	**$ (20,523)**	**$ (53,814)**	**262.2%**
Net loss per share				
Basic loss per share	**$ (1.44)**	**$ (0.45)**	**$ (0.99)**	**N/A**
Basic weighted average number of shares	**51,528,703**	**45,814,868**	**N/A**	**N/A**
Diluted loss per share	**$ (1.44)**	**$ (0.45)**	**$ (0.99)**	**N/A**
Diluted weighted average number of shares	**51,528,703**	**45,814,868**	**N/A**	**N/A**

Revenue

Our total revenue from product sales increased by approximately $0.8 million or 10.9% from approximately $7.1 million in the year ended December 31, 2021 to approximately $7.8 million in the year ended December 31, 2022. The increase in revenue was primarily related to a full year of SerEnergy's and FES's operations in 2022 compared to a partial year post-acquisition in 2021.

Cost of Revenues

Cost of revenues increased by approximately $3.2 million from approximately $5.4 million in the year ended December 31, 2021 to approximately $8.6 million in the year ended December 31, 2022. The increase in cost of revenues was directly related to the increased revenues and the requirement for increased production of MEAs and fuel cell systems to satisfy customer demand, as well as, cost of revenues attributed to UltraCell's, SerEnergy's and FES's operations for a full year in 2022 compared to a partial year post-acquisition in 2021.

Gross profit (loss), which is revenue, net minus the cost of revenue, decreased to $(0.7) million in the year ended December 31, 2022 from $1.7 million in the year ended December 31, 2021.

Research and Development Expenses

Research and development expenses were approximately $9.8 million in the year ended December 31, 2022, primarily related to internal research and development costs, including a full year of operations for SerEnergy and FES, as well as the Company's cooperative research and development agreement with the U.S. Department of Energy. Research and development expenses were approximately $3.5 million in the year ended December 31, 2021, primarily related to the Company's cooperative research and development agreement with the U.S. Department of Energy, as well as the research and development costs of SerEnergy and FES in the four-month period from September 1, 2021 to December 31, 2021.

Administrative and Selling Expenses

Administrative and selling expenses were approximately $35.9 million in the year ended December 31, 2022, and $41.9 million in the year ended December 31, 2021. The decrease was primarily due to one-time transaction costs following the Business Combination amounting to $5.9 million in the year ended December 31, 2021, a decrease in incentive compensation, and a non-recurring executive severance charge of $2.4 million in the year ended December 31, 2021. This was partially offset by an increase in expenses related to SerEnergy's and FES's operations for a full year in 2022 compared to a partial year post-acquisition in 2021 and an increase in stock-based compensation expenses of $2.7 million.

Amortization of Intangibles

Amortization of intangible assets was approximately $2.8 million in the year ended December 31, 2022, which was an increase of $1.6 million compared to the year ended December 31, 2021. This increase was primarily due to the full year of amortization of intangible assets acquired from the SerEnergy and FES acquisition in the year ended December 31, 2022.

Credit Loss – Customer Contracts

We recognized a credit loss on customer contracts during the year ended December 31, 2022. Refer to *Contract Assets and Contract Liabilities* disclosure for further details.

Gain from Purchase Price Adjustment

We recognized a gain from a purchase price adjustment related to our acquisition of SerEnergy and FES. See Note 3 in the audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K for more information about the purchase price adjustment.

Impairment Losses – Intangible Assets and Goodwill

We recognized impairment losses on intangible assets and goodwill related to the SerEnergy and FES acquisition. Refer to *Critical Accounting Policies and Estimates* disclosure for further details.

Change in fair value of Warrant Liability

The change in fair value of warrant liability amounting to $9.4 million and $22.7 million was due to the change in fair value of the Private Placement Warrants and Working Capital Warrants for the year ended December 31, 2022 and for the period February 4, 2021 to December 31, 2021, respectively.

Liquidity and Capital Resources

The following table sets forth a summary of our consolidated cash flows for the years ended December 31, 2022 and 2021, and the changes between periods.

(Amounts in thousands)	Years Ended December 31, 2022	2021	$ change	% change
Net Cash used in Operating Activities	**$ (32,125)**	**$ (35,837)**	**$ 3,712**	**(10.4)%**
Cash Flows from Investing Activities:				
Proceeds from sale of property and equipment	0	7	(7)	N/A
Purchases of property and equipment	(11,527)	(3,920)	(7,607)	194.1%
Purchases of intangible assets	(117)	(18)	(99)	550.0%
Advances for the acquisition of property and equipment	(2,557)	(2,200)	(357)	16.2%
Acquisition of a subsidiary, net of cash acquired	-	(19,425)	19,425	N/A
Acquisition of available for sale financial assets	(316)	-	(316)	N/A
Net Cash used in Investing Activities	**$ (14,517)**	**$ (25,556)**	**$ 11,039**	**(43.2)%**
Cash Flows from Financing Activities:				
Business Combination and PIPE financing, net of issuance costs paid	-	141,121	(141,121)	N/A
Proceeds of issuance of common stock and paid-in capital from warrants exercise	-	262	(262)	N/A
State loan proceeds	-	118	(118)	N/A
State refundable deposit repayment	(40)	-	(40)	N/A
Net Cash (used in) provided by Financing Activities	**$ (40)**	**$ 141,501**	**$ (141,541)**	**(100.0)%**
Net (decrease) / increase in cash, cash equivalents, restricted cash and restricted cash equivalents	**$ (46,682)**	**$ 80,108**	**$ (126,791)**	**(158.3)%**
Effect of exchange rate changes on cash, cash equivalents, restricted cash and restricted cash equivalents	537	(860)	1,398	(162.6)%
Cash, cash equivalents, restricted cash and restricted cash equivalents at the beginning of year	79,764	516	79,248	15,358.1%
Cash, cash equivalents, restricted cash and restricted cash equivalents at the end of year	**$ 33,619**	**$ 79,764**	**$ (46,145)**	**(57.9)%**

Cash flows used in Operating Activities

Advent's cash flows from operating activities reflect the income statement position adjusted for working capital movements in current assets and liabilities. As Advent grows, it expects that operating cash flows will be affected by increased working capital needs to support growth in personnel-related expenditures and fluctuations in accounts receivable, inventory, accounts payable and other current assets and liabilities.

Net cash used in operating activities was approximately $(32.1) million for the year ended December 31, 2022, which related to outflows in connection with administrative and selling expenses, an increase in inventory, research and development expenses, and costs associated with insurances services and other personnel costs. These outflows were partially offset by $8.0 million of expense reimbursements by the landlord related to the build-out of our new R&D and product development facility at Hood Park in Boston, MA.

Net cash used in operating activities was approximately $(35.8) million for the year ended December 31, 2021, which related to outflows in connection with one-time transaction costs, administrative and selling expenses, research and development expenses, and costs associated with insurances services and other consulting services.

Cash Flows used in Investing Activities

Advent's cash flows used in investing activities was approximately $(14.5) million for the year ended December 31, 2022, which mostly related to the acquisition of plant and equipment, including approximately $10.5 million for the Hood Park facility.

Advent's cash flows used in investing activities were approximately $(25.6) million for the year ended December 31, 2021, which related to the acquisition of fixed assets and the amounts paid for the acquisition of UltraCell LLC on February 18, 2021 and the acquisition of SerEnergy and FES on August 31, 2021, net of cash acquired.

Advent expects to invest in fixed assets, plant and equipment in the future as it executes its product development programs.

Cash Flows from Financing Activities

Advent's cash flows provided by financing activities were approximately $141.5 million for the year ended December 31, 2021, which related to the cash amount contributed at the date of the Merger (February 4, 2021) and proceeds from issuance of common stock and additional paid-in capital from warrants exercise.

Contract Assets and Contract Liabilities

Contract assets reflect revenue recognized and performance obligations satisfied in advance of customer billing. As of December 31, 2022, and 2021, Advent recognized contract assets of $0.1 million and $1.6 million, respectively on the consolidated balance sheets. During the year December 31, 2022, Advent recognized a credit loss of $0.9 million related to the likelihood of realizing of a contract asset. The balance as of December 31, 2022 and 2021 includes an amount of $0 and $0.6 million, respectively, from the SerEnergy and FES acquisition.

Advent recognizes contract liabilities when we receive customer payments or has the unconditional right to receive consideration in advance of the performance obligations being satisfied on our contracts. We receive payments from customers based on the terms established in our contracts. Contract liabilities are classified as either current or long-term liabilities in the consolidated balance sheets based on the timing of when we expect to recognize the related revenue. As of December 31, 2022, and 2021, Advent recognized contract liabilities of $1.0 million and $1.1 million, respectively, in the consolidated balance sheets. During the years ended December 31, 2022 and 2021, the Company recognized $0.1 million and $0.2 million in revenues. The balance as of December 31, 2022 and 2021 amounting to $0.8 million and $1.1 million, respectively, was from the SerEnergy and FES acquisition.

Off-Balance Sheet Commitments and Arrangements

Since the date of our incorporation, Advent has not engaged in any off-balance sheet arrangements, as defined in the rules and regulations of the SEC.

Critical Accounting Policies and Estimates

Advent's consolidated financial statements have been prepared in accordance with U.S. GAAP. The preparation of these financial statements requires Advent to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities as of the balance sheet date, as well as the reported expenses incurred during the reporting period. Management bases its estimates on historical experience and on various other assumptions believed to be reasonable, the results of which form the basis for making judgments about the carrying values of assets and liabilities. Actual results could differ from those estimates, and such differences could be material to Advent's financial statements.

Emerging Growth Company Status

Section 102(b)(1) of the JOBS Act exempts emerging growth companies from being required to comply with new or revised financial accounting standards until private companies (that is, those that have not had a Securities Act registration statement declared effective or do not have a class of securities registered under the Exchange Act of 1934, as amended (the "Exchange Act")) are required to comply with the new or revised financial accounting standards. The JOBS Act provides that a company can elect to opt out of the extended transition period and comply with the requirements that apply to non-emerging growth companies but any such an election to opt out is irrevocable. Advent elected not to opt out of such extended transition period which means that when a standard is issued or revised and it has different application dates for public or private companies, Advent, as an emerging growth company, can adopt the new or revised standard at the time private companies adopt the new or revised standard, until such time Advent is no longer considered to be an emerging growth company. At times, Advent may elect to early adopt a new or revised standard. See Note 2 in the audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K for more information about the recent accounting pronouncements adopted and the recent accounting pronouncements not yet adopted for the year ended December 31, 2022.

In addition, Advent relies on the other exemptions and reduced reporting requirements provided by the JOBS Act. Subject to certain conditions set forth in the JOBS Act, if, as an emerging growth company, Advent intends to rely on such exemptions, Advent is not required to, among other things: (a) provide an auditor's attestation report on Advent's system of internal control over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act; (b) provide all of the compensation disclosure that may be required of non-emerging growth public companies under the Dodd-Frank Wall Street Reform and Consumer Protection Act; (c) comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements (auditor discussion and analysis); and (d) disclose certain executive compensation-related items such as the correlation between executive compensation and performance and comparisons of the Chief Executive Officer's compensation to median employee compensation.

Advent will remain an emerging growth company under the JOBS Act until the earliest of (a) the last day of Advent's first fiscal year following the fifth anniversary of the date of the first sale of common equity securities pursuant to an effective registration statement under the Securities Act of 1933, as amended, (b) the last date of Advent's fiscal year in which Advent has total annual gross revenue of at least $1.235 billion, (c) the date on which Advent is deemed to be a "large accelerated filer" under the rules of the SEC with at least $700.0 million of outstanding securities held by non-affiliates or (d) the date on which Advent has issued more than $1.0 billion in non-convertible debt securities during the previous three years.

While Advent's significant accounting policies are described in the notes to Advent's financial statements (see Note 2 in the consolidated financial statements), Advent believes that the following accounting policies require a greater degree of judgment and complexity. Accordingly, these are the policies Advent believes are the most critical to aid in fully understanding and evaluating Advent's financial condition and results of operations.

Revenue Recognition from January 1, 2019

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606), as amended, which requires an entity to recognize the amount of revenue to which it expects to be entitled for the transfer of promised goods or services to customers. We adopted ASU No. 2014-09 on January 1, 2019, using the modified retrospective approach to all contracts not completed at the date of initial application.

In accordance with ASC 606, revenue is recognized when control of the promised goods or services are transferred to a customer in an amount that reflects the consideration that the Company expects to receive in exchange for those services. We apply the following five steps in order to determine the appropriate amount of revenue to be recognized as it fulfills its obligations under each of its arrangements:

- identify the contract with a customer,
- identify the performance obligations in the contract,
- determine the transaction price,
- allocate the transaction price to performance obligations in the contract, and
- recognize revenue as the performance obligation is satisfied.

With significant and recurring customers, we negotiate written master agreements as framework agreements (general terms and conditions of trading), following individual purchase orders. For customers with no master agreements, the approved purchase orders form the contract. Effectively, contracts under the revenue standard have been assessed to be the purchase orders agreed with customers.

We have assessed that each product sold is a single performance obligation because the promised goods are distinct on their own and within the context of the contract. In cases where the agreement includes customization services for the contracted products, we are providing integrated services; therefore, the goods are not separately identifiable, but are inputs to produce and deliver a combined output and form a single performance obligation within the context of the contract. Furthermore, we assessed whether it acts as a principal or agent in each of its revenue arrangements and has concluded that in all sales transactions it acts as a principal. Additionally, we, taking into consideration the guidance and indicative factors provided by ASC 606, concluded that it provides assurance type warranties (warranty period is up to two years) as it does not provide a service to the customer beyond fixing defects that existed at the time of sale. We, based on historical performance, current circumstances, and projections of trends, estimated that no allowance for returns as per warranty policy should be recognized, at the time of sale, accounted for under ASC 460, Guarantees.

Under ASC 606, we estimate the transaction price, including variable consideration, at the commencement of the contract and recognize revenue over the contract term, rather than when fees become fixed or determinable. In other words, where contracts with customers include variable consideration (i.e. volume rebates), we estimate at contract inception the variable consideration and adjust the transaction price only to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. Furthermore, no material rights or significant financing components have been identified in our contracts. Payment terms generally include advance payment requirements. The time between a customer's payment and completion of the performance obligation is less than one year. Payment terms are in the majority fixed and do not include variable consideration, except from volume rebates.

Revenue from satisfaction of performance obligations is recognized based on identified transaction price. The transaction price reflects the amount to which we have rights under the present contract. It is allocated to the distinct performance obligations based on standalone selling prices of the services promised in the contract. In cases of more than one performance obligation, we allocate transaction price to the distinct performance obligations in proportion to their observable stand-alone selling prices and recognize revenue as those performance obligations are satisfied.

In the majority of cases of product sales, revenue is recognized at a point in time when the customer obtains control of the respective goods that is, when the products are shipped from our facilities as control passes to the customer in accordance with agreed contracts and the stated shipping terms. In cases where the contract includes customization services, in which one performance obligation is identified, revenue is recognized over time as our performance does not create an asset with alternative use and we have an enforceable right to payment for performance completed to date. We use the input method (i.e., cost-to-cost method) to measure progress towards complete satisfaction of the performance obligation.

Income from grants and related deferred income

Grants include cash subsidies received from various institutions and organizations. Grants are recognized as other income. Such amounts are recognized in the consolidated statements of operations when all conditions attached to the grants are fulfilled.

Condition to the grants would not be fulfilled unless related costs have been characterized as eligible by the grantors, are actually incurred and there is certainty that costs are allowable. These grants are recognized as deferred income when received and recorded in income when the eligible and allowable related costs and expenses are incurred. Under all grant programs, a coordinator is specified. The coordinator, among other, receives the funding from the grantor and proceeds to its distribution to the parties agreed in the process specified in the program. We assessed whether it acts as a principal or agent in its role as a coordinator for specific grants and has concluded that in all related transactions it acts as an agent.

Goodwill

The Company allocates the fair value of purchase consideration transferred in a business acquisition to the tangible assets acquired, liabilities assumed, and intangible assets acquired based on their estimated fair values. The excess of the fair value of purchase consideration transferred over the fair values of these identifiable assets and liabilities is recorded as goodwill. Such valuations require management to make significant estimates and assumptions, especially with respect to intangible assets. Significant estimates in valuing certain intangible assets include, but are not limited to, future expected cash flows from acquired licenses, trade names, in process research and development ("R&D"), useful lives and discount rates, patents, customer clientele, customer contracts and know-how. Management's estimates of fair value are based upon assumptions believed to be reasonable, but which are inherently uncertain and unpredictable and, as a result, actual results may differ from estimates. During the measurement period, the Company may record adjustments to the assets acquired and liabilities assumed, with the corresponding offset to goodwill. Upon the conclusion of the measurement period, any subsequent adjustments are recorded in the consolidated statement of operations.

For significant acquisitions, the Company obtains independent appraisals and valuations of the intangible (and certain tangible) assets acquired and certain assumed obligations as well as equity. The Company analyzes each acquisition individually and all acquisitions within each reporting period in aggregate to determine if those are material acquisitions in the context of ASC 805-10-50.

The estimated fair values and useful lives of identified intangible assets are based on many factors, including estimates and assumptions of future operating performance and cash flows of the acquired business, estimates of cost avoidance, the nature of the business acquired, the specific characteristics of the identified intangible assets and our historical experience and that of the acquired business. The estimates and assumptions used to determine the fair values and useful lives of identified intangible assets could change due to numerous factors, including product demand, market conditions, regulations affecting the business model of our operations, technological developments, economic conditions and competition.

We conduct a goodwill impairment analysis annually in the fourth fiscal quarter, or more frequently, if changes in facts and circumstances indicate that the fair value of our reporting units may be less than their carrying amounts. In testing goodwill for impairment, the Company first assesses qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If, after assessing the totality of events or circumstances, the Company determines it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, then additional impairment testing is not required. When the Company determines a fair value test is necessary, it estimates the fair value of a reporting unit and compares the result with its carrying amount, including goodwill. If the carrying amount of a reporting unit exceeds its fair value, an impairment is recorded equal to the amount by which the carrying value exceeds the fair value, up to the amount of goodwill associated with the reporting unit. Currently, we identify three reporting units.

As a part of the annual impairment assessment, the Company determined that a triggering event for two of our reporting units, UltraCell and SerEnergy / FES, had occurred which would require testing goodwill and long-lived assets, including definite-lived intangibles, for impairment.

The Company considered the triggering events related to current and expected future economic and market conditions and their impact on the Company, as well as the current revenue forecasts. Given certain market factors, the Company determined that these triggering events had occurred and would require a quantitative analysis to be performed.

As a part of the impairment assessment, the Company reviewed significant fair value input assumptions including revenues, margin, and capital expenditures to reflect current market conditions. Other changes in valuation assumptions included increases in interest rates and market volatility, resulting in higher discount rates.

UltraCell Reporting Unit

In the fourth quarter of 2022, the Company updated the forecasted future cash flows of UltraCell used in the fair value measurement of the intangible assets and goodwill using a combination of market, cost and income approach methods. The royalty rate used for the valuation of the Trade Name was 1.3%, which was determined from the market using databases from completed transactions at a global level while the discount rate increased to 15.0% from 12.6% at the time of the acquisition of UltraCell. The Company determined that the current fair value of the Trade Name was greater than the current carrying value and therefore did not recognize any impairment during the period. The Patented Technology was valued with the multi period excess earnings method, which is an income approach. The discount rate used for the valuation of the Patented Technology increased to 14.0% from 11.6% at the time of acquisition of UltraCell. The Company determined that the undiscounted cash flows related to the Patented Technology was greater than the current carrying value and therefore did not recognize any impairment during the period. The Company believes that its updated long-term forecasted cash flows did not indicate that the fair value of this reporting unit may be below its current carrying value.

SerEnergy and FES Reporting Unit

In the fourth quarter of 2022, the Company updated the forecasted future cash flows of SerEnergy and FES used in the fair value measurement of the intangible assets and goodwill using a combination of market, cost and income approach methods. The Company acquired finite-lived intangible assets, including patents, process know-how, and order backlog as a result of the SerEnergy and FES acquisition. The fair value of patents was determined by applying the multi-period excess earnings method which is an income approach. The discount rate used for the valuation of patents increased to 14.4% from 7.2% at the time of SerEnergy and FES acquisition. The Company determined that the current discounted cash flows related to the patents was ($5.3) million which is below the current carrying value. As a result, the Company recorded an impairment charge of $14.6 million related to the patents. The Company determined the undiscounted cash flows attributable to the IPR&D was greater than the current carrying value. As a result, the Company believes that the updated long-term forecast did not indicate impairment related to IPR&D. As of the December 31, 2022, intangible assets related to order backlogs did not have a remaining carrying value. The Company determined that the fair value of the reporting unit was $15.5 million utilizing the updated forecast which is less than its current carrying value. As a result, the Company recorded a goodwill impairment charge of $24.3 million.

In the event there are further adverse changes in the Company's projected cash flows and/or further changes in key assumptions, including but not limited to an increase in the discount rate, lower market multiples, lower revenue growth, lower margin, and/or a lower terminal growth rate, the Company may be required to record non-cash impairment charges to its goodwill, other intangibles, and/or long-lived assets. Such non-cash charges could have a material adverse effect on the Company's consolidated statement of operations and balance sheet in the reporting period of the charge. The assessment is sensitive to broader market conditions, including the discount rate and market multiples, and to the Company's estimated future cash flows.

Income Taxes

Advent follows the asset and liability method of accounting for income taxes under ASC 740, Income Taxes. Under the asset and liability method, deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to temporary differences between the financial statements carrying amounts of existing assets and liabilities and their respective tax bases. This method also requires the recognition of future tax benefits, such as net operating loss carry forwards, to the extent that it is more likely than not that such benefits will be realized. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that included the enactment date. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount expected to be realized. Valuation allowances are reassessed periodically to determine whether it is more likely than not that the tax benefits will be realized in the future and if any existing valuation allowance should be released.

Part of the Advent's business activities are conducted through its subsidiaries outside of U.S. Earnings from these subsidiaries are generally indefinitely reinvested in the local businesses. Further, local laws and regulations may also restrict certain subsidiaries from paying dividends to their parents. Consequently, Advent generally does not accrue income taxes for the repatriation of such earnings in accordance with ASC 740, "Income Taxes." To the extent that there are excess accumulated earnings that we intend to repatriate from any such subsidiaries, we recognize deferred tax liabilities on such foreign earnings.

Advent assesses its income tax positions and records tax benefits for all years subject to examination based on the evaluation of the facts, circumstances, and information available at each reporting date. For those tax positions with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information, Advent records a tax benefit. For those income tax positions that are not likely to be sustained, no tax benefit is recognized in the consolidated financial statements. Advent recognizes interest and penalties related to uncertain tax positions as part of the provision for income taxes.

ASC 740 prescribes a recognition threshold and a measurement attribute for the financial statement recognition and measurement of tax positions taken or expected to be taken in a tax return. For those benefits to be recognized, a tax position must be more likely than not to be sustained upon examination by taxing authorities. For those income tax positions that are not likely to be sustained, no tax benefit is recognized in the consolidated financial statements. Advent recognizes interest and penalties related to uncertain tax positions as part of the provision for income taxes.

For the years ended December 31, 2022 and 2021, net income tax benefits of $2.0 million and $0.9 million, respectively, have been recorded in the consolidated statements of operations. Advent is currently not aware of any issues under review that could result in significant accruals or material deviation from its position. The Company is currently not aware of any issues under review that could result in significant accruals or material deviation from its position. The Company is subject to income tax examinations by major taxing authorities.

The Company and its U.S. subsidiaries may be subject to potential examination by U.S. federal, state and city, while the Company's subsidiaries outside U.S. may be subject to potential examination by their taxing authorities in the areas of income taxes. These potential examinations may include questioning the timing and amount of deductions, the nexus of income among various tax jurisdictions and compliance with the U.S. federal, state and city, and tax laws in the countries where business activities of Company's subsidiaries are conducted. On December 22, 2017, the Tax Cuts and Jobs Act of 2017 was signed into legislation. As part of the legislation, the U.S. corporate income tax rate was reduced from 35% to 21%, among other changes.

Bond Loan

On May 25, 2022, Advent SA and UNI.FUND entered into an agreement to finance Cyrus with a Bond Loan of €1.0 million. As a part of this transaction, Advent SA offered €0.3 million in bond loans with an annual interest rate of 8.00%. The term of the loan is three years and there is a surcharge of 2.5% for overdue interest.

Mandatory conversion of the Bond Loan will occur in the event of qualified financing which is equivalent to a share capital increase by Cyrus in the first three years from the execution of the Bond Loan agreement with a total amount over €3 million which is covered by third parties unrelated to the basic shareholders or by investors related to them.

The Company classifies the Bond Loan as an available for sale financial asset on the consolidated balance sheets. The Company recognizes interest income within the consolidated statement of operations. For the year ended December 31, 2022, the Company recognized $13 thousand of interest income related to the Bond Loan within the consolidated statements of operations.

The Bond Loan is remeasured to its fair value at each reporting period and upon settlement. The estimated fair value of the Bond Loan is determined using Level 3 inputs by using a discounted cash flow model. The change in fair value is recognized within the consolidated statements of comprehensive loss. The Company did not recognize any unrealized gain / (loss) from the agreement date of May 25, 2022 through December 31, 2022.

Warrant Liability

The Company accounts for the 26,369,557 warrants (comprising of 22,029,279 Public Warrants and 3,940,278 Private Placement Warrants) issued in connection with the initial public offering and the 400,000 Working Capital Warrants issued at the consummation of the Business Combination in accordance with ASC 815-40-15-7D. If the warrants do not meet the criteria for equity treatment, they must be recorded as liabilities. We have determined that only the Private Placement Warrants and Working Capital Warrants must be recorded as liabilities and accordingly, the Company classifies these warrant instruments as liabilities at their fair value and adjusts the instruments to fair value at each reporting period. These liabilities are subject to re-measurement at each balance sheet date until exercised, and any change in fair value is recognized in the Company's statement of operations. The fair value of the Private Placement Warrants and the Working Capital Warrants has been determined using either the quoted price, if available, or was based on a modified Black-Scholes-Merton model. The fair value of the Private Placement Warrants and the Working Capital Warrants has been determined based on a modified Black-Scholes-Merton model for the years ended December 31, 2022 and 2021.

Recent Accounting Pronouncements

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies that are adopted by Advent as of the specified effective date. Unless otherwise discussed, Advent believes that the impact of recently issued standards that are not yet effective will not have a material impact on Advent's financial position or results of operations under adoption.

See Note 2 in the consolidated financial statements included elsewhere in this Annual Report on Form 10-K for more information about recent accounting pronouncements, the timing of their adoption and Advent's assessment, to the extent Advent has made one, of their potential impact on Advent's financial condition and results of operations.

Supplemental Non-GAAP Measures and Reconciliations

In addition to providing measures prepared in accordance with GAAP, we present certain supplemental non-GAAP measures. These measures are EBITDA, Adjusted EBITDA and Adjusted Net Income / (Loss), which we use to evaluate our operating performance, for business planning purposes and to measure our performance relative to that of our peers. These non-GAAP measures do not have any standardized meaning prescribed by GAAP and therefore may differ from similar measures presented by other companies and may not be comparable to other similarly titled measures. We believe these measures are useful in evaluating the operating performance of the Company's ongoing business. These measures should be considered in addition to, and not as a substitute for net income, operating expense and income, cash flows and other measures of financial performance and liquidity reported in accordance with GAAP. The calculation of these non-GAAP measures has been made on a consistent basis for all periods presented.

EBITDA and Adjusted EBITDA

These supplemental non-GAAP measures are provided to assist readers in determining our operating performance. We believe this measure is useful in assessing performance and highlighting trends on an overall basis. We also believe EBITDA and Adjusted EBITDA are frequently used by securities analysts and investors when comparing our results with those of other companies. EBITDA differs from the most comparable GAAP measure, net income / (loss), primarily because it does not include interest, income taxes, depreciation of property, plant and equipment, and amortization of intangible assets. Adjusted EBITDA adjusts EBITDA for items such as one-time transaction costs, asset impairment charges, fair value changes in the warrant liability.

The following tables show a reconciliation of net loss to EBITDA and Adjusted EBITDA for the three months ended December 31, 2022 and 2021 and for the years ended December 31, 2022 and 2021.

EBITDA and Adjusted EBITDA	Three months ended December 31, (Unaudited)			**Years Ended December 31,**		
(in Millions of US dollars)	**2022**	**2021**	**$ change**	**2022**	**2021**	**$ change**
Net loss	**$ (47.63)**	**$ (9.00)**	**(38.63)**	**$ (74.34)**	**$ (20.52)**	**(53.82)**
Depreciation of property and equipment	$ 0.36	$ 0.38	(0.02)	$ 1.49	$ 0.56	0.93
Amortization of intangibles	$ 0.65	$ 0.71	(0.06)	$ 2.76	$ 1.18	1.58
Finance income / (expenses), net	$ (0.06)	$ 0.02	(0.08)	$ (0.05)	$ 0.05	(0.10)
Other income / (expenses), net	$ 0.00	$ 0.06	(0.06)	$ 0.22	$ (0.02)	0.24
Foreign exchange differences, net	$ 0.04	$ 0.04	-	$ 0.09	$ 0.04	0.05
Income taxes	$ (0.31)	$ (0.87)	0.56	$ (1.97)	$ (0.92)	(1.05)
EBITDA	**$ (46.95)**	**$ (8.66)**	**(38.29)**	**$ (71.80)**	**$ (19.63)**	**(52.17)**
Net change in warrant liability	$ (2.13)	$ (6.91)	4.78	$ (9.38)	$ (22.74)	13.36
Gain from purchase price adjustment	$ (2.37)	$ -	(2.37)	$ (2.37)	$ -	(2.37)
Impairment loss – intangible assets and goodwill	$ 38.92	$ -	38.92	$ 38.92	$ -	38.92
One-Time Transaction Related Expenses(1)	$ -	$ -	-	$ -	$ 5.87	(5.87)
One-Time Transaction Related Expenses(2)	$ -	$ -	-	$ -	$ 0.89	(0.89)
Executive severance(3)	$ -	$ -	-	$ -	$ 2.44	(2.44)
Adjusted EBITDA	**$ (12.53)**	**$ (15.57)**	**3.04**	**$ (44.63)**	**$ (33.17)**	**(11.46)**

(1) Bonus awarded after consummation of the Business Combination effective February 4, 2021.
(2) Transaction costs related to the acquisition of SerEnergy/FES.
(3) Former Financial Officer resignation.

Adjusted Net Income/(Loss)

This supplemental non-GAAP measure is provided to assist readers in determining our financial performance. We believe this measure is useful in assessing our actual performance by adjusting our results from continuing operations for changes in warrant liability and one-time transaction costs. Adjusted Net Loss differs from the most comparable GAAP measure, net loss, primarily because it does not include one-time transaction costs, asset impairment charges and warrant liability changes. The following table shows a reconciliation of net income/(loss) for three months ended December 31, 2022 and 2021 and for the years ended December 31, 2022 and 2021.

Adjusted Net Loss	Three months ended December 31, (Unaudited)			Years Ended December 31,		
(in Millions of US dollars)	**2022**	**2021**	**$ change**	**2022**	**2021**	**$ change**
Net loss	**$ (47.63)**	**$ (9.00)**	**(38.63)**	**$ (74.34)**	**$ (20.52)**	**(53.82)**
Net change in warrant liability	$ (2.13)	$ (6.91)	4.78	$ (9.38)	$ (22.74)	13.36
Gain from purchase price adjustment	$ (2.37)	$ -	(2.37)	$ (2.37)	$ -	(2.37)
Impairment loss – intangible assets and goodwill	$ 38.92	$ -	38.92	$ 38.92	$ -	38.92
One-Time Transaction Related Expenses(1)	$ -	$ -	-	$ -	$ 5.87	(5.87)
One-Time Transaction Related Expenses(2)	$ -	$ -	-	$ -	$ 0.89	(0.89)
Executive severance(3)	$ -	$ -	-	$ -	$ 2.44	(2.44)
Adjusted Net Loss	**$ (13.21)**	**$ (15.91)**	**2.70**	**$ (47.17)**	**$ (34.06)**	**(13.11)**

(1) Bonus awarded after consummation of the Business Combination effective February 4, 2021.
(2) Transaction costs related to the acquisition of SerEnergy/FES.
(3) Former Financial Officer resignation.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Advent is exposed to a variety of market and other risks, including the effects of changes in interest rates and inflation, as well as risks to the availability of funding sources, hazard events and specific asset risks.

Interest Rate Risk

Advent holds cash and cash equivalents for working capital, investment and general corporate purposes. As of December 31, 2022, Advent had an unrestricted cash balance of approximately $32.9 million, consisting of operating and savings accounts which are not affected by changes in the general level of U.S. interest rates. Advent is not expected to be materially exposed to interest rate risk in the future as it intends to take on limited debt finance.

Inflation Risk

Advent does not believe that inflation currently has a material effect on its business. To mitigate cost increases caused by inflation, Advent has taken steps such as searching for alternative supplies at a lower cost and pre-buying materials and supplies at a more advantageous price in advance of its intended use.

Foreign Exchange Risk

Advent has costs and revenues denominated in Euros, Danish krone and Philippine pesos, and therefore is exposed to fluctuations in exchange rates. To date, Advent has not entered into any hedging transactions to mitigate the effect of foreign exchange due to the relatively low exposure. As we increase in scale, we expect to continue to realize a portion of our revenues and costs in foreign currencies, and therefore expect to put in place appropriate foreign exchange risk mitigation features in due course.

Item 8. Financial Statements and Supplementary Data.

This information required by this item may be found on pages F-1 through F-51 of this annual report on Form 10-K.

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

None.

Item 9A. Controls and Procedures.

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2022. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Based on the foregoing, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective as of the end of the period covered by this report.

Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the Company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2022, based on the criteria established in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO").

Our internal control over financial reporting includes policies and procedures that pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions recorded necessary to permit the preparation of financial statements in accordance with U.S. generally accepted accounting principles. Our policies and procedures also provide reasonable assurance that receipts and expenditures are being made only in accordance with authorizations of our management and directors, and 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.

Management conducted an assessment of the effectiveness of the Company's internal control over financial reporting based on the criteria established in COSO. This evaluation included review of the documentation, evaluation of the design effectiveness and testing of the operating effectiveness of controls.

Based on management's assessment, management concluded that the Company's internal control over financial reporting is effective and provides reasonable assurance that assets are safeguarded and that the financial records are reliable for preparing financial statements as of December 31, 2022.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act, that occurred during our most recently completed fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Executive Officers and Board of Directors

Our business and affairs are managed by or under the direction of our Board. The table below lists the persons who currently serve as executive officers and directors.

Name	Age	Position
Vassilios Gregoriou	58	Chairman, Chief Executive Officer and Director
Kevin Brackman	50	Chief Financial Officer
Christos Kaskavelis	54	Chief Marketing Officer
Emory De Castro	65	Chief Technology Officer and Director
James F. Coffey	60	Chief Operating Officer and General Counsel
Panoraia ‘Nora’ Gourdoupi	44	Director
Anggelos Skutaris	58	Director
Lawrence Epstein	55	Director
Wayne Threatt	68	Director
Von McConnell	63	Director

The following is a brief biography of each executive officer and director:

Vassilios Gregoriou has been Chairman and CEO of Advent since inception. Dr. Gregoriou cofounded Advent Technologies Inc. in 2012. In addition, Dr. Gregoriou is an internationally known scientist with research and/or managerial positions in both the U.S. (Northeastern, MIT, Polaroid, Princeton) and Greece (NHRF, FORTH) over his 30-year career so far in the technology sector. His research activity extends over a wide area of subjects in the renewable energy space that include the areas of flexible photovoltaics based on organic semiconductors, optically active materials based on conjugated oligomers and polymer nanocomposites. His published work as co-author includes three books and more than 100 scientific papers. He is also co-inventor of 15 patents. Dr. Gregoriou has more than 25 years of experience in the U.S. market. He has extensive experience in the technical development of new products and in the management of such activities. He holds a Ph.D. in Physical Chemistry from Duke University and he has attended the MBA program at Northeastern University. He was also a NRSA award recipient at Princeton University. He also served as President of Society for Applied Spectroscopy(SAS) in 2001. Dr. Gregoriou is well-qualified to serve on the board of directors due to his extensive scientific, managerial and industry experience.

Kevin Brackman has been Chief Financial Officer of Advent since July 2021. Prior to joining the Company, Mr. Brackman served as Executive Vice President, Chief Financial Officer of Myers Industries, a publicly traded corporation with internationally located manufacturing and sales operations in the polymer production sector. Before his promotion to Chief Financial Officer in 2018, he served as Myers Industries’ Chief Accounting Officer and Corporate Controller. Prior to joining Myers Industries in 2015, Mr. Brackman was Director of Financial Planning and Analysis, Financial Reporting and Technical Accounting at Ingersoll-Rand and previously excelled in a variety of positions at Chiquita Brands International, including Assistant Corporate Controller and Controller - North American operations. Mr. Brackman received his bachelor’s degree in Accounting and Finance from Miami University.

Christos Kaskavelis joined Advent as Chief Marketing Officer in 2019. From 2015 to 2016 he served as Managing Director of Mamaya IKE, a Greek publishing and media consulting company. From 2016 to 2018, he was a research scholar at the MIT Media Lab in Boston, Massachusetts. He has been a seed investor in the Company, an angel investor, and has served on its board of directors. He is a serial entrepreneur in the tech industry and primarily digital marketing, with successful exits in both Nasdaq and London Stock Exchanges. He has designed and been responsible for enterprise software systems designed for Pratt & Whitney, Analog Devices, General Electric and Lucent Technologies in the areas of Just-In-Time (JIT) manufacturing, Supply Chain Management and Production Scheduling. He holds a Ph.D. in Supply Chain Management as well as an M.Sc. in Manufacturing Engineering from Boston University, a B.Sc. in Electrical Engineering and a B.A. in Business Economics from Brown University.

Emory De Castro has been Advent's Chief Technology Officer since 2013. Dr. De Castro is responsible for the overall technical, manufacturing and business development operations for Advent. Prior to joining Advent, Dr. De Castro was a Vice President, Business Management and the site manager for BASF Fuel Cell Inc. in Somerset NJ. At BASF Dr. De Castro led marketing and sales, business development, quality control, and R&D direction all cumulating in nearly a four-fold increase in revenues. As the Executive Vice President at the E-TEK Division, De Nora North America he managed operations, created a global brand, and expanded the organization's fuel cell component business in Asia and Europe. Dr. De Castro has over 20 patent applications spanning fuel cell materials and catalysts, electrochemical technology, sensors, and a beer bottle cap that extends shelf life. He is the recipient of the 2013 Department of Energy Award for Manufacturing R&D in lowering the cost of gas diffusion electrodes and the 2005 ECS New Technology Award to E-TEK Division, for introducing and commercializing a new electrolysis technology. Emory De Castro received his Ph.D. from the Department of Chemistry at the University of Cincinnati and a B.S. in Chemistry from Duke University. Dr. De Castro is well-qualified to serve on our board of directors due to his extensive scientific and technological experience.

James F. Coffey has served as General Counsel and Corporate Secretary of Advent since March 2020. Beginning in 2018, while a partner at a national Am Law 100 law firm, Jim served as Advent's outside legal counsel. Mr. Coffey has over thirty years of experience in corporate and securities law, mergers and acquisitions, venture capital and corporate finance, and intellectual property law. He has extensive international experience having closed transactions in both North and South America, Europe, and China. Throughout the course of his career, Jim has developed strong relationships and strategic contacts within the clean energy and technology sectors and specific experience in the fuel cell industry. From 2013 to 2017, he served as general counsel to another HT PEM fuel cell company that was a customer of Advent. Mr. Coffey was a Gerald L. Wallace Scholar at New York University School of Law where he received an LL.M. in Corporate Law. He received his J.D. from the New England School of Law, and his B.A., cum laude, from Providence College. Mr. Coffey is listed in The Best Lawyers in America® for Mergers and Acquisitions. He is recognized for his work in intellectual property law by the IAM Patent 1000. Mr. Coffey was named a Massachusetts Super Lawyer by Law and Politics magazine. He is AV® rated by Martindale-Hubbell. Mr. Coffey is a fellow of the Boston Bar Foundation and the American Bar Foundation.

Nora Gourdoupi was appointed as a director in July 2022 and, since February 2022, has served as SVP, Corporate Business Development of the Company's Greek branch overseeing daily operations while being also engaged in product development, government projects and technical sales. Dr. Gourdoupi joined Advent in 2006, became a Senior Scientist in 2012 and is co-inventor in 18 patents. Being part of a fast-growing Small Medium Enterprise from its foundation, she has been involved in several key business processes including materials R&D as well as project management. Dr. Gourdoupi holds a BSc in Chemistry and a PhD from the University of Patras specializing in the synthesis and characterization of polymers for fuel cell applications. Dr. Gourdoupi is well-qualified to serve on our board of directors due to her extensive scientific and technological experience.

Anggelos Skutaris has been a director of Advent since February 2021. Mr. Skutaris has a BSc in Economics from Arizona State University and an MBA from the Thunderbird School of Global Management. He has more than 30 years of international experience in banking, finance, management, treasury and investments. In February 2023, Mr. Skutaris became Chief Investment Officer for Al Khor Holding, a Family Office managing investments for the Al Mesnad family of Qatar. Prior to that, since November 2019, he was a member of the Incorporation Committee and Chief Investment Officer for Power Bank, a Qatar-based financial institution with a mission to provide Islamic financing to the global energy sector. Between August 2017 and November 2019, he served as the Chief Investment Officer for Janus Continental Group. Other key positions he held in the past include: Head of Treasury Operations & Transformation (Qatar Airways), Managing Partner (New Symbol Global Advisors), Chief Executive Officer (Piraeus Capital Management), Founder & CEO (OliveTree Management Associates), Group Treasurer (Titan Cement), Head of Equity Financing (Calyon Securities) and Director of Equity Financing (Credit Suisse). Whilst at Titan cement, Mr. Skutaris was instrumental in issuing the largest corporate syndicated facility in Greece, a 5-year, €800 million transaction. Mr. Skutaris is well-qualified to serve on the board of directors due to his extensive business development and financial experience.

Lawrence Epstein has been a director of Advent since April 2022. Mr. Epstein has over two decades of experience in commercial real estate transactions, driving over one billion dollars in transactional value since 2016. Since October 2021, he has been a Senior Managing Director for Savills. Savills is an international leader in promoting sustainability in building operations and design, offering expertise to its worldwide real estate clients in sustainable design, energy infrastructure, strategic advisory, impact assessment, and reporting, offsets and environmental land management and general operational sustainability support. The company was founded in the UK in 1855 and is one of the world's leading brokerage firms. Savills' experience and expertise spans the globe, with offices across Europe, the Americas, Asia Pacific, Africa, and the Middle East. Mr. Epstein focuses exclusively on representing tenants in both the U.S. and international markets. Previously, from May 2016 to September 2021, he was a principal at Avison Young, a commercial real estate company. He is a graduate of Bates College, where he received a BA in History. Mr. Epstein is a member of the Commercial Brokers Association. He formerly served on the Direct Federal Credit Union Board and the Greater Boston Real Estate Association. His volunteer efforts include Call2Talk, a mental health services hotline. Mr. Epstein is well-qualified to serve on the board of directors due to his business experience in the international commercial real estate industry.

Wayne Threatt has been a director of Advent since June 2022. Mr. Threatt has extensive experience in financing, from angel startups through venture capital investments and initial public offerings. He has negotiated and designed all manner of financings, acquisitions, divestitures and strategic alliances, and has conducted nine figure private placement financings. Mr. Threatt is currently the managing principal at WBT Strategy Consulting, where he has worked since 2001, and was formerly a principal at SPC Capital Management, a diversified private equity fund with more than of $100 million under management. He has years of general management, marketing, and business development experience in both corporate and entrepreneurial environments, in industries spanning from technology to branded consumer goods. Mr. Threatt was previously CEO of Androx Corporation and EMUMAIL, VP Marketing and Sales at Scientific Computing Associates, VP Corporate Development Cambridge SoundWorks, and VP and General Manager Sapphire Audio. He has been a consultant providing strategic capital and operational insight for high-tech industries such as energy, biotechnology, information technology, and photonics. He is a graduate of the University of Chicago, where he received his degree in Physics. Mr. Threatt holds a Master of Science in Physics awarded by the University of Pittsburgh and received his MBA from the Harvard Business School. His volunteer commitments include serving as a board member to Synergy Services, an organization dedicated to helping families in crisis. Mr. Threatt is well qualified to serve on the Advent Board of Directors due to his extensive experience as an executive and with technology companies.

Von McConnell has been a director since November 2022. Mr. McConnell has nearly four decades of experience in leading technology firms, including Sprint Corporation (now T-Mobile). His positions included serving as the Chief Operating Officer and Executive Director of Operations for Sprint's 4G business unit and he also served as Sprint's Executive Director of Advanced Labs & Innovation, where he was responsible for research and development, systems and network design, engineering, product evaluation, customer trials, and quality certification for all wireless systems and products. Mr. McConnell is currently the founder and president of the TM Group, a successful technology consulting firm which has been engaged in venture capital acquisitions, 5G network rollouts, Division 1 university artificial intelligence programs, and other cutting edge technological commitments. He has served as a director of incubator level and growth stage tech companies and served as a director of a non-profit economic development entity. Mr. McConnell is responsible for dozens of patent innovations. Mr. McConnell has been an advisor and mentor to numerous companies affiliated with the SparkLabKC incubator and served on the Board of Advisors for the Business IT School at the University of Missouri, where he was also an Adjunct Professor. Mr. McConnell holds an executive MBA from AJI Network and a Masters in Telecommunications from George Washington University. He also holds a bachelors degree in economics from Emory & Henry College and is a graduate of economic modeling at George Mason University. Mr. McConnell is well-qualified to serve on the board of directors due to his business experience in the technology sector and his expertise within the field.

Board Composition

Our authorized board of directors consists of seven members. In accordance with the second amended and restated certificate of incorporation, our board of directors is divided into three classes, Classes I, II and III, each to serve a three-year term. At each annual meeting of stockholders, the successors to directors whose terms then expire will be elected to serve from the time of election and qualification until the third annual meeting following the election. Directors will not be able to be removed during their term except for cause. The directors are divided among the three classes as follows:

- the Class I directors are Anggelos Skutaris and Von McConnell, and their terms will expire at the annual meeting of stockholders to be held in 2024;
- the Class II directors are Lawrence Epstein and Wayne Threatt, and their terms will expire at the annual meeting of stockholders to be held in 2025; and
- the Class III directors are Vassilios Gregoriou, Nora Gourdoupi and Emory De Castro, and their terms will expire at the annual meeting of stockholders to be held in 2023.

We expect that any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the directors. The division of the board of directors into three classes with staggered three-year terms may delay or prevent a change of our management or a change in control.

Director Independence

The board of directors has determined that each of Mr. Skutaris, Mr. Epstein, Mr. Threatt and Mr. McConnell are independent directors as defined in Nasdaq rules and the applicable SEC rules. For further information, see "Item 13. Certain Relationships and Related Transactions, and Director Independence."

Board Leadership Structure

The leadership of the Board is currently structured so that it is led by the Chairman, Vassilios Gregoriou, who also serves as the Company's Chief Executive Officer. When the Chairman of the Board is not an independent director, a Lead Director may be elected annually by the Board. The Board has elected Mr. Skutaris to serve as Lead Director.

Our Board has concluded that our current leadership structure is appropriate at this time. However, our Board will continue to periodically review our leadership structure and may make such changes in the future as it deems appropriate.

Committees of the Board of Directors

The board of directors has the authority to appoint committees to perform certain management and administration functions. The Board has established an audit committee, compensation committee and nominating and corporate governance committee.

Audit Committee

Our audit committee consists of Mr. Skutaris, Mr. Epstein and Mr. Threatt. The board of directors has determined that each member is independent under the Nasdaq Capital Market listing standards and Rule 10A-3(b)(1) under the Exchange Act. The chairperson of our audit committee is Mr. Skutaris. Our board of directors has determined that Mr. Skutaris qualifies as an "audit committee financial expert" as such term is defined in Item 407(d)(5) of Regulation S-K and possesses financial sophistication, as defined under the rules of Nasdaq Capital Market.

The primary purpose of the audit committee is to discharge the responsibilities of the board of directors with respect to our accounting, financial, and other reporting and internal control practices and to oversee our independent registered accounting firm. Specific responsibilities of our audit committee include:

- selecting a qualified firm to serve as the independent registered public accounting firm to audit our financial statements;
- helping to ensure the independence and performance of the independent registered public accounting firm;
- discussing the scope and results of the audit with the independent registered public accounting firm, and reviewing, with management and the independent accountants, our interim and year-end operating results;
- developing procedures for employees to submit concerns anonymously about questionable accounting or audit matters;
- reviewing policies on risk assessment and risk management;
- reviewing related party transactions;
- obtaining and reviewing a report by the independent registered public accounting firm at least annually, that describes our internal quality-control procedures, any material issues with such procedures, and any steps taken to deal with such issues when required by applicable law; and
- by the independent registered public accounting firm.

Compensation Committee

The compensation committee consists of Mr. Epstein and Mr. Skutaris. The chairperson of the compensation committee is Mr. Epstein. The primary purpose of the compensation committee is to discharge the responsibilities of the board of directors to oversee its compensation policies, plans and programs and to review and determine the compensation to be paid to its executive officers, directors and other senior management, as appropriate.

Specific responsibilities of the compensation committee include:

- reviewing and approving on an annual basis the corporate goals and objectives relevant to our Chief Executive Officer’s compensation, evaluating our Chief Executive Officer’s performance in light of such goals and objectives and determining and approving the remuneration (if any) of our Chief Executive Officer based on such evaluation;
- reviewing and approving the compensation of our other executive officers;
- reviewing and recommending to our board of directors the compensation of our directors;
- reviewing our executive compensation policies and plans;
- reviewing and approving, or recommending that our board of directors approve, incentive compensation and equity plans, severance agreements, change-of-control protections and any other compensatory arrangements for our executive officers and other senior management, as appropriate;
- selecting independent compensation consultants and assessing whether there are any conflicts of interest with any of the committee’s compensation advisors;
- assisting management in complying with our proxy statement and Annual Report disclosure requirements;
- if required, producing a report on executive compensation to be included in our annual proxy statement;
- reviewing and establishing general policies relating to compensation and benefits of our employees; and
- reviewing our overall compensation philosophy.

Role of the Compensation Consultant

In accordance with the Compensation Committee Charter, the Compensation Committee has the authority to engage, retain and terminate a compensation consultant. The Compensation Committee also has the sole authority to approve the fees of such consultant. The Compensation Committee engaged ClearBridge Compensation Group LLC ("ClearBridge") as its independent compensation consultant. ClearBridge reports directly to the Compensation Committee, which has authority under the Compensation Committee Charter to retain compensation consultants, although its representatives may also meet with management from time to time.

Services performed by ClearBridge for the Compensation Committee include, but are not limited to:

1. reviewing the Company's compensation philosophy;

2. evaluation of compensation program design for 2022;

3. providing market context for Compensation Committee decisions

    a. In 2022, the Company elected to forgoe establishing a compensation peer group, and as a result relied on survey data for benchmark purposes (as needed), scoped to the Company's size;

4. review of cash bonuses paid to executive officers;

5. review of long-term incentive awards;

6. review and determine go-forward non-employee director compensation program; and

7. analysis of current trends in executive compensation, and updates regarding applicable legislative and governance activity.

The Compensation Committee determined that the services provided by ClearBridge to the Compensation Committee did not give rise to any conflicts of interest. The Compensation Committee made this determination by assessing the independence of ClearBridge under the applicable rules adopted by the SEC and incorporated into the Nasdaq Corporate Governance Requirements. In making this assessment, the Compensation Committee also considered ClearBridge's written correspondence to the Compensation Committee that affirmed the independence of ClearBridge and the consultants and employees who provide services to the Compensation Committee on executive compensation matters.

Nominating and Corporate Governance Committee

Our nominating and corporate governance committee consists of Mr. Threatt and Mr. Epstein. The board of directors has determined each proposed member is independent under Nasdaq listing standards. The chairperson of our nominating and corporate governance committee is Mr. Threatt.

Specific responsibilities of our nominating and corporate governance committee include:

- identifying, evaluating and selecting, or recommending that our board of directors approve, nominees for election to our board of directors;
- evaluating the performance of our board of directors and of individual directors;
- reviewing developments in corporate governance practices;
- evaluating the adequacy of our corporate governance practices and reporting;
- reviewing management succession plans; and
- developing and making recommendations to our board of directors regarding corporate governance guidelines and matters.

Code of Business Conduct and Ethics

The Company's Code of Business Conduct and Ethics applies to all of its employees, officers and directors, including those officers responsible for financial reporting. The Code of Business Conduct and Ethics is available on its website at www.advent.energy. Information contained on or accessible through such website is not a part of this Annual Report, and the inclusion of the website address in this Annual Report is an inactive textual reference only. The Company intends to disclose any amendments to the Code of Business Conduct and Ethics, or any waivers of its requirements, on its website to the extent required by the applicable rules and exchange requirements.

Delinquent Section 16(a) Reports

Section 16(a) of the Exchange Act requires the Company's directors and executive officers and persons who beneficially own more than 10% of the Company's common stock to file with the SEC reports showing initial ownership of and changes in ownership of the Company's common stock and other registered equity securities. Based solely upon our review of the copies of such forms or written representations from certain reporting persons received by us with respect to fiscal year 2022, the Company believes that its directors and executive officers and persons who own more than 10% of a registered class of its equity securities have complied with all applicable Section 16(a) filing requirements for fiscal year 2022, except for the following: Vassilios Gregoriou did not timely file two Form 4s reporting four transactions; James F. Coffey did not timely file one Form 4 reporting one transaction; Emory De Castro did not timely file one Form 4 reporting one transaction; and Panoraia Gourdoupi did not timely file one Form 3 and one Form 4 reporting one transaction.

Item 11. Executive Compensation.

Summary Compensation Table

The following table sets forth certain information about the compensation paid or accrued during the years ended December 31, 2022 and 2021 to our Chief Executive Officer and each of our two most highly compensated executive officers other than our Chief Executive Officer who were serving as executive officers at December 31, 2022, and whose annual compensation exceeded $100,000 during such year or would have exceeded $100,000 during such year if the executive officer were employed by the Company for the entire fiscal year (collectively the "named executive officers" or "NEOs").

Name and Principal Position	Fiscal Year	Salary ($)	Bonus ($) (1)(2)	Stock Awards ($) (3)	Option Awards ($) (3)	Non-Equity Incentive Plan Compensation ($)	All Other Compensation ($) (4)	Total ($)
Vassilios Gregoriou	2022	$ 800,000	-	$ 479,500	$ 418,250	-	-	$ 1,697,750
Chairman of the Board of Directors and Chief Executive Officer	2021	$ 800,000	$ 3,000,000	$ 9,553,142	$ 4,647,475	$ 1,200,000	-	$ 19,200,617
James Coffey	2022	$ 475,000	-	-	-	-	-	$ 475,000
Chief Operating Officer and General Counsel	2021	$ 475,000	$ 770,000	$ 3,582,426	$ 1,742,802	$ 475,000	-	$ 7,045,228
Kevin Brackman	2022	$ 375,000	-	-	-	-	-	$ 375,000
Chief Financial Officer	2021	$ 187,500	-	$ 1,756,631	$ 995,885	$ 375,000	$ 40,000	$ 3,355,016

(1) The Company entered into transaction bonus letter agreements with Dr. Gregoriou and Mr. Coffey, which entitled the executives to receive a transaction bonus which was paid promptly in February 2021 following the Business Combination, contingent upon such executive's continued employment through the consummation of the Business Combination and execution of a general release of claims.

(2) The Company entered into employment agreements with Dr. Gregoriou and Mr. Coffey, which entitled the executives to receive a one-time sign-on bonus in 2021.
(3) The amounts included under the "Stock Awards" and "Option Awards" columns reflect the aggregate grant date fair value of such awards granted during the 2022 and 2021 fiscal years. For more information regarding these share-based compensation arrangements, see Note 17 to the audited Consolidated Financial Statements for the year ended December 31, 2022 included as part of this filing and Note 16 to the audited Consolidated Financial Statements for the year ended December 31, 2021 as part of the 2021 Annual Report filed with the SEC on March 31, 2022.
(4) Mr. Brackman received $40,000 in relocation expense benefits during 2021.

Narrative Disclosure to Summary Compensation Table

Compensation Philosophy and Objectives

The Company operates in a dynamic and rapidly evolving environment, which requires a highly-skilled and technical workforce. As a result, the Company places great emphasis on its ability to attract, retain, and motivate top talent in the industry. The Company achieves these objectives by creating an appropriate balance between achieving short-term results and creating long-term sustainable value to shareholders that reinforces the linkage between pay and performance.

Elements of Executive Compensation

The compensation of executives of the Company includes three main elements: (i) base salary; (ii) an annual bonus; and (iii) long-term equity incentives. Perquisites and personal benefits are not a significant element of compensation for the Company's executive officers.

Base Salaries

Base salary is provided as a fixed source of compensation for the Company's executive officers. Adjustments to base salaries are reviewed annually and as warranted throughout the year to reflect promotions or other changes in the scope of an executive officer's role or responsibilities, as well as to maintain market competitiveness.

Dr. Gregoriou's annual base salary was $800,000; Mr. Coffey's annual base salary was $475,000; and Mr. Brackman's annual base salary was $375,000 for the year ended December 31, 2022.

Annual Bonuses

In 2022, the named executive officers were each eligible to receive an annual cash incentive award, based on the achievement of pre-approved key performance objectives determined by the Compensation Committee.

As provided in their respective employment agreements, the target bonus amount for Dr. Gregoriou was 150% of his base salary and for Messrs. Coffey and Brackman were 100% of their base salaries. Actual bonus payouts vary based on Compensation Committee assessment of executive performance versus pre-established key performance indicators.

Management, at its discretion, decided there will not be performance related bonus payouts for fiscal year 2022.

Equity Compensation

In 2021, the Company adopted the Advent Technologies Holdings, Inc. 2021 Incentive Plan (the "2021 Equity Incentive Plan"). The 2021 Equity Incentive Plan advances the Company's interests by providing for the grant to our employees, directors, consultants and advisors of stock options, SARs, restricted and unrestricted stock and stock units, performance awards and other awards that are convertible into or otherwise based on our common stock.

Following the Business Combination, on June 11, 2021, the Compensation Committee made grants to select senior executives. The grants were made to recognize each executive's role and contributions to date, including outstanding efforts towards a successful transaction, as well as to incentivize and to retain the executives, and to further align them with the post-Business Combination stockholders. As a result of the Business Combination grants, and Mr. Brackman's sign-on award in 2021, the Compensation Committee elected to not make any additional annual grants in 2022 to the NEOs.

In recognition of Dr. Gregoriou's role and contributions related to the ratification of GreenHiPo by the EU, the Compensation Committee, in July 2022, granted a one-time special award of 175,000 time-vested restricted stock units ("RSUs") and stock options to purchase 175,000 shares of common stock to Dr. Gregoriou.

Transaction Bonus Letter Agreements with Executive Officers

Advent entered into transaction bonus letter agreements with each of Dr. Gregoriou and Mr. Coffey, which entitled each executive to receive a transaction bonus that was payable promptly following the Business Combination, contingent upon such executive's continued employment through the consummation of the Business Combination and execution of a general release of claims. The transaction bonuses, which were paid at the time of the Business Combination in February 2021, were as follows: (i) for Dr. Gregoriou, $2,500,000, and (ii) for Mr. Coffey, $520,000.

One-Time Bonuses

On October 12, 2020, in connection with the execution of the Merger Agreement and the announcement of the Merger, Advent entered into employment agreements, with each of Dr. Gregoriou and Mr. Coffey. As part of the employment agreements, Advent agreed to pay one-time sign-on bonuses payable in two installments: (i) 50% on the first payroll date following the consummation of the Business Combination and (ii) 50% to be paid on the first payroll date following the one-year anniversary of the consummation of the Business Combination, subject to the applicable executive's employment through the relevant payment date. The one-time bonuses were as follows: (i) Dr. Gregoriou, $500,000 and (ii) Mr. Coffey, $250,000.

Employment Agreements

Advent is a party to certain offer letters with each of the named executive officers that set forth the initial terms and conditions of the officer's employment with Advent, each of which has since been superseded by new employment agreements as described in "Executive Compensation-Employment Agreements and Other Arrangements with Executive Officers and Directors-Employment and Consulting Arrangements with Executive Officers and Directors" below. The material terms of these offer letters are summarized below.

Dr. Gregoriou. On December 3, 2012, Advent entered into an offer letter with Dr. Gregoriou, which provided for an annual base salary of $170,000, eligibility to receive an annual performance bonus of cash and performance stock awards and an initial grant of restricted stock awards in an amount equal to 4% of outstanding common stock on Dr. Gregoriou's date of hire. Pursuant to the offer letter, if Dr. Gregoriou's employment is terminated without "cause" or if he resigns for "good reason" (as each such term was defined in the offer letter), he is entitled to (i) 6 months' base salary continuation and (ii) 12 months' subsidized benefits continuation, in each case subject to Dr. Gregoriou's execution and non-revocation of a release of claims. As described in further detail in the "Executive Compensation-Employment Agreements and Other Arrangements with Executive Officers and Directors-Employment and Consulting Arrangements with Executive Officers and Directors" section of this report, effective as of the consummation of the Business Combination, this offer letter was superseded in its entirety by a new employment agreement between Dr. Gregoriou and Advent.

On October 19, 2019, Dr. Gregoriou separately entered into an agreement with Advent that contained (i) a perpetual confidentiality covenant, (ii) an assignment of intellectual property covenant, (iii) a non-competition covenant for two year post-termination of employment, (iv) a covenant not to solicit any of Advent's customers or patrons during the two-year period following termination and (v) a covenant not to solicit any of Advent's employees or consultants during the two-year period following termination.

Mr. Coffey and Mr. Brackman. As described in further detail in the “Executive Compensation-Employment Agreements and Other Arrangements with Executive Officers and Directors-Employment and Consulting Arrangements with Executive Officers and Directors” section of this report, in connection with the announcement of the Business Combination, Mr. Coffey entered into an employment agreement with Advent, which became effective as of the consummation of the Business Combination. Mr. Brackman entered into an employment agreement with Advent on August 13, 2021, which was effective as of July 2, 2021 and superseded certain offer letter entered into between the Company and Mr. Brackman dated July 2, 2021.

Employee Benefits

The Company sponsors an employee savings plan under Section 401(k) of the Internal Revenue Code. Subsequent to the Business Combination, the Company made matching contributions equal to 100% of the participant’s pre-tax contribution up to a maximum of 5% of the participant’s eligible earnings for U.S employees. Total expense related to the Company’s defined contribution plan was $0.3 million and $0.1 million for the years ended December 31, 2022 and 2021.

As described in Note 2 of the Company’s audited consolidated financial statements for fiscal years 2022 and 2021, pursuant to Greek Labor Law 2112/1920, employees in Greece are entitled to an indemnity in the event of dismissal or retirement, though as a director, Dr. Gregoriou is not eligible for such indemnity.

Other Compensation Policies

Stock Ownership/Holding Policy

The Company maintains meaningful stock ownership guidelines to reinforce the importance of stock ownership. These guidelines are intended to align the interests of executives and shareholders and to focus the executives on our long-term success. Under these guidelines, each of our active executives and non-employee directors must own shares in accordance with the following schedule:

Role	**Required Ownership Level**
Chief Executive Officer and Chairman	6.0x Base Salary
Other Executive Officers	3.0x Base Salary
Non-Employee Directors	3.0x Annual Cash Retainer

Shares that count towards satisfying the ownership requirements include:

- Shares owned by the executive/director, including those obtained through the vesting of restricted stock units and performance stock units;
- Shares owned jointly by the executive/director and spouse or held in trust established by the; executive/director for the benefit of the executive/director and/or family members;
- Unvested time-based restricted stock units;
- Note: Unvested performance stock units and unexercised stock options do not count towards satisfying stock ownership requirements.

Each executive or non-employee director has 5 years to meet the ownership guidelines starting from when the executive/director first becomes subject to the policy. Executives/directors who do not meet the ownership guidelines after 5 years of being subject to the guidelines are expected to retain 50% of net shares (i.e., shares remaining after payment of taxes) upon vesting or exercise of stock options until they meet the guidelines. Executive and Non-Employee Directors are either already in compliance with the stock ownership guidelines or expected to be within the 5-year timeframe.

Prohibition on Pledging and Hedging

The Company maintains a comprehensive Insider Trading Policy that includes a prohibition on pledging Company securities or holding Company securities in a margin account. Additionally, the policy prohibits engaging in hedging, monetization and similar transactions in respect of Company securities. This policy, applicable to all officers, directors and associates, was put in place to ensure that the interests of these individuals remain aligned with those of stockholders, and that they continue to have the incentive to execute the Company's long-term plans and achieve the performance for which their equity awards are intended.

Employment Agreements and Other Arrangements with Executive Officers and Directors

Employment Agreements

On October 12, 2020, in connection with the execution of the Merger Agreement and the announcement of the Business Combination Advent entered into employment agreements, with each of Dr. Gregoriou and Mr. Coffey. The material terms of these employment agreements are set forth below:

- Dr. Gregoriou serves as our Chief Executive Officer and Chairman of our board of directors, with an initial annual base salary of $800,000, a one-time signing bonus of $500,000, and beginning in fiscal year 2021, eligibility to earn an annual performance bonus with a target equal to 150% of his annual base salary.

- Mr. Coffey serves as our Chief Operating Officer and General Counsel, with an annual base salary of $475,000, a one-time signing bonus of $250,000, and beginning in fiscal year 2021, eligibility to earn an annual performance bonus with a target equal to 100% of his annual base salary.

The sign-on bonuses were paid in two installments: (i) 50% on the first payroll date following the consummation of the Business Combination and (ii) 50% on the first payroll date following the one year anniversary of the consummation of the Business Combination, subject to the applicable executive's employment through the relevant payment date.

On August 13, 2021, Advent entered into employment agreement with Mr. Brackman, which was effective as of July 2, 2021 and superseded certain offer letter entered into between the Company and Mr. Brackman dated July 2, 2021. The material terms of this employment agreement are set forth below:

- Mr. Brackman serves as our Chief Financial Officer, with an annual base salary of $375,000, a one-time relocation expense payment of $40,000, and beginning in fiscal year 2021, eligibility to earn an annual performance bonus with a target equal to 100% of his annual base salary.

The employment agreements provide that if an executive's employment terminates without "cause" or by him for "good reason," (as such terms are defined in the employment agreement or term sheet, as applicable), the executive will be entitled to (i) up to 12 months' subsidized medical, dental and vision benefits continuation (18 months for Dr. Gregoriou) and (ii) payment of one times (two times for Dr. Gregoriou) the sum of such executive's annual base salary and target bonus, payable over 12 months. If such termination of employment without "cause" or resignation for "good reason" occurs within 60 days prior to, or 12 months following, a "change in control" (as such term is defined in the 2021 Equity Incentive Plan), severance is enhanced and provides for (i) up to 18 months' subsidized medical, dental and vision benefits continuation for all executives, (ii) two times (three times for Dr. Gregoriou) the sum of such executive's annual base salary and target bonus, payable over 12 months, and (iii) the initial grant of stock options and restricted stock units issued pursuant to the 2021 Equity Incentive Plan, shall become fully vested, and such options will remain exercisable for a period of one year following such termination of employment. Moreover, if the acquirer in such "change in control" does not agree to assume or substitute for equivalent stock options, any unvested portion of the initial grant of stock options shall become fully vested and exercisable at the time of such transaction.

The employment agreements for Dr. Gregoriou, Messrs. Coffey and Brackman each contain (i) a perpetual confidentiality covenant, (ii) an assignment of intellectual property covenant, (iii) a non-competition covenant for one year post-termination of employment (subject to, for Dr. Gregoriou, the Executive's receipt of at least 50% of the Executive's highest annualized base salary within the two (2) year period preceding termination) for the entire year, (iv) a covenant not to solicit any of our customers, vendors, suppliers or other business partners during the eighteen (18)-month period following termination and (v) a covenant not to solicit any of our employees or independent contractors during the eighteen (18)-month period following termination.

Non-Competition Agreements

Simultaneously with the execution and delivery of the Merger Agreement, certain insider Advent stockholders entered into non-competition and non-solicitation agreements for the benefit of the Company, Advent and each of their respective present and future affiliates, successors and subsidiaries (each, a "Non-Competition Agreement"), to become effective at the Closing, pursuant to which the Advent stockholder party thereto agreed not to compete with the Company, Advent and their respective affiliates during the three (3) year period following the Closing in North America or the European Union (including Greece) or in any other markets in which the Company and Advent are engaged. The Advent stockholder party thereto also agreed during such three (3) year restricted period to not solicit employees or customers of such entities. The Non-Competition Agreement also contains customary confidentiality and non-disparagement provisions.

Outstanding Equity Awards at Fiscal Year End

The following table provides information with respect to awards held by the named executive officers as of December 31, 2022.

	Option Awards				Stock Awards	
Name	**Number of Securities Underlying Unexercised Options (#) Exercisable**	**Number of Securities Underlying Unexercised Options (#) Unexercisable**	**Option Exercise Price ($)**	**Option Expiration Date**	**Number of Shares or Units of Stock that Have Not Vested (#)**	**Market Value of Shares or Units of Stock That Have Not Vested ($) (7)**
Vassilios Gregoriou(1)(2)	230,530	691,588	$ 10.36	6/11/2031	691,588	$ 1,251,774
Vassilios Gregoriou(3)(4)	-	175,000	$ 2.74	7/12/2032	175,000	$ 316,750
James Coffey(1)(2)	86,449	259,345	$ 10.36	6/11/2031	259,345	$ 469,414
Kevin Brackman(5)(6)	57,632	172,897	$ 7.62	8/24/2031	172,897	$ 312,944

(1) Option awards vest 25% upon each anniversary of February 4, 2021, the vesting commencement date, until the fourth anniversary of the vesting commencement date.
(2) Stock awards consist of grants of restricted stock units that vest 25% upon each anniversary of February 4, 2021, the vesting commencement date, until the fourth anniversary of the vesting commencement date.
(3) Option awards vest 25% upon each anniversary of July 12, 2022, the vesting commencement date, until the fourth anniversary of the vesting commencement date.
(4) Stock awards consist of grants of restricted stock units that vest 25% upon each anniversary of July 12, 2022, the vesting commencement date, until the fourth anniversary of the vesting commencement date.
(5) Option awards vest 25% upon each anniversary of August 24, 2021, the vesting commencement date, until the fourth anniversary of the vesting commencement date.
(6) Stock awards consist of grants of restricted stock units that vest 25% upon each anniversary of August 24, 2021, the vesting commencement date, until the fourth anniversary of the vesting commencement date.
(7) Market value of restricted stock unit awards is based on the closing price of $1.81 per share on December 30, 2022 on the Nasdaq Capital Market.

Director Compensation

Pursuant to offer letters with each of the Company's non-employee directors (the "Director Offer Letters"), each director receives an annual retainer of $100,000, to be paid quarterly in arrears. In addition, each non-employee director is eligible to receive an annual grant of stock awards for a number of shares of Company common stock determined by dividing $100,000 by the closing price per share of Company common stock on the applicable grant date. While each of Drs. Gregoriou, De Castro, Gourdoupi, and Christos Kaskavelis, the Company's Chief Marketing Officer, served as members of the board of directors of the Company in 2022, none received additional compensation for director services. Dr. Gregoriou's compensation earned with respect to his employment with Advent is set forth in the "Summary Compensation Table" above.

The following table sets forth all compensation paid to or earned by each non-employee director of the Company during fiscal year 2022.

	Year Ended December 31, 2022		
Name	Fees Earned or Paid in Cash ($)	Stock Awards ($)[(1)(2)]	Total ($)
Anggelos Skutaris	$ 100,000	$ 100,000	$ 200,000
Lawrence Epstein[(3)]	$ 66,667	$ 100,000	$ 166,667
Wayne Threatt[(4)]	$ 50,000	$ 100,000	$ 150,000
Von McConnell[(5)]	$ 10,000	$ -	$ 10,000
Katherine E. Fleming (*former director*)[(6)]	$ 50,000	$ -	$ 50,000
Katrina Fitz (*former director*)[(7)]	$ 46,945	$ -	$ 46,945

(1) The amounts disclosed above reflect the full grant date fair values in accordance with FASB ASC Topic 718. See "Note 17 - Share Based Compensation" to our consolidated financial statements for the year ended December 31, 2022.
(2) On June 15, 2022, the Company granted to each non-employee director a total of 64,516 restricted stock units which vest on June 8, 2023.
(3) Mr. Epstein was appointed as a director of the Company on April 8, 2022.
(4) Mr. Threatt was appointed as a director of the Company on June 8, 2022.
(5) Mr. McConnell was appointed as a director of the Company on November 4, 2022.
(6) Ms. Fleming's term expired on June 8, 2022.
(7) Ms. Fritz resigned on May 27, 2022.

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

The following table sets forth information known to the Company regarding the beneficial ownership of our common stock as of March 29, 2023 by:

- each person known to us to be the beneficial owner of more than 5% of outstanding common stock;
- each of our named executive officers and directors; and
- all executive officers and directors as a group

Beneficial ownership is determined according to the rules of the SEC, which generally provide that a person has beneficial ownership of a security if he, she or it possesses sole or shared voting or investment power over that security, including options and warrants that are currently exercisable or exercisable within 60 days. Stock issuable upon exercise of options and warrants currently exercisable within 60 days are deemed outstanding solely for purposes of calculating the percentage of total voting power of the beneficial owner thereof.

The beneficial ownership of Company common stock is based on 52,261,643 shares of common stock outstanding as of March 29, 2023.

Unless otherwise indicated, the Company believes that each person named in the table below has sole voting and investment power with respect to all shares of Company common stock beneficially owned by them.

Name and Address of Beneficial Owner	Number of Shares	%
Directors and Executive Officers		
Vassilios Gregoriou(1)	6,210,343	11.8%
Emory De Castro(2)	2,414,940	4.6%
James Coffey(2)	878,812	1.7%
Nora Gourdoupi(3)	162,297	*
Kevin Brackman(4)	88,983	*
Christos Kaskavelis(2)	4,049,909	7.7%
Anggelos Skutaris	19,304	*
Lawrence Epstein	3,100	*
Wayne Threatt	-	-
Von McConnell	-	-
All directors and executive officers as a group (ten individuals)(5)	13,827,688	26.0%
Five Percent Holders:		
BNP Paribas Asset Management UK Ltd.(6)	5,549,573	10.6%
F.E.R. fischer Edelstahlrohre GmbH(7)	5,124,846	9.8%
Charalampos Antoniou(8)	2,775,049	5.3%

* Less than one percent.

(1) Share amount includes 461,060 shares issuable upon exercise of options.

(2) Share amount includes an aggregate of 172,896 shares issuable upon exercise of options.

(3) Share amount includes an aggregate of 18,750 shares issuable upon exercise of options.

(4) Share amount includes an aggregate of 57,632 shares issuable upon exercise of options.

(5) Share amount includes an aggregate of 1,056,134 shares issuable upon exercise of options. Unless otherwise indicated, the business address of each of the individuals is 500 Rutherford Ave Suite 102, Boston, MA 02129.

(6) Pursuant to a Schedule 13G filed with the SEC on January 31, 2023, BNP Paribas Asset Management UK Ltd. ("BNP") has sole voting and dispositive power over such shares. The business address for BNP is 5 Aldermanbury Square, London, EX2V 7BP.

(7) Pursuant to a Schedule 13G filed with the SEC on February 9, 2023, all shares are held of record by F.E.R. fischer Edelstahlrohre GmbH ("Fischer GmbH"). Fischer GmbH has shares voting and dispositive power over such shares. Fischer GmbH is 100% owned by fischer group SE & Co. KG ("Fischer KG"). Johann Fischer holds an interest and 51% of the voting power in Fischer KG. The remaining interests in Fischer KG are held by Hans-Peter Fischer, Roland Fischer and Michaela Behrle. The business address for such entities and persons is Im Gewerbegebiet 7, 77855 Achern-Fautenbach, Germany.

(8) Share amount includes 1,784,389 shares owned by Neptune International AG, an entity for which Mr. Antoniou holds shared voting and dispositive power with regard to such shares of Company common stock. The business address of Mr. Antoniou is Bernoldweg 14, ZUG, 6300, Switzerland. The business address of Neptune International AG is Bahnhofstrasse 7, ZUG, 6300, Switzerland.

Equity Compensation Plan Table

The following table summarizes our equity compensation plan information as of December 31, 2022. Information is included for equity compensation plans approved by our stockholders and equity compensation plans not approved by our stockholders.

Plan Category	(a) Number of securities to be issued upon exercise of outstanding options, warrants and rights	(b) Weighted-average exercise price per share of outstanding options, warrants and rights	(c) Number of securities remaining available for future issuance under equity compensation plans
Equity compensation plans approved by stockholders	3,331,154	$ 8.12	234,754
Equity compensation plans not approved by stockholders	-	$ -	-
Total	3,331,154	$ 8.12	234,754

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

There have been no transactions since January 1, 2022 to which we have been a participant in which the amount involved, exceeded or will exceed $120,000, and in which any of our directors, executive officers or holders of more than 5% of our capital stock, or any members of their immediate family, had or will have a direct or indirect material interest, other than compensation arrangements which are described under "Executive Officer and Director Compensation."

Director Independence

Our Board has determined that four (4) of our directors, Messrs. Skutaris, Epstein, Threatt, and McConnell are independent directors in accordance with the listing requirements of the Nasdaq Capital Market, or Nasdaq. Under the rules of the Nasdaq Capital Market, independent directors must comprise a majority of a listed company's board of directors within one year of the completion of its initial public offering. In addition, the rules of the Nasdaq Capital Market require that, subject to specified exceptions, each member of a listed company's audit and compensation committees be independent and that director nominees be selected or recommended for the board's selection by independent directors constituting a majority of the independent directors or by a nominating and corporate governance committee comprised solely of independent directors. Under the rules of the Nasdaq Capital Market, a director will only qualify as "independent" if, in the opinion of that company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director and that such person is "independent" as defined by the applicable rules of the Nasdaq Capital Market and the Exchange Act.

Audit committee members must also satisfy the independence criteria set forth in Rule 10A-3 under the Exchange Act. In order to be considered independent for purposes of Rule 10A-3, a member of an audit committee of a listed company may not, other than in his or her capacity as a member of the audit committee, the board of directors or any other board committee: (1) accept, directly or indirectly, any consulting, advisory or other compensatory fee from the listed company or any of its subsidiaries or (2) be an affiliated person of the listed company or any of its subsidiaries.

Based upon information requested from and provided by each director concerning his background, employment and affiliations, including family relationships, our board of directors has determined that four of our directors are "independent directors" as defined under applicable rules of the Nasdaq Capital Market, including, in the case of all the members of our audit committee, the independence criteria set forth in Rule 10A-3 under the Exchange Act, and in the case of all the members of our compensation committee, the independence criteria set forth in Rule 10C-1 under the Exchange Act. In making such determination, our board of directors considered the relationships that each such non-employee director has with our Company and all other facts and circumstances that our board of directors deemed relevant in determining his or her independence, including the beneficial ownership of our capital stock by each non-employee director. Dr. Gregoriou is not an independent director under these rules because he is our Chief Executive Officer. Emory De Castro is not an independent director under these rules because he is our Chief Technology Officer. Nora Gourdoupi is not an independent director under these rules because she is our SVP of Business Development.

Item 14. Principal Accounting Fees and Services.

Ernst & Young (Hellas) Certified Auditors Accountants S.A. (“EY”) has served as the Company’s independent registered public accounting firm since February 9, 2021.

The following is a summary of fees paid or to be paid to EY, for services rendered for the years ended December 31, 2022 and 2021.

Audit Fees. Audit fees consist of fees for professional services rendered for the audit of our year-end financial statements and services that are normally provided by EY in connection with regulatory filings. The aggregate fees of EY related to audit and review services totaled $660,790 for the year ended December 31, 2022 and $851,573 for the year ended December 31, 2021. The above amounts include interim procedures and audit fees, as well as attendance at audit committee meetings.

Audit-Related Fees. Audit-related fees consist of fees billed for assurance and related services that are reasonably related to performance of the audit or review of our financial statements and are not reported under “Audit Fees.” These services include attest services that are not required by statute or regulation and consultations concerning financial accounting and reporting standards. During the years ended December 31, 2022 and December 31, 2021, we paid EY $95,750 and $11,827, respectively, in audit-related fees.

Tax Fees. We did not pay EY for tax return services, planning and tax advice for each of the year ended December 31, 2022 and December 31, 2021.

All Other Fees. We did not pay EY for any other services for each of the year ended December 31, 2022 and December 31, 2021.

Pre-Approval Policy

Our audit committee is responsible for approving or pre-approving all auditing services (including comfort letters and statutory audits) and all permitted non-audit services by the independent auditor and pre-approve the related fees. Pursuant to its charter, the audit committee delegated to each of its members, acting singly, the authority to pre-approve any audit services if the need for consideration of a pre-approval request arises between regularly scheduled meetings, with such approval presented to the audit committee at its next scheduled meeting or as soon as practicable thereafter.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(1) Financial Statements

For a list of the financial information included herein, see Index to the Financial Statements on page F-1.

(2) Financial Statement Schedules:

All financial statement schedules have been omitted because they are not applicable, not required or the information required is shown in the financial statements or the notes thereto.

(3) Exhibits.

The following is a list of exhibits filed as part of this Annual Report on Form 10-K.

Exhibit Number	Description
2.1	Agreement and Plan of Merger, dated as of October 12, 2020 by and among AMCI, our sponsor, in its capacity as Purchaser Representative thereunder, Advent and Vassilios Gregoriou in his capacity as Seller Representative thereunder (incorporated by reference to Exhibit 2.1 of AMCI Acquisition Corp.'s Registration Statement on Form S-4/A (Reg. No. 333-250946), filed with the SEC on January 14, 2021).
2.2	First Amendment to Agreement and Plan of Merger, dated as of October 19, 2020, by and among AMCI, our sponsor, in its capacity as Purchaser Representative thereunder, Advent and Vassilios Gregoriou in his capacity as Seller Representative thereunder (incorporated by reference to Exhibit 2.2 of AMCI Acquisition Corp.'s Registration Statement on Form S-4/A (Reg. No. 333-250946), filed with the SEC on January 14, 2021).
2.3	Second Amendment to Agreement and Plan of Merger, dated as of December 31, 2020, by and among AMCI, our sponsor, in its capacity as Purchaser Representative thereunder, Advent and Vassilios Gregoriou in his capacity as Seller Representative thereunder (incorporated by reference to Exhibit 2.3 of AMCI Acquisition Corp.'s Registration Statement on Form S-4/A (Reg. No. 333-250946), filed with the SEC on January 14, 2021).
2.4	Share Purchase Agreement, dated as of June 25, 2021, by and between Advent Technologies Holdings, Inc. and F.E.R. Fischer Edelstahlrohre GmbH (incorporated by reference to Exhibit 2.1 of the Company's Current Report on Form 8-K filed with the SEC on June 25, 2021).
3.1	Second Amended and Restated Certificate of Incorporation of Advent Technologies Holdings, Inc. (incorporated by reference to Exhibit 3.1 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
3.2	Second Amended and Restated Bylaws of Advent Technologies Holdings, Inc. (incorporated by reference to Exhibit 3.1 of the Company's Current Report on Form 8-K, filed with the SEC on September 9, 2022).
4.1	Warrant Agreement, dated November 15, 2018 by and between AMCI Acquisition Corp. and Continental Stock Transfer & Trust company, as warrant agent (incorporated by reference to Exhibit 4.1 of AMCI Acquisition Corp.'s Registration Statement on Form S-4/A (Reg. No. 333-250946), filed with the SEC on January 14, 2021).
4.2	Specimen Common Stock Certificate (incorporated by reference to Exhibit 4.2 of AMCI Acquisition Corp.'s Registration Statement on Form S-1/A (Reg. No. 333-227994), filed with the SEC on November 9, 2018).

4.3	Specimen Warrant Certificate (incorporated by reference to Exhibit 4.3 of AMCI Acquisition Corp.'s Registration Statement on Form S-1/A (Reg. No. 333-227994), filed with the SEC on November 9, 2018).
4.4	Description of Securities (incorporated by reference to Exhibit 4.4 of the Company's Annual Report on Form 10-K, filed with the SEC on May 20, 2021).
10.1	Registration Rights Agreement, dated November 15, 2018, by and among AMCI, our sponsor and the holders party thereto (incorporated by reference to Exhibit 10.3 of AMCI Acquisition Corp's Current Report on Form 8-K, filed with the SEC on November 20, 2018).
10.2+	Employment Agreement, dated as of October 12, 2020, by and between Advent Technologies Inc. and Vassilios Gregoriou (incorporated by reference to Exhibit 10.7 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
10.3+	Employment Agreement, dated as of December 31, 2020, by and between Advent Technologies SA and Christos Kaskavelis (incorporated by reference to Exhibit 10.9 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
10.4+	Employment Agreement, dated as of October 12, 2020, by and between Advent Technologies Inc. and Emory De Castro (incorporated by reference to Exhibit 10.10 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
10.5+	Employment Agreement, dated as of October 12, 2020, by and between Advent Technologies, Inc. and James F. Coffey (incorporated by reference to Exhibit 10.11 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
10.6+	Form of Indemnification Agreement (incorporated by reference to Exhibit 10.13 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
10.7+*	Form of Director Offer Letters.
10.8	Offer Letter Agreement, dated as of July 2, 2021, by and between Advent Technologies Holdings, Inc. and Kevin Brackman (incorporated by reference to Exhibit 10.2 of the Company's Current Report on Form 8-K, filed with the SEC on July 6, 2021).
10.9+	Employment Agreement, dated as of August 13, 2021, by and between Advent Technologies, Inc. and Kevin Brackman (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K, filed with the SEC on August 18, 2021).
10.17	Lease Agreement, dated as of March 8, 2021, by and between Advent Technologies, Inc. and Hood Park LLC (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K/A, filed with the SEC on March 26, 2021).
10.10+	2021 Equity Incentive Plan (incorporated by reference to Exhibit 10.12 of the Company's Current Report on Form 8-K filed with the SEC on February 9, 2021)
10.11	Lease Agreement, dated as of September 2, 2019, by and between Advent Technologies S.A. and Patras Science Park S.A. (English summary of Greek original) (incorporated by reference to Exhibit 10.5 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).

10.12	Lease Agreement, dated as of September 25, 2019, by and between Advent Technologies S.A. and Patras Science Park S.A. (English summary of Greek original) (incorporated by reference to Exhibit 10.6 of the Company's Current Report on Form 8-K, filed with the SEC on February 9, 2021).
10.13	Lease Agreement, dated as of August 30, 2021, by and between Advent Technologies GmbH and fisher group SE & Co.,KG (English summary of German original) (incorporated by reference to Exhibit 10.21 of the Company's Annual Report on Form 10-K, filed with the SEC on March 31, 2022).
21.1	List of Subsidiaries (incorporated by reference to Exhibit 21.1 of the Company's Annual Report on Form 10-K, filed with the SEC on March 31, 2022)
23.1*	Consent of Independent Registered Public Accounting Firm
31.1*	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a)
31.2*	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a)
32.1**	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350
32.2**	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350
101.INS*	Inline XBRL Instance
101.SCH*	Inline XBRL Taxonomy Extension Schema
101.CAL*	Inline XBRL Taxonomy Extension Calculation
101.LAB*	Inline XBRL Taxonomy Extension Labels
101.PRE*	Inline XBRL Taxonomy Extension Presentation
104*	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

* Filed herewith.
** Furnished herewith
+ Indicated a management or compensatory plan, contract or arrangement.

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, as amended, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Advent Technologies Holdings, Inc.

March 31, 2023

By: /s/ Kevin Brackman
Name: Kevin Brackman
Title: Chief Financial Officer

Name	Position	Date
/s/ Vassilios Gregoriou Vassilios Gregoriou	Chief Executive Officer and Chairman of the Board	March 31, 2023
/s/ Kevin Brackman Kevin Brackman	Chief Financial Officer	March 31, 2023
/s/ Emory De Castro Emory De Castro	Chief Technology Officer and Director	March 31, 2023
/s/ Panoraia Gourdoupi Panoraia Gourdoupi	Director	March 31, 2023
/s/ Lawrence Epstein Lawrence Epstein	Director	March 31, 2023
/s/ Anggelos Skutaris Anggelos Skutaris	Director	March 31, 2023
/s/ Wayne Threatt Wayne Threatt	Director	March 31, 2023
/s/ Von McConnell Von McConnell	Director	March 31, 2023

ADVENT TECHNOLOGIES HOLDINGS, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Advent Technologies Holdings, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Advent Technologies Holdings, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, stockholders' equity/(deficit) and cash flows for each of the two years in the period ended December 31, 2022, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

The Company's Ability to Continue as a Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has incurred recurring operating losses and has stated that substantial doubt exists about the Company's ability to continue as a going concern. In addition, based on its projections, the Company may not be able to cover its working capital needs as they become due in the twelve-month period ending following the issuance of these consolidated financial statements. Management's evaluation of the events and conditions and management's plans regarding these matters also are described in Note 1. The 2022 consolidated financial statements do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the outcome of this uncertainty.

Adoption of ASU No. 2016-02

As discussed in Note 2 to the consolidated financial statements, the Company changed its method for accounting for leases effective January 1, 2022 due to the adoption of Accounting Standards Update ("ASU") No. 2016-02, Leases (Topic 842).

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 Public Company Accounting Oversight Board (United States) (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. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

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.

/s/ Ernst & Young (Hellas) Certified Auditors Accountants S.A.

We have served as the Company's auditor since 2020.

Athens, Greece
March 31, 2023

ADVENT TECHNOLOGIES HOLDINGS, INC.
CONSOLIDATED BALANCE SHEETS
(Amounts in USD thousands, except share and per share amounts)

	As of December 31, 2022	As of December 31, 2021
ASSETS		
Current assets:		
Cash and cash equivalents	$ 32,869	$ 79,764
Accounts receivable	979	3,139
Contract assets	52	1,617
Inventories	12,620	6,958
Prepaid expenses and Other current assets	2,980	5,873
Total current assets	**49,500**	**97,351**
Non-current assets:		
Goodwill	5,742	30,030
Intangibles, net	6,062	23,344
Property and equipment, net	17,938	8,585
Right-of-use assets	4,055	-
Other non-current assets	5,971	2,475
Deferred tax assets	-	1,246
Available for sale financial asset	320	-
Total non-current assets	**40,088**	**65,680**
Total assets	**$ 89,588**	**$ 163,031**
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Trade and other payables	$ 4,680	$ 4,837
Deferred income from grants, current	801	205
Contract liabilities	1,019	1,118
Other current liabilities	4,703	12,515
Operating lease liabilities	2,280	-
Income tax payable	183	196
Total current liabilities	**13,666**	**18,871**
Non-current liabilities:		
Warrant liability	998	10,373
Deferred tax liabilities	-	2,500
Long-term operating lease liabilities	9,802	-
Defined benefit obligation	72	90
Deferred income from grants, non-current	50	-
Other long-term liabilities	852	996
Total non-current liabilities	**11,774**	**13,959**
Total liabilities	**25,440**	**32,830**
Commitments and contingent liabilities		
Stockholders' equity		
Common stock ($0.0001 par value per share; Shares authorized: 110,000,000 at December 31, 2022 and December 31, 2021; Issued and outstanding: 51,717,720 and 51,253,591 at December 31, 2022 and December 31, 2021, respectively)	5	5
Preferred stock ($0.0001 par value per share; Shares authorized: 1,000,000 at December 31, 2022 and December 31, 2021; nil issued and outstanding at December 31, 2022 and December 31, 2021)	-	-
Additional paid-in capital	174,509	164,894
Accumulated other comprehensive loss	(2,604)	(1,273)
Accumulated deficit	(107,762)	(33,425)
Total stockholders' equity	**64,148**	**130,201**
Total liabilities and stockholders' equity	**$ 89,588**	**$ 163,031**

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

ADVENT TECHNOLOGIES HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(Amounts in USD thousands, except share and per share amounts)

	Years Ended December 31,	
	2022	**2021**
Revenue, net	$ 7,837	$ 7,069
Cost of revenues	(8,581)	(5,406)
Gross profit (loss)	**(744)**	**1,663**
Income from grants	1,460	829
Research and development expenses	(9,796)	(3,541)
Administrative and selling expenses	(35,915)	(41,877)
Amortization of intangibles	(2,764)	(1,185)
Credit loss – customer contracts	(1,116)	-
Gain from purchase price adjustment	2,370	-
Impairment loss - intangible assets and goodwill	(38,922)	-
Operating loss	**(85,427)**	**(44,111)**
Fair value change of warrant liability	9,375	22,743
Finance income / (expenses), net	52	(51)
Foreign exchange gains / (losses), net	(91)	(43)
Other income / (expenses), net	(216)	16
Loss before income taxes	**(76,307)**	**(21,446)**
Income taxes	1,970	923
Net loss	**$ (74,337)**	**$ (20,523)**
Net loss per share		
Basic loss per share	**$ (1.44)**	**$ (0.45)**
Basic weighted average number of shares	**51,528,703**	**45,814,868**
Diluted loss per share	**$ (1.44)**	**$ (0.45)**
Diluted weighted average number of shares	**51,528,703**	**45,814,868**

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

ADVENT TECHNOLOGIES HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(All amounts in USD thousands)

	Years Ended December 31,	
	2022	**2021**
Net loss	**$ (74,337)**	**$ (20,523)**
Other comprehensive income / (loss):		
Foreign currency translation adjustments	(1,370)	(1,329)
Actuarial gains / (losses)	39	(56)
Total other comprehensive loss	**(1,331)**	**(1,385)**
Comprehensive loss	**$ (75,668)**	**$ (21,908)**

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

ADVENT TECHNOLOGIES HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY / (DEFICIT)
(Amounts in USD thousands, except share amounts)

	Preferred Stock Series A Shares	Amount	Preferred Stock Series Seed Shares	Amount	Common Stock Shares	Amount	Additional Paid-in Capital	Accumulated Deficit	Accumulated OCI	Total Stockholders' (Deficit) Equity
Balance as of December 31, 2020*	**-**	**$ -**	**-**	**$ -**	**25,033,398**	**$ 2**	**$ 10,994**	**$ (12,902)**	**$ 112**	**$ (1,794)**
Business combination and PIPE financing	-	-	-	-	21,072,549	2	108,006	-	-	108,008
Share capital increase from warrants exercise	-	-	-	-	22,798	0	262	-	-	262
Share capital increase	-	-	-	-	5,124,846	1	37,923	-	-	37,924
Stock based compensation expense	-	-	-	-	-	-	7,709	-	-	7,709
Net loss	-	-	-	-	-	-	-	(20,523)	-	(20,523)
Other comprehensive loss	-	-	-	-	-	-	-	-	(1,385)	(1,385)
Balance as of December 31, 2021	**-**	**$ -**	**-**	**$ -**	**51,253,591**	**$ 5**	**$ 164,894**	**$ (33,425)**	**$ (1,273)**	**$ 130,201**
Stock issued under stock compensation plan	-	-	-	-	464,129	0	-	-	-	0
Stock based compensation expense	-	-	-	-	-	-	9,615	-	-	9,615
Net loss	-	-	-	-	-	-	-	(74,337)	-	(74,337)
Other comprehensive loss	-	-	-	-	-	-	-	-	(1,331)	(1,331)
Balance as of December 31, 2022	**-**	**$ -**	**-**	**$ -**	**51,717,720**	**$ 5**	**$ 174,509**	**$ (107,762)**	**$ (2,604)**	**$ 64,148**

* The amounts have been retroactively restated to give effect to the recapitalization transaction.

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

ADVENT TECHNOLOGIES HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(All amounts in USD thousands)

	Years Ended December 31,	
	2022	**2021**
Cash flows from operating activities:		
Net loss for the year	**$ (74,337)**	**$ (20,523)**
Adjustments to reconcile net loss to net cash flows used in operating activities:		
Depreciation of property and equipment	1,493	559
Amortization of intangible assets	2,764	1,185
Credit loss – customer contracts	1,116	-
Gain from purchase price adjustment	(2,370)	-
Impairment loss - intangible assets and goodwill	38,922	-
Fair value gain of warrant liability	(9,375)	(22,743)
Stock-based compensation expense	10,414	7,709
Benefit for current and deferred income taxes	(1,970)	(923)
Net losses on disposal/write-offs of property, plant and equipment and intangible assets	232	9
Provision for credit losses	-	13
Net periodic cost of defined benefit obligation	27	5
Changes in operating assets and liabilities, exclusive of net assets acquired:		
Decrease in accounts receivable	1,830	940
Decrease in due from related parties	-	68
Decrease/(increase) in contract assets	620	(1,313)
Increase in inventories	(5,932)	(1,595)
Decrease/(increase) in prepaid expenses and other current assets	1,963	(4,961)
Increase in other non-current assets	(194)	(198)
(Decrease)/increase in trade payables	(46)	2,959
Decrease in due to related parties	-	(1,115)
Increase/(decrease) in deferred income from grants	649	(563)
(Decrease)/increase in contract liabilities	(247)	37
(Decrease)/increase in other current liabilities	(5,661)	4,879
(Decrease)/Increase in income tax payable	(13)	10
Decrease in other long-term liabilities	(46)	(276)
Proceeds for tenant improvement incentive from landlord	7,958	-
Operating lease asset and liabilities	78	-
Net cash used in operating activities	**$ (32,125)**	**$ (35,837)**
Cash flows from investing activities:		
Proceeds from sale of property and equipment	0	7
Purchases of property and equipment	(11,527)	(3,920)
Purchases of intangible assets	(117)	(18)
Advances for the acquisition of property and equipment	(2,557)	(2,200)
Acquisition of subsidiaries, net of cash acquired	-	(19,425)
Acquisition of available for sale financial assets	(316)	-
Net cash used in investing activities	**$ (14,517)**	**$ (25,556)**
Cash flows from financing activities:		
Issuance of common stock and paid-in capital from warrants exercise	-	262
Business Combination and PIPE financing, net of issuance costs paid	-	141,121
State loan proceeds	-	118
Repayments of debt	(40)	-
Net cash (used in) provided by financing activities	**$ (40)**	**$ 141,501**
Net increase/(decrease) in cash, cash equivalents, restricted cash and restricted cash equivalents	**$ (46,682)**	**$ 80,108**
Effect of exchange rate changes on cash, cash equivalent, restricted cash and restricted cash equivalents	537	(860)
Cash, cash equivalents, restricted cash and restricted cash equivalents, beginning of year	79,764	516
Cash, cash equivalents, restricted cash and restricted cash equivalents, end of year	**$ 33,619**	**$ 79,764**
Supplemental Cash Flow Information		
Cash activities		
Interest paid	$ 15	$ 12
Income taxes paid	$ 13	$ 958
Non-cash investing and financing activities:		
Common stock issued as partial consideration of SerEnergy and FES acquisition	$ -	$ 37,923
Assets acquired under operating leases	$ 1,594	$ -

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

1. Basis of presentation:

Overview

On February 4, 2021 ("Closing Date"), AMCI Acquisition Corp. ("AMCI"), consummated the previously announced business combination (the "Business Combination") pursuant to that certain merger agreement (the "Agreement and Plan of Merger"), dated October 12, 2020, by and among AMCI, AMCI Merger Sub Corp., a Delaware corporation and newly formed wholly-owned subsidiary of AMCI ("Merger Sub"), AMCI Sponsor LLC (the "Sponsor"), solely in the capacity as the representative from and after the effective time of the Business Combination for the stockholders of AMCI, Advent Technologies, Inc., a Delaware corporation ("Legacy Advent"), and Vassilios Gregoriou, solely in his capacity as the representative from and after the effective time for the Legacy Advent stockholders (the "Seller Representative"), as amended by Amendment No. 1 and Amendment No. 2 to the Agreement and Plan of Merger, dated as of October 19, 2020 and December 31, 2020, respectively, by and among AMCI, Merger Sub, Sponsor, Legacy Advent, and Seller Representative. In connection with the closing of the Business Combination (the "Closing"), AMCI acquired 100% of the stock of Legacy Advent (as it existed immediately prior to the Closing) and its subsidiaries.

On the Closing Date, and in connection with the closing of the Business Combination, AMCI changed its name to Advent Technologies Holdings, Inc. (the "Company" or "Advent"). Legacy Advent was deemed the accounting acquirer in the Business Combination based on an analysis of the criteria outlined in Accounting Standards Codification ("ASC") 805. This determination was primarily based on Legacy Advent's stockholders prior to the Business Combination having a majority of the voting interests in the combined company, Legacy Advent's operations comprising the ongoing operations of the combined company, Legacy Advent's board of directors comprising a majority of the board of directors of the combined company, and Legacy Advent's senior management comprising the senior management of the combined company. Accordingly, for accounting purposes, the Business Combination was treated as the equivalent of Legacy Advent issuing stock for the net assets of AMCI, accompanied by a recapitalization. The net assets of AMCI are stated at historical cost, with no goodwill or other intangible assets recorded.

While AMCI was the legal acquirer in the Business Combination, because Legacy Advent was deemed the accounting acquirer, the historical financial statements of Legacy Advent became the historical financial statements of the combined company, upon the consummation of the Business Combination. As a result, the consolidated financial statements included in this report reflect (i) the historical operating results of Legacy Advent prior to the Business Combination; (ii) the results of the Company (combined results of AMCI and Legacy Advent) following the closing of the Business Combination; (iii) the assets and liabilities of Legacy Advent at their historical cost; and (iv) Company's equity structure for all periods presented.

In accordance with guidance applicable to these circumstances, the equity structure has been restated in all comparative periods up to the Closing Date, to reflect the number of shares of the Company's common stock, $0.0001 par value per share, issued to Legacy Advent's stockholders in connection with the recapitalization transaction. As such, the shares and corresponding capital amounts and earnings per share related to Legacy Advent Preferred Stock ("Preferred Series A" and "Preferred Series Seed") and Legacy Advent common stock prior to the Business Combination have been retroactively restated as shares reflecting the exchange ratio established in the Business Combination Agreement. Activity within the statement of changes in stockholders' equity / (deficit) for the issuances of Legacy Advent's Preferred Stock, were also retroactively converted to Legacy Advent common stock (Note 3).

On February 18, 2021, Advent Technologies, Inc. entered into a Membership Interest Purchase Agreement with Bren-Tronics, Inc. ("Bren-Tronics") and UltraCell, LLC ("UltraCell"), a Delaware limited liability company and a direct wholly owned subsidiary of Bren-Tronics (the "UltraCell Purchase Agreement"). See Note 3 "Business Combination" for additional information.

UltraCell LLC was renamed to Advent Technologies LLC following its acquisition by the Company.

On June 25, 2021, the Company entered into a Share Purchase Agreement (the "Purchase Agreement"), with F.E.R. fischer Edelstahlrohre GmbH, a limited liability company incorporated under the Laws of Germany (the "Seller") to acquire all of the issued and outstanding equity interests in SerEnergy A/S, a Danish stock corporation and a wholly-owned subsidiary of the Seller ("SerEnergy") and fischer eco solutions GmbH, a German limited liability company and a wholly-owned subsidiary of the Seller ("FES") together with certain outstanding shareholder loan receivables. See Note 3 "Business Combination" for additional information.

SerEnergy and FES were renamed to Advent Technologies A/S and Advent Technologies GmbH, respectively, following their acquisition by the Company.

Advent Technologies Holdings, Inc. and its subsidiaries (collectively referred to as "Advent" and the "Company") is an advanced materials and technology development company operating in the fuel cell and hydrogen technology space. Advent develops, manufactures and assembles the critical components that determine the performance of hydrogen fuel cells and other energy systems. To date, Advent's principal operations have been to develop and manufacture Membrane Electrode Assembly (MEA) and to design fuel cell stacks and complete fuel cell systems for a range of customers in the stationary power, portable power, automotive, aviation, energy storage and sensor markets.

Advent has its headquarters in Boston, Massachusetts, which includes a research and development and manufacturing facility, a product development facility in Livermore, California, production facilities in Greece, Denmark, and Germany, and sales and warehousing facilities in the Philippines.

The consolidated financial statements of the Company have been prepared to reflect the consolidation of the companies listed below:

	Country of	Ownership Interest		Statements of Operations	
Company Name	**Incorporation**	**Direct**	**Indirect**	**2022**	**2021**
Advent Technologies, Inc.	USA	100%	-	01/01 – 12/31	01/01 – 12/31
Advent Technologies S.A.	Greece	-	100%	01/01 – 12/31	01/01 – 12/31
Advent Technologies LLC	USA	-	100%	01/01 – 12/31	02/19 – 12/31
Advent Technologies GmbH	Germany	100%	-	01/01 – 12/31	09/01 – 12/31
Advent Technologies A/S	Denmark	100%	-	01/01 – 12/31	09/01 – 12/31
Advent Green Energy Philippines, Inc	Philippines	-	100%	01/01 – 12/31	09/01 – 12/31

Going Concern

The accompanying consolidated financial statements have been prepared assuming the Company will continue as a going concern. The going concern basis of presentation assumes that the Company will continue in operation one year from the date these consolidated financial statements are issued and will be able to realize its assets and discharge its liabilities and commitments in the normal course of business. As such, the accompanying audited consolidated financial statements do not include any adjustments relating to the recoverability and classification of assets and their carrying amounts, or the amount and classification of liabilities that may result should the Company be unable to continue as a going concern.

In accordance with the Financial Accounting Standards Board ("FASB") Accounting Standards Update ("ASU") 2014-15, Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern (Subtopic 205-40), the Company has evaluated whether there are conditions and events, considered in the aggregate, that raise substantial doubt about the Company's ability to continue as a going concern for one year from the date that the consolidated financial statements are issued. The Company's ability to meet its liquidity needs will largely depend on its ability to generate cash in the future. During the year ended December 31, 2022, the Company used $32.1 million of cash in operating activities, and the Company's ability to generate cash in the future is subject to general economic, financial, competitive, legislative, regulatory, and other factors that are beyond the Company's control. The transition to profitability is dependent upon the successful development, approval, and commercialization of its products and the achievement of a revenue level adequate to support its cost structure. Based on the Company's current operating plan, the Company believes that its cash and cash equivalents as of December 31, 2022 of $32.9 million will not be sufficient to fund operations and capital expenditures for the twelve months following the filing of this Annual Report on Form 10-K, and the Company will need to obtain additional funding. In July 2022, the Company received official ratification from the European Commission of the European Union for one of the Important Projects of Common European Interest ("IPCEI"), Green HiPo. This project provides for the availability of funding of €782.1 million over the next six years. As of the issuance date of the consolidated financial statements, the Company has not received an agreement which provides the terms of the funding. In addition to Green HiPo, management will pursue an additional capital raise in the second quarter of 2023, but this is based on estimates that are subject to risks and uncertainties. There can be no assurance that the Company will be able to obtain additional funding on acceptable terms, if at all. If the Company is unable to obtain sufficient funding, it could be required to delay its development efforts, limit activities and reduce research and development costs, which could adversely affect its business prospects. Because of the uncertainty in securing additional funding and the insufficient amount of cash and cash equivalents as of the financial statement filing date, management has concluded that substantial doubt exists with respect to the Company's ability to continue as a going concern for one year from the date the consolidated financial statements are issued.

2. Summary of Significant Accounting Policies:

Basis of Presentation

The accompanying consolidated financial statements are presented in United States ("U.S.") dollars and have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP") and pursuant to the rules and regulations of the SEC.

The Company is an "emerging growth company," as defined in Section 2(a) of the Securities Act, as modified by the Jumpstart our Business Startups Act of 2012, (the "JOBS Act"). As an emerging growth company ("EGC"), the JOBS Act allows the Company to delay adoption of new or revised accounting pronouncements applicable to public companies until such pronouncements are applicable to private companies. The Company elected to use this extended transition period under the JOBS Act until such time the Company is no longer considered to be an EGC. The Company applied the following accounting policies:

Principles of Consolidation

The accompanying consolidated financial statements represent the consolidation of the accounts of the Company and its wholly owned subsidiaries.

Subsidiaries: Subsidiaries are those entities in which the Company has an interest of more than one-half of the voting rights or otherwise has power to govern the financial and operating policies of the entity. The acquisition method of accounting is used to account for the acquisition of subsidiaries. The cost of an acquisition is measured as the fair value of the assets given up, shares issued, or liabilities undertaken at the date of acquisition. The excess of the cost of acquisition over the fair value of the net assets acquired and liabilities assumed is recorded as goodwill. In case the fair value of purchase consideration transferred is below fair values of these identifiable assets and liabilities, the Company recognizes a gain from a bargain purchase. The Company recognizes the fair value of estimated contingent consideration at the acquisition date as part of the consideration transferred in exchange for the acquired business. The contingent consideration is remeasured to fair value at each reporting date until the contingency is resolved. Any changes in fair value are recognized each reporting period in non-cash changes in fair value of estimated contingent consideration in the accompanying consolidated statements of operations.

The subsidiaries are fully consolidated from the date on which control is obtained by the Company. All subsidiaries included in the accompanying consolidated financial statements are 100% owned by the Company. Inter-company transaction balances and unrealized gains/(losses) on transactions between the companies are eliminated.

Use of Estimates

The preparation of consolidated 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 as of the dates of the financial statements and the reported amounts of revenues and expenses during the reporting periods. On an on-going basis, management evaluates the estimates and judgments, including those related to the selection of useful lives for tangible assets, expected future cash flows from long-lived assets to support impairment tests, the carrying value of goodwill, provisions necessary for accounts receivables and inventory write downs, provisions for legal disputes, and contingencies. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results could differ from those estimates under different assumptions and/or conditions.

Foreign Currency Translation

The Company's reporting currency is U.S. dollar. The financial statements of the Company's subsidiaries outside the U.S. have been translated into U.S. dollars. Assets and liabilities of foreign operations are translated from foreign currencies into U.S. dollars at the exchange rates in effect as of the balance sheet date. Revenue and expenses are translated at the weighted average exchange rates for the period. Equity accounts are translated at historical rates. Gains or losses resulting from translating foreign currency financial statements into U.S. dollar are reported as cumulative translation adjustments, a separate component of other comprehensive income (loss) in stockholders' equity.

Transactions denominated in foreign currencies other than the functional currency of the Company and the functional currencies of the Company's subsidiaries are translated using the exchange rates in effect at the time of the transactions. At the balance sheet date, monetary assets and liabilities denominated in foreign currencies are translated at exchange rates in effect as of the balance sheet date. Resulting foreign exchange differences are included in the consolidated statements of operations.

Comprehensive Income (Loss)

Comprehensive income (loss) is comprised of net income (loss) and other comprehensive income (loss). Other comprehensive income (loss) consists of foreign currency translation adjustments that result from consolidation of Company's subsidiaries and actuarial losses related to the defined benefit obligation recognized in the Company's Greek subsidiary.

Segment Information

Under ASC 280, Segment Reporting, operating segments are defined as components of an enterprise where discrete financial information is available that is evaluated regularly by the chief operating decision-maker ("CODM"), in deciding how to allocate resources and in assessing performance. The Company's Chief Executive Officer, who is also the CODM, makes decisions and manages the Company's operations as a single operating segment for purposes of allocating resources and evaluating financial performance. For the above reasons, the Company has determined that it operates in one reportable operating segment. The disaggregation of Company's revenue by geographic location is presented in Note 22.

Cash, Cash Equivalents, Restricted Cash and Restricted Cash Equivalents

Cash and cash equivalents are highly liquid investments with original maturities of three months or less. Cash and cash equivalents consist of cash on hand, deposits held on call with banks and investments in money market funds with original maturities of three months or less at the date of acquisition. As of December 31, 2022, the Company has cash and cash equivalents which are restricted of $0.8 million. The restricted cash equivalent is a letter of credit required by the Company's lease agreement for the Hood Park facility in Boston, MA. The letter of credit is required for the duration of the lease agreement which has a term of eight years. The lease commenced in October 2022. As of December 31, 2021, the Company had no cash and cash equivalents which are restricted.

The Company reconciles cash, cash equivalents, restricted cash and restricted cash equivalents reported in the consolidated balance sheets that aggregate to the beginning and ending balances shown in the consolidated statements of cash flows as follows:

	December 31,	
(Amounts in thousands)	2022	2021
Cash and cash equivalents	$ 32,869	$ 79,764
Restricted cash and restricted cash equivalents:		
Other non-current assets	750	-
Cash, cash equivalents, restricted cash and restricted cash equivalents	**$ 33,619**	**$ 79,764**

Inventories

Inventories, which consist of raw materials, work-in-process and finished goods are stated at the lower of cost or net realizable value using the first-in, first-out cost method. Cost includes the cost of purchased materials, inbound freight charges, external and internal processing and applicable labor and overhead costs. Net realizable value is the estimated selling price in the ordinary course of business, less reasonably predictable costs of completion, disposal and transportation.

The Company periodically reviews quantities of inventories on hand and compares these amounts to the expected use of each product. Inventories are reviewed to determine if valuation allowances are required for obsolescence (excess, obsolete, and slow-moving inventory). This review includes analyzing inventory levels of individual parts considering the current design of our products and production requirements as well as the expected inventory requirements for maintenance on installed power platforms. The Company records a charge to cost of revenue for the amount required to reduce the carrying value of inventory to the net realizable value.

Leases

In February 2016, the Financial Accounting Standards Board ("FASB") issued ASU 2016-02, Leases (Topic 842) ("ASC 842"), to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. In July 2018, ASU 2018-10, Codification Improvements to Topic 842, Leases, was issued to provide more detailed guidance and additional clarification for implementing ASU 2016-02. Furthermore, in July 2018, the FASB issued ASU 2018-11, Leases (Topic 842): Targeted Improvements, which provides an optional transition method in addition to the existing modified retrospective transition method by allowing a cumulative effect adjustment to the opening balance of retained earnings in the period of adoption. Additionally, ASU 2019-01, Codification Improvements to Topic 842, Leases and ASU 2020-02, Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 119 and Update to SEC Section on Effective Date Related to Accounting Standards Update No. 2016-02, Leases (Topic 842), provided additional clarifications for implementing ASU 2016.02. The new lease standard was originally effective for private entities on January 1, 2021, with early adoption permitted. Following the issuance of ASU 2020-05, Effective Dates for Certain Entities (Topic 842), the effective date of Leases was deferred for private entities (the "all other" category) to fiscal years beginning after December 15, 2021, and interim periods within fiscal years beginning after December 15, 2022. Early application continues to be permitted which means that an entity may choose to implement Leases before those deferred effective dates.

The Company adopted ASC 842 on January 1, 2022 for its annual consolidated financial statements and related disclosures and for interim periods within annual periods from January 1, 2023 in accordance with the adoption dates for private entities applicable to it under its emerging growth company status. The Company adopted this new accounting standard on a modified retrospective basis and applied the new standard to all leases. As a result, comparative financial information has not been restated and continues to be reported under the accounting standards in effect for those periods. The Company elected the package of practical expedients, ASC 842-10-65-1(f) and ASC 842-10-65-1(g), permitted under the transition guidance within the new standard, which includes, among other things, the ability to carry forward the existing lease classification. The adoption of ASC 842 on January 1, 2022 resulted in the recognition of operating lease right-of-use assets of $3.6 million, lease liabilities for operating leases of $3.6 million, and a zero cumulative-effect adjustment to accumulated deficit. The new standard had a material impact on the Company's consolidated balance sheet but did not materially impact the Company's consolidated operating results and had no impact on the Company's cash flows.

The Company is a lessee in noncancelable operating leases. The Company determines if an arrangement is or contains a lease at contract inception. This determination depends on whether the arrangement conveys the right to control the use of an explicitly or implicitly identified asset for a period of time in exchange for consideration. Control of an underlying asset is conveyed if the Company obtains the right to direct the use of and obtains substantially all of the economic benefits from using the underlying asset. The Company classifies leases with contractual terms greater than 12 months as either operating or finance. The Company recognizes a right of use asset and a lease liability at the lease commencement date. For operating leases, the lease liability is initially measured at the present value of the unpaid lease payments at the lease commencement date. For finance leases, the lease liability is initially measured in the same manner and date as for operating leases and is subsequently measured at amortized cost using the effective interest method.

Key estimates and judgments include how the Company determines (1) the discount rate it uses to discount the unpaid lease payments to present value, (2) the lease term and (3) the lease payments.

- ASC Topic 842 requires a lessee to discount its unpaid lease payments using the interest rate implicit in the lease or, if that rate cannot be readily determined, its incremental borrowing rate. Generally, the Company cannot determine the interest rate implicit in the lease because it does not have access to the lessor’s estimated residual value or the amount of the lessor’s deferred initial direct costs. Therefore, the Company generally uses its incremental borrowing rate as the discount rate for the lease. The Company’s incremental borrowing rate for a lease is the rate of interest it would have to pay on a collateralized basis to borrow an amount equal to the lease payments under similar terms.

- The lease term for all of the Company’s leases includes the noncancelable period of the lease, plus any additional periods covered by either a Company option to extend (or not to terminate) the lease that the Company is reasonably certain to exercise, or an option to extend (or not to terminate) the lease controlled by the lessor.

- Lease payments included in the measurement of the lease liability comprise fixed payments, and for certain finance leases, the exercise price of a Company option to purchase the underlying asset if the Company is reasonably certain at lease commencement to exercise the option.

- Lease incentives, such as leasehold improvement and rent holidays, that are paid or payable to the lessee at lease commencement are deducted from the lease payments, which affects the lease classification test and reduces the initial measurement of the lessee’s right-of-use asset. Lease incentives that are payable to the lessee at lease commencement also reduce a lessee’s lease liability.

The right of use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for lease payments made at or before the lease commencement date, plus any initial direct costs incurred less any lease incentives received. For operating leases, the right of use asset is subsequently measured throughout the lease term at the carrying amount of the lease liability, plus initial direct costs, plus (minus) any prepaid (accrued) lease payments, less the unamortized balance of lease incentives received. Lease expense for lease payments is recognized on a straight-line basis over the lease term which included within administrative and selling expenses on the consolidated statements of operations.

For finance leases, the right of use asset is subsequently amortized using the straight-line method from the lease commencement date to the earlier of the end of the useful life of the underlying asset or the end of the lease term unless the lease transfers ownership of the underlying asset to the Company or the Company is reasonably certain to exercise an option to purchase the underlying asset. In those cases, the right of use asset is amortized over the useful life of the underlying asset. Amortization of the right of use asset is recognized and presented separately from interest expense on the lease liability.

Right of use assets for operating and finance leases are periodically reviewed for impairment losses. The Company uses the long-lived assets impairment guidance in ASC Subtopic 360-10, *Property, Plant, and Equipment – Overall*, to determine whether a right of use asset is impaired, and if so, the amount of the impairment loss to recognize.

The Company monitors for events or changes in circumstances that require a reassessment of its leases. When a reassessment results in the remeasurement of a lease liability, a corresponding adjustment is made to the carrying amount of the corresponding right of use asset.

Operating and finance lease right of use assets are presented separately on the Company's consolidated balance sheets. The current portions of operating and finance lease liabilities are also presented separately within current liabilities and the long-term portions are presented separately within noncurrent liabilities on the consolidated balance sheets.

The Company has elected not to recognize right of use assets and lease liabilities for short-term leases that have a lease term of 12 months or less. The Company recognizes the lease payments associated with its short-term leases as an expense on a straight-line basis over the lease term.

For the year ended December 31, 2021, leases were classified as operating leases in accordance with Accounting Standards Codification (ASC) Topic 840, Leases. Rent expense, including any contractual rent increases, were recorded on a straight-line basis over the life of the lease. Building improvements made with the lease incentives or tenant allowances were capitalized as leasehold improvements and included in property, plant and equipment in the consolidated balance sheets.

Variable payments related to a lease are expensed as incurred. These costs often relate to payments for real estate taxes, insurance, common area maintenance, and other operating costs in addition to base rent. The Company has not recognized variable lease payments during the years ended December 31, 2022 and 2021.

Accounts Receivable and Credit Losses

Accounts receivable are recorded at the invoiced amounts, net of an allowance for doubtful accounts based on the Company's best estimate of probable credit losses. The Company is exposed to credit losses primarily through sales of its products. The Company assesses each customer's ability to pay by conducting a credit review which includes consideration of established credit rating or an internal assessment of the customer's creditworthiness based on an analysis of their payment history when a credit rating is not available. The Company monitors the credit exposure through active review of customer balances. The Company's expected loss methodology for accounts receivable is developed through consideration of factors including, but not limited to, historical collection experience, current customer credit ratings, current customer financial condition, current and future economic and market condition, and age of the receivables. Charges related to credit losses are included in administrative and selling expenses and are recorded in the period that the outstanding receivables are determined to be doubtful. Account balances are written-off against the allowance when they are deemed uncollectible.

Property, Plant and Equipment

Property, plant and equipment are stated at cost, adjusted for any impairment, less accumulated depreciation which is recorded based on the straight-line method over the estimated useful lives of the respective assets. Estimated useful lives range from 5 to 50 years for buildings and leasehold improvements and 3 to 20 years for machinery and other equipment. Leasehold improvements are depreciated on the straight-line method over the shorter of the estimated useful lives of the assets or the term of the lease. Land is not depreciated.

Subsequent expenditures are capitalized, provided they increase the functionality, output or expected life of an asset and depreciated ratably over the identified useful life. Repairs and maintenance costs are expensed as incurred.

Fixed assets under construction are shown at their cost. Fixed assets under construction are not depreciated until the fixed asset is completed and entered in operation.

When property is sold or otherwise disposed of, the cost and related accumulated depreciation are removed from the consolidated balance sheet and any resulting gain or loss is reflected in the consolidated statements of operations for the period.

Business acquisitions, Goodwill and Intangible Assets

The Company accounts for business acquisitions under ASC Topic 805, *Business Combinations.* The total purchase consideration for an acquisition is measured as the fair value of the assets given, equity instruments issued, and liabilities assumed at the acquisition date. The Company allocates the fair value of purchase consideration transferred in a business acquisition to the tangible assets acquired, liabilities assumed, and intangible assets acquired based on their estimated fair values. The excess of the fair value of purchase consideration transferred over the fair values of these identifiable assets and liabilities is recorded as goodwill. In case the fair value of purchase consideration transferred is below fair values of these identifiable assets and liabilities, the Company recognizes a gain from a bargain purchase. The Company recognizes the fair value of estimated contingent consideration at the acquisition date as part of the consideration transferred in exchange for the acquired business. The contingent consideration is remeasured to fair value at each reporting date until the contingency is resolved. Any changes in fair value are recognized each reporting period in non-cash changes in fair value of estimated contingent consideration in the accompanying consolidated statements of operations.

Such valuations require management to make significant estimates and assumptions, especially with respect to intangible assets. Significant estimates in valuing certain intangible assets include, but are not limited to, future expected cash flows from acquired licenses, trade names, in process research and development ("R&D"), useful lives and discount rates, patents, customer clientele, customer contracts and know-how. Management's estimates of fair value are based upon assumptions believed to be reasonable, but which are inherently uncertain and unpredictable and, as a result, actual results may differ from estimates. During the measurement period, the Company may record adjustments to the assets acquired and liabilities assumed, with the corresponding offset to goodwill. Upon the conclusion of the measurement period, any subsequent adjustments are recorded in the consolidated statement of operations.

For significant acquisitions, the Company obtains independent appraisals and valuations of the intangible (and certain tangible) assets acquired and certain assumed liabilities. The Company analyzes each acquisition individually and all acquisitions within each reporting period in aggregate to determine if those are material acquisitions in the context of ASC 805-10-50.

The estimated fair values and useful lives of identified intangible assets are based on many factors, including estimates and assumptions of future operating performance and cash flows of the acquired business, estimates of cost avoidance, the nature of the business acquired, the specific characteristics of the identified intangible assets and our historical experience and that of the acquired business. The estimates and assumptions used to determine the fair values and useful lives of identified intangible assets could change due to numerous factors, including product demand, market conditions, regulations affecting the business model of our operations, technological developments, economic conditions and competition.

The Company's most significant intangible assets are patents and developed technologies, trade names, in process know-how and order backlogs. The fair values of intangible assets are based on valuations using an income approach, with estimates and assumptions provided by management of the acquired companies and the Company. The process for estimating the fair values of identifiable intangible assets requires the use of significant estimates and assumptions, including revenue growth rates, royalty rates, discount rates and projected cash flows. All definite-lived intangible assets are amortized on a straight-line basis over the periods in which their economic benefits are expected to be realized, which range from 1 to 10 years. The Company reviews the useful life assumptions, including the classification of certain intangible assets as "indefinite-lived," on a periodic basis to determine if changes in circumstances warrant revisions to them.

The Company conducts a goodwill impairment analysis annually in the fourth fiscal quarter, or more frequently if changes in facts and circumstances indicate that the fair value of our reporting units may be less than their carrying amounts. In testing goodwill for impairment, the Company first assesses qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If, after assessing the totality of events or circumstances, the Company determines it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, then additional impairment testing is not required. When the Company determines a fair value test is necessary, it estimates the fair value of a reporting unit and compares the result with its carrying amount, including goodwill. If the carrying amount of a reporting unit exceeds its fair value, an impairment is recorded equal to the amount by which the carrying value exceeds the fair value, up to the amount of goodwill associated with the reporting unit. Currently, we identify three reporting units.

Impairment of Long-Lived Assets Including Acquired Intangible Assets

The Company reviews the property, plant and equipment, long-term prepayments and intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. The Company measures recoverability by comparing the carrying amount to the future undiscounted cash flows that the asset is expected to generate. If the asset is not recoverable, its carrying amount is adjusted down to its fair value.

Warranties

The Company provides a warranty on fuel cells we sell for typically 2 years. The Company accrues a warranty reserve of 8% of the sale price of the fuel cells sold, which includes the Company's best estimate of the projected costs to repair or replace items under warranties and recalls when identified. Warranty reserve is released when repairs or replacements are carried out in relation to items under warranties or when the warranty period for the fuel cell expires. The portion of the warranty reserve expected to be incurred within the next 12 months is included within Other current liabilities (Note 12), while the remaining balance is included within Other long-term liabilities (Note 16) on the consolidated balance sheets. Warranty expense is recorded as a component of cost of revenue in the consolidated statements of operations.

The changes in the accrued warranty reserve for the years ended December 31, 2022 and 2021 were as follows:

	Years Ended December 31,	
(Amounts in thousands)	**2022**	**2021**
Balance at beginning of year	**$ 1,048**	**$ -**
Assumed at business combination	-	1,081
Additions	460	42
Settlements	(401)	(28)
Foreign exchange fluctuations	(60)	(47)
Balance at end of year	**$ 1,047**	**$ 1,048**

Revenue Recognition

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606), as amended, which requires an entity to recognize the amount of revenue to which it expects to be entitled for the transfer of promised goods or services to customers. The Company adopted ASU No. 2014-09 on January 1, 2019, using the modified retrospective approach to all contracts not completed at the date of initial application.

In accordance with ASC 606, revenue is recognized when control of the promised goods or services are transferred to a customer in an amount that reflects the consideration that the Company expects to receive in exchange for those services. The Company applies the following five steps in order to determine the appropriate amount of revenue to be recognized as it fulfills its obligations under each of its arrangements:

- identify the contract with a customer,
- identify the performance obligations in the contract,
- determine the transaction price,
- allocate the transaction price to performance obligations in the contract, and
- recognize revenue as the performance obligation is satisfied.

With significant and recurring customers, the Company negotiates written master agreements as framework agreements (general terms and conditions of trading), following individual purchase orders. For customers with no master agreements, the approved purchase orders form the contract. Effectively, contracts under the revenue standard have been assessed to be the purchase orders agreed with customers.

The Company has assessed that each product sold is a single performance obligation because the promised goods are distinct on their own and within the context of the contract. In cases where the agreement includes customization services for the contracted products, the Company is providing integrated services; therefore, the goods are not separately identifiable, but are inputs to produce and deliver a combined output and form a single performance obligation within the context of the contract. Furthermore, the Company assessed whether it acts as a principal or agent in each of its revenue arrangements and has concluded that in all sales transactions it acts as a principal. Additionally, the Company, taking into consideration the guidance and indicative factors provided by ASC 606, concluded that it provides assurance type warranties (warranty period is up to two years) as it does not provide a service to the customer beyond fixing defects that existed at the time of sale. The Company, based on historical performance, current circumstances, and projections of trends, estimated that no allowance for returns as per warranty policy should be recognized, at the time of sale, accounted for under ASC 460, Guarantees.

Under ASC 606, the Company estimates the transaction price, including variable consideration, at the commencement of the contract and recognize revenue over the contract term, rather than when fees become fixed or determinable. In other words, where contracts with customers include variable consideration (i.e. volume rebates), the Company estimates at contract inception the variable consideration and adjusts the transaction price only to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. Furthermore, no material rights or significant financing components have been identified in the Company's contracts. Payment terms generally include advance payment requirements. The time between a customer's payment and completion of the performance obligation is less than one year. Payment terms are in the majority fixed and do not include variable consideration, except from volume rebates.

Revenue from satisfaction of performance obligations is recognized based on identified transaction price. The transaction price reflects the amount to which the Company has rights under the present contract. It is allocated to the distinct performance obligations based on standalone selling prices of the services promised in the contract. In cases of more than one performance obligation, the Company allocates transaction price to the distinct performance obligations in proportion to their observable stand-alone selling prices and recognize revenue as those performance obligations are satisfied.

In the majority of cases of product sales, revenue is recognized at a point in time when the customer obtains control of the respective goods that is, when the products are shipped from the Company's facilities as control passes to the customer in accordance with agreed contracts and the stated shipping terms. In cases where the contract includes customization services, which one performance obligation is identified, revenue is recognized over time as the Company's performance does not create an asset with alternative use and the Company has an enforceable right to payment for performance completed to date. The Company uses the input method (i.e., cost-to-cost method) to measure progress towards complete satisfaction of the performance obligation.

Contract Assets and Contract Liabilities

Contract assets reflect revenue recognized and performance obligations satisfied in advance of customer billing. As of December 31, 2022, and 2021, Advent recognized contract assets of $0.1 million and $1.6 million, respectively on the consolidated balance sheets. During the year December 31, 2022, the Company recognized a credit loss of $0.9 million related to the likelihood of realizing a contract asset. The balance as of December 31, 2022 and 2021 includes an amount of $0 and $0.6 million, respectively, from the SerEnergy and FES acquisition.

Advent recognizes contract liabilities when the Company receives customer payments or has the unconditional right to receive consideration in advance of the performance obligations being satisfied on the Company's contracts. The Company receives payments from customers based on the terms established in the contracts. Contract liabilities are classified as either current or long-term liabilities in the consolidated balance sheets based on the timing of when the Company expects to recognize the related revenue. As of December 31, 2022, and 2021, The Company recognized contract liabilities of $1.0 million and $1.1 million, respectively, in the consolidated balance sheets. During the years ended December 31, 2022 and 2021, the Company recognized $0.1 million and $0.2 million in revenues. The balance as of December 31, 2022 and 2021 amounting to $0.8 million and $1.1 million, respectively, was from the SerEnergy and FES acquisition.

Cost of revenues

Cost of revenues consists of consumables, raw materials, processing costs and direct labor costs associated with the assembly and manufacture of MEAs, membranes, fuel cell stacks and systems and electrodes. Advent recognizes cost of revenues in the period that revenues are recognized.

Research and Development Expenses

Research and development expenses consist of costs associated with Advent's research and development activities, such as laboratory costs, labor costs and sample material costs.

Administrative and Selling Expenses

Administrative and selling expenses consist of travel expenses, indirect labor costs, fees paid to consultants, third parties and service providers, taxes and duties, legal and audit fees, depreciation, business development salaries and limited marketing activities, and incentive and stock-based compensation expense.

Income from grants and related deferred income

Grants include cash subsidies received from various institutions and organizations. Grants are recognized as income from grants. Such amounts are recognized in the consolidated statements of operations when all conditions attached to the grants are fulfilled.

Condition to the grants would not be fulfilled unless related costs have been characterized as eligible by the grantors, are actually incurred and there is certainty that costs are allowable. These grants are recognized as deferred income when received and recorded in income when the eligible and allowable related costs and expenses are incurred. Under all grant programs, a coordinator is specified. The coordinator, among other, receives the funding from the grantor and proceeds to its distribution to the parties agreed in the process specified in the program. The Company assessed whether it acts as a principal or agent in its role as a coordinator for specific grants and has concluded that in all related transactions it acts as an agent.

During the years ended December 31, 2022 and 2021, the Company recognized income for grants of $1.5 million and $0.8 million, respectively, in connection with amounts received for fuel cell research and development. As of December 31, 2022 and 2021, the Company had receivables from grant income of $0.3 million and $0.5 million, respectively, which is included within prepaid expenses and other current assets in the consolidated balance sheets. As of December 31, 2022 and 2021, deferred income from grants in the consolidated balance sheets is $0.9 million and $0.2 million, respectively, and is split between current and non-current portion based on the estimated time of realization of eligible costs and expenses.

Advent Technologies S.A. and Disruptive Sustainable Technologies for Next Generation PV Windows ("Tech4Win Project")

In January 2019 Advent Technologies S.A became a partner in the European Union ("EU") funded Tech4Win Project. The aim of the project is to develop a novel transparent PV window concept based on a tandem inspired structure that combines an inorganic ultraviolet selective multi-functional coating with an organic infrared selective PV device. It will be able to generate renewable energy on site at a reduced cost, guaranteeing a high-transparency degree while avoiding the use of critical raw materials. Per the terms of the project, Advent Technologies was reimbursed for $0.2 million of research and development costs. The project ended in September 2022.

During the years ended December 31, 2022 and 2021, the Company recognized $10 thousand and $16 thousand, respectively, in reimbursements related to the project which is included as income from grants on the consolidated statement of operations.

As of December 31, 2021, $41 thousand was included as deferred income from grants, current on the consolidated balance sheets.

Advent Technologies A/S and The Energy Technology Development and Demonstration Program (“EUDP”)

In February 2019, Advent Technologies A/S entered into a Cooperation Agreement with EUDP, sponsored by the Danish Energy Agency, for the Cobra Drive projects. This purpose of this projects is to advance the reformed methanol fuel cell technology to a level where it can replace diesel engines in light commercial vehicles. Per the terms of the Cooperation Agreement, Advent Technologies A/S can be reimbursed up to 40% of the research and development costs incurred on component development for the mobility market. The agreement is in effect until January 2025.

During the years ended December 31, 2022 and 2021, the Company recognized $0.4 million and $0.1 million, respectively, in reimbursements related to the project which is included as income from grants on the consolidated statement of operations. As of December 31, 2022 and 2021, the Company had receivables related to project of $0.3 million and $0.3 million, respectively, included within prepaid expenses and other current assets in the consolidated balance sheets.

Advent Technologies S.A. and Helical Systems for Chiral Organic Light Emitting Diodes (“HEL4CHIROLED Project”)

In January 2020 Advent Technologies S.A became a partner in the European Union (“EU”) funded HEL4CHIROLED Project. The aim of the project is to improving organic light-emitting diodes (OLEDs) in Europe by training early-career researchers. The project aims to develop new thinking in OLED technologies, developing new material sets and approaches that take advantage of emerging technologies to improve the performance of displays based on OLEDs. Per the terms of the project, Advent Technologies S.A. was reimbursed for $0.2 million of research and development costs. The project ends in September 2023.

During the years ended December 31, 2022 and 2021, the Company recognized $37 thousand and $0.1 million, respectively, in reimbursements related to the project which is included as income from grants on the consolidated statement of operations.

Advent Technologies GmbH and the HT-PEM2 Project

In January 2020, Advent Technologies GmbH entered into an agreement with the German Federal Ministry for Economic Affairs and Climate Action as the project coordinator for the HT-PEM2 Project. The projects aim is to develop long-term stable membrane-electrode units with reduced platinum contents for the HT-PEM fuel cell use in power stationary units. Under this agreement, Advent Technologies GmbH is eligible for reimbursements up to €0.3 million of research and development costs related to the HT-PEM2 Project. The project ended on December 31, 2022.

During the year ended December 31, 2022 and 2021, the Company recognized $0.1 million and $0.3 million, respectively, in reimbursements related to the project which is included as income from grants on the consolidated statement of operations.

Advent Technologies GmbH / Advent Technologies A/S and The Industrialization of Power Generation with High-Temperature Proton Exchange Membrane (“HT-PEM” or “HT-PEMs”) Fuel Cell and Integrated Methanol Reformer Project (“ISEHM Project”)

In September 2020, Advent Technologies GmbH entered into an agreement with the German Federal Ministry for Economic Affairs and Climate Action as the project coordinator for the ISEHM Project. The aim of the project is to enable the marketable series production of 5kW power generators with fuel cell technology, based on HT-PEMs and an integrated methanol reformer. The project is in coordination with a consortium of partners including Advent Technologies A/S. The term of the ISEHM Project is from September 2020 through September 2023 and has a total budget of €5.4 million. The project partners can be reimbursed for expenses related to research and development up to 30% of the total budget.

During the years ended December 31, 2022 and 2021, the Company recognized $0.5 million and $0.4 million, respectively, in reimbursements related to the project which is included as income from grants on the consolidated statement of operations.

Advent Technologies GmbH and Innovation Competition for Climate-Neutral Production Using Industry 4.0 Solutions Project

In June 2022, Advent Technologies GmbH signed an agreement with the State Parliament of Baden-Württemberg and the Ministry of Economics, Labor, and Tourism to lead a consortium of partners for the innovation competition for climate-neutral production using industry 4.0 solutions. The project aim is to reduce waste production of fuel cell stacks through imaging quality control of the bipolar plates. Advent Technologies GmbH is eligible to receive reimbursements up to €0.1 million related to research and development related to the project. The project's term is through fiscal year 2023.

During the year ended December 31, 2022, the Company recognized $29 thousand in reimbursements related to the project which is included as income from grants on the consolidated statement of operations.

Advent Technologies S.A. and Ni-Based Ferromagnetic Coatings with Enhanced Efficiency to Replace Pt in Energy & Digital Storage Applications Project ("NICKEFFECT Project")

In June 2022 Advent Technologies S.A became a partner in the European Union ("EU") funded NICKEFFECT Project. The aim of the project is to find alternatives to platinum group metals ("PGMs") to replace PGMs in key applications as electrolysers electrodes, fuel cell catalysts and magneto-electronic devices. NICKEFFECT will develop and validate at least 3 new materials, together with the coating methodologies (including process modelling) and decision support tools for materials selection (integrating safe and sustainable by design criteria and materials modelling). Per the terms of the project, Advent Technologies S.A. can be reimbursed up to $0.4 million of research and development costs. The project ends in May 2026.

During the year ended December 31, 2022, the Company recognized $0.1 million in reimbursements related to the project which is included as income from grants on the consolidated statement of operations. As of December 31, 2022, $0.2 million was included as deferred income from grants, current on the consolidated balance sheets.

Advent Technologies S.A. and GreenSkills4H2 - The European Hydrogen Skills Alliance Project ("GreenSkills4H2 Project")

In July 2022 Advent Technologies S.A became a partner in the European Union ("EU") funded GreenSkills4H2 Project. The aim of the project is to bring together key industry and education stakeholders from across the European hydrogen sector to promote investments and stimulate clean hydrogen production and use. Per the terms of the project, Advent Technologies S.A. can be reimbursed up to $0.1 million or 80% of eligible of research and development costs. The project ends in May 2026.

As of December 31, 2022, $35 thousand was included as deferred income from grants, non-current on the consolidated balance sheets.

Advent Technologies S.A. and Liquid Fuel Electrochemical Generators Project ("Li.F.E. Project")

In September 2022 Advent Technologies S.A became a partner in the European Union ("EU") funded Li.F.E. Project. The aims of the project are to improve and validate the next generation liquid fuel electrochemical engine technology for power generation and mobility, especially marine, create partnerships with Tier-1 and original equipment manufacturers, lead the transition e-fuels for the transport sector and provide zero-emission vehicles through the most environmentally friendly fuel cell stacks. Per the terms of the project, Advent Technologies S.A. can be reimbursed up to $1.9 million or 70% of eligible of research and development costs. The project ends in August 2024.

During the year ended December 31, 2022, the Company recognized $0.2 million in reimbursements related to the project which is included as income from grants on the consolidated statement of operations.

As of December 31, 2022, $0.6 million was included within deferred income from grants, current on the consolidated balance sheet.

Advent Technologies S.A. and Next Generation of Improved High Temperature Membrane Electrode Assembly for Aviation Project ("NIMPHEA Project")

In December 2022 Advent Technologies S.A became a partner in the European Union ("EU") funded NIMPHEA Project. The aim of the project is to develop a new-generation HT MEA compatible with aircraft environment and requirements, considering a system size of 1.5 MW and contributing to higher level FC targets: a power density of 1.25 W/cm² at nominal operating temperature comprised between 160°C-200°C. MEA components' upscale synthesis and assembly process will be assessed by identifying process parameters and improved through an iterative process with lab-scale MEA tests. Advent SA can be reimbursed up to $0.8 million of research and development costs. The project ends in December 2026.

The project did not have any impact on consolidated financial statements for the years ended December 31, 2022 and 2021.

Advent Technologies S.A. and Electrochemical Conversion of CO2 into Added Value Products via Highly Selective Bimetallic Materials and Innovative Process Design Network ("ECOMATES Network")

In February 2023 Advent Technologies S.A became a partner in the European Union ("EU") funded ECOMATES network which gathers large European universities, international research laboratories, and other enterprises for cutting-edge Membrane Electrode Assemblies ("MEA" or "MEAs") research. Per the terms of the project, Advent Technologies S.A. can be reimbursed up to $0.2 million of eligible of research and development costs. The project ends in January 2027.

The project did not have any impact on consolidated financial statements for the years ended December 31, 2022 and 2021.

Advertising, Marketing and Promotional Costs

Advertising marketing and promotional costs are expensed as incurred and are included as an element of administrative and selling expenses in the consolidated statement of operations. Advertising, marketing and promotional costs were $0.5 million and $0.4 million for the years ended December 31, 2022 and 2021, respectively.

Income taxes

Advent follows the asset and liability method of accounting for income taxes under ASC 740, Income Taxes. Under the asset and liability method, deferred tax assets and liabilities are recognized for the estimated future tax consequences attributable to temporary differences between the financial statements carrying amounts of existing assets and liabilities and their respective tax bases. This method also requires the recognition of future tax benefits, such as net operating loss carry forwards, to the extent that it is more likely than not that such benefits will be realized. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that included the enactment date. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount expected to be realized. Valuation allowances are reassessed periodically to determine whether it is more likely than not that the tax benefits will be realized in the future and if any existing valuation allowance should be released.

Part of the Advent's business activities are conducted through its subsidiaries outside of U.S. Earnings from these subsidiaries are generally indefinitely reinvested in the local businesses. Further, local laws and regulations may also restrict certain subsidiaries from paying dividends to their parents. Consequently, Advent generally does not accrue income taxes for the repatriation of such earnings in accordance with ASC 740, "Income Taxes." To the extent that there are excess accumulated earnings that the Company intends to repatriate from any such subsidiaries, the Company will recognize deferred tax liabilities on such foreign earnings.

Advent assesses its income tax positions and records tax benefits for all years subject to examination based on the evaluation of the facts, circumstances, and information available at each reporting date. For those tax positions with a greater than 50 percent likelihood of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information, Advent records a tax benefit. For those income tax positions that are not likely to be sustained, no tax benefit is recognized in the consolidated financial statements. Advent recognizes interest and penalties related to uncertain tax positions as part of the provision for income taxes.

ASC 740 prescribes a recognition threshold and a measurement attribute for the financial statement recognition and measurement of tax positions taken or expected to be taken in a tax return. For those benefits to be recognized, a tax position must be more likely than not to be sustained upon examination by taxing authorities. For those income tax positions that are not likely to be sustained, no tax benefit is recognized in the consolidated financial statements. Advent recognizes interest and penalties related to uncertain tax positions as part of the provision for income taxes.

For the years ended December 31, 2022 and 2021, net income tax benefits (provisions) of $2.0 million and $0.9 million, respectively, have been recorded in the consolidated statements of operations. The Company is currently not aware of any issues under review that could result in significant accruals or material deviation from its position. The Company is subject to income tax examinations by major taxing authorities.

The Company and its U.S. subsidiaries may be subject to potential examination by U.S. federal, state and city, while the Company's subsidiaries outside U.S. may be subject to potential examination by their taxing authorities in the areas of income taxes. These potential examinations may include questioning the timing and amount of deductions, the nexus of income among various tax jurisdictions and compliance with the U.S. federal, state and city, and tax laws in the countries where business activities of Company's subsidiaries are conducted. On December 22, 2017, the Tax Cuts and Jobs Act of 2017 ("Tax Reform") was signed into legislation. As part of the legislation, the U.S. corporate income tax rate was reduced from 35% to 21%, among other changes.

As of December 31, 2021, the Company recorded deferred tax assets of $1.2 million and deferred tax liabilities of $2.5 million arising from the acquisition of its subsidiaries FES and SerEnergy.

Employee Benefits

U.S. Retirement Savings Plan

The Company sponsors an employee savings plan under Section 401(k) of the Internal Revenue Code. Subsequent to the Business Combination, the Company made matching contributions equal to 100% of the participant's pre-tax contribution up to a maximum of 5% of the participant's eligible earnings for U.S employees. Total expense related to the Company's defined contribution plan was $0.3 million and $0.1 million for the years ended December 31, 2022 and 2021, respectively.

Defined Benefit Plans

Under Greek labor law, employees are entitled to staff leaving indemnity in the event of dismissal or retirement with the amount of payment varying in relation to the employee's compensation, length of service and manner of termination (dismissed or retired). Employees who resign or are dismissed with cause are not entitled to staff leaving indemnity. Staff retirement obligations are calculated at the present value of the future retirement benefits deemed to have accrued at year-end, based on the employees earning retirement benefit rights accumulated throughout the working period in accordance with the Greek Labor Law 2112/1920.

The provision for retirement obligations is classified as defined benefit plan under ASC 715-30 and is based on an actuarial valuation. Net costs for the period are separately reflected in the accompanying consolidated statements of comprehensive loss consist of the present value of benefits earned in the year, interest cost on the benefit obligation, past service cost and gains or losses on curtailment. Past service costs are recognized in the consolidated statements of operations on the earlier of the date of plan amendment and the date that the Company recognizes restructuring or termination costs. Actuarial gains or losses are recognized immediately in the consolidated balance sheets with a corresponding debit or credit to equity through other comprehensive income (loss) in the period in which they occur. Re-measurements are not reclassified to profit and loss in subsequent periods.

Stock-based Compensation

Stock-based compensation consists of stock options and restricted stock units ("RSUs"). Stock options and RSUs are equity classified and are measured at the fair market value of the underlying stock at the grant date. The fair value of stock option awards with only service is estimated on the grant date using the Black-Scholes option-pricing model. The fair value of RSUs is measured on the grant date based on the closing fair market value of our common stock. Under ASC 718, an entity may recognize stock-based compensation expense for an award with only a service condition that has a graded vesting schedule on either (1) an accelerated basis as though each separately vesting portion of the award was, in substance, a separate award or (2) a straight-line basis over the total requisite service period for the entire award. An entity's use of either a straight-line or an accelerated attribution method represents an accounting policy election and thus should be applied consistently to all similar awards. The Company has elected to recognize compensation cost on a straight-line basis over the total requisite service period for the stock options and restricted stock units. This election does not affect the Company's previous year results since the Restricted Stock Awards granted in the prior period did not have a service requirement and therefore the stock compensation expense was recognized immediately. The Company also has a policy of accounting for forfeitures when they occur. Stock-based compensation expense is recorded in administrative and selling expenses in the consolidated statements of operations.

Earnings / (Loss) Per Share

Basic earnings / (Loss) per share is computed by dividing net earnings / (loss) by the weighted average number of common shares outstanding during the period. Diluted earnings / (loss) per share reflects the potential dilution that could occur if securities or other contracts to issue common stock were exercised or converted at the beginning of the periods presented, or issuance date, if later. The treasury stock method is used to compute the dilutive effect of warrants, stock options and restricted stock units.

Fair Value Measurements

The Company follows the accounting guidance in ASC 820 for its fair value measurements of financial assets and liabilities measured at fair value on a recurring basis. Fair value is defined as an exit price, representing the amount 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. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or a liability.

The accounting guidance requires fair value measurements be classified and disclosed in one of the following three categories:

- Level 1: Quoted prices in active markets for identical assets or liabilities.
- Level 2: Observable inputs other than Level 1 prices, for similar assets or liabilities that are directly or indirectly observable in the marketplace.
- Level 3: Unobservable inputs which are supported by little or no market activity and that are financial instruments whose values are determined using pricing models, discounted cash flow methodologies, or similar techniques, as well as instruments for which the determination of fair value requires significant judgment or estimation.

The fair value hierarchy also requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. Assets and liabilities measured at fair value are classified in their entirety based on the lowest level of input that is significant to the fair value measurement.

Available for Sale Financial Asset

On May 25, 2022, Advent Technologies S.A ("Advent SA") and UNI.FUND Mutual Fund ("UNIFUND") entered into an agreement to finance Cyrus SA ("Cyrus") with a convertible bond loan ("Bond Loan") of €1.0 million. As a part of this transaction, Advent SA offered €0.3 million in bond loans with an annual interest rate of 8.00%. The term of the loan is three years and there is a surcharge of 2.5% for overdue interest.

Mandatory conversion of the Bond Loan will occur in the event of qualified financing which is equivalent to a share capital increase by Cyrus in the first three years from the execution of the Bond Loan agreement with a total amount over €3 million which is covered by third parties unrelated to the basic shareholders or by investors related to them.

The Company classifies the Bond Loan as an available for sale financial asset on the consolidated balance sheets. The Company recognizes interest income within the consolidated statement of operations. For the year ended December 31, 2022, the Company recognized $13 thousand of interest income related to the Bond Loan within the consolidated statements of operations. The Company did not recognize any interest income related to the Bond Loan during the year ended December 31, 2021.

The Company initially measured the available for sale Bond Loan at the transaction price plus any applicable transaction costs. The Bond Loan is remeasured to its fair value at each reporting period and upon settlement. The estimated fair value of the Bond Loan is determined using Level 3 inputs by using a discounted cash flow model. The change in fair value is recognized within the consolidated statements of comprehensive loss. The Company did not recognize any unrealized gain / (loss) from the agreement date of May 25, 2022 through December 31, 2022.

Warrants

The Company may issue or assume common stock warrants with debt, equity or as standalone financing instruments that are recorded as either liabilities or equity in accordance with the respective accounting guidance. Warrants recorded as equity are recorded at their relative fair value or fair value determined at the issuance date and remeasurement is not required. Warrants recorded as liabilities are recorded at their fair value, within warrant liability on the consolidated balance sheets, and remeasured on each reporting date with changes recorded in fair value change of warrant liability on the Company's consolidated statements of operations.

Warrant Liability

As a result of the Business Combination, the Company assumed a warrant liability (the "Warrant Liability") related to previously issued 3,940,278 warrants, each exercisable to purchase one share of common stock at an exercise price of $11.50 per share, originally sold to AMCI Sponsor LLC (the "Sponsor") in a private placement consummated in connection with AMCI's initial public offering (the "Private Placement Warrants") and the 400,000 warrants, each exercisable to purchase one share of common stock at an exercise price of $11.50 per share, converted from the Sponsor's non-interest bearing loan to the Company of $0.4 million in connection with the closing of the Business Combination (the "Working Capital Warrants") (Note 14). The Private Placement Warrants and the Working Capital Warrants have substantially the same terms as the 22,029,279 warrants, each exercisable to purchase one share of common stock at an exercise price of $11.50 per share, issued by AMCI in its initial public offering (the "Public Warrants").

The following tables summarize the fair value of the Company's assets and liabilities measured at fair value on a recurring basis as of December 31, 2022 and December 31, 2021.

	As of December 31, 2022	
(Amounts in thousands)	Fair Value	Unobservable Inputs (Level 3)
Assets		
Available for sale financial asset	$ 320	$ 320
	$ 320	**$ 320**
Liabilities		
Warrant liability	$ 998	$ 998
	$ 998	**$ 998**

	As of December 31, 2021	
(Amounts in thousands)	Fair Value	Unobservable Inputs (Level 3)
Liabilities		
Warrant liability	$ 10,373	$ 10,373
	$ 10,373	**$ 10,373**

As of December 31, 2021, the Company did not hold any assets measured at fair value on a recurring basis.

The carrying amounts of the Company's remaining financial instruments reflected on the consolidated balance sheets and which consist of cash and cash equivalents, accounts receivables, net, other current assets, trade and other payables, and other current liabilities, approximate their respective fair values due to their short-term nature.

Changes in the fair value of Level 3 assets and liabilities for the years ended December 31, 2022 and 2021 were as follows:

Available for Sale Financial Asset

(Amounts in thousands)	For the Year Ended December 31, 2022	For the Year Ended December 31, 2021
Estimated fair value (beginning of period)	**$ -**	**$ -**
Estimated fair value of available for sale financial asset acquired	311	-
Foreign exchange fluctuations	9	-
Change in estimated fair value	-	-
Estimated fair value (end of period)	**$ 320**	**$ -**

Warrant Liability

(Amounts in thousands)	For the Year Ended December 31, 2022	For the Year Ended December 31, 2021
Estimated fair value (beginning of period)	**$ 10,373**	**$ -**
Estimated fair value of warrant issuance	-	33,116
Change in estimated fair value	(9,375)	(22,743)
Estimated fair value (end of period)	**$ 998**	**$ 10,373**

The Warrant Liability is remeasured to its fair value at each reporting period and upon settlement. The change in fair value is recognized in "Fair value change of warrant liability" on the consolidated statements of operations.

The estimated fair value of the Private Placement Warrants and the Working Capital Warrants (each as defined below) is determined using Level 3 inputs by using the Black-Scholes model. The application of the Black-Scholes model requires the use of a number of inputs and significant assumptions including volatility. Significant judgment is required in determining the expected volatility of our common stock. Due to the limited history of trading of our common stock, we determined expected volatility based on a peer group of publicly traded companies.

The following tables provide quantitative information regarding Level 3 fair value measurement inputs as of their measurement date December 31, 2022:

Available for Sale Financial Asset	
Interest Rate	8.00%
Discount Rate	8.00%
Remaining term (in years)	2.50

Warrant Liability		
Stock price	$	1.81
Exercise price (strike price)	$	11.50
Risk-free interest rate		4.12%
Volatility		75.7%
Remaining term (in years)		3.09

The Company performs routine procedures such as comparing prices obtained from independent source to ensure that appropriate fair values are recorded.

Concentration of Risk

i) Credit risk

Financial instruments that potentially subject us to a concentration of credit risk consist of cash, cash equivalents and accounts receivable. Our cash balances are primarily invested in money market funds or on deposits at high credit quality financial institutions.

As of December 31, 2022, the Company had two (2) major customers that each represented more than 10% of our accounts receivable balance. As of December 31, 2021, the Company had two (2) major customer that represented more than 10% of our accounts receivable balance.

During the year ended December 31, 2022, the Company had two (2) major customers that each represented more than 10% of its revenues, on an individual basis, and together represented approximately $3.3 million or 42% of its total revenues. During the year ended December 31, 2021, the Company had three (3) major customers that each represented more than 10% of its revenues, on an individual basis, and together represented approximately $3.7 million or 53% of its total revenues.

ii) Supply risk

The Company obtains a limited number of components and supplies included in its products from a small group of suppliers. During the years ended December 31, 2022 and 2021, the Company did not have suppliers who accounted for more than 10% of its total purchases.

Recent Accounting pronouncements

Recently issued accounting pronouncements adopted during the year:

In November 2021, the FASB issued ASU 2021-10 "Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance." This ASU will improve the transparency of government assistance received by most business entities by requiring the disclosure of: (1) the types of government assistance received; (2) the accounting for such assistance; and, (3) the effect of the assistance on a business entity's financial statements. ASU 2021-10 is effective for financial statements issued for annual periods beginning after December 15, 2021, with early application permitted. The Company adopted the standard on January 1, 2022 and included the related disclosures in this footnote.

In December 2019, the FASB issued ASU 2019-12, Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes, which is intended to simplify various aspects related to accounting for income taxes. The pronouncement is effective for fiscal years, and for interim periods within those fiscal years, beginning after December 15, 2020 for public entities, with early adoption permitted. The Company adopted the standard on January 1, 2022, in accordance with the adoption dates for private entities applicable to it under its emerging growth company status and did not have a material impact on the Company's consolidated financial statements and related disclosures.

Recently issued accounting pronouncements not yet adopted:

In June 2016, the FASB issued ASU 2016-13, Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses of Financial Instruments, which, amends the requirement on the measurement and recognition of expected credit losses for financial assets held. Furthermore, amendments, ASU 2019-10 and ASU 2019-11 provided additional clarification for implementing ASU 2016-13. ASU 2016-13 is effective for the Company beginning January 1, 2023, with early adoption permitted. The Company is currently in the process of evaluating the effect of this guidance on the consolidated financial statements.

3. Business Combination

(a) AMCI Acquisition Corp.

As detailed in Note 1, on February 4, 2021, the Company and AMCI consummated the Business Combination pursuant to the terms of the Agreement and Plan of Merger, with Legacy Advent surviving the merger as a wholly-owned subsidiary of AMCI. Immediately prior to the closing of the Business Combination, all shares of outstanding preferred stock Series A and preferred stock Series Seed of Legacy Advent were automatically converted into shares of the Legacy Advent's common stock. Upon the consummation of the Business Combination, each share of Legacy Advent common stock issued and outstanding was canceled and converted into the right to receive the amount of shares as determined based on the merger consideration of $250 million minus the estimated consolidated indebtedness of Legacy Advent and its subsidiaries as of the consummation of the Business Combination, net of their estimated consolidated cash and cash equivalents ("Closing Net Indebtedness") divided by $10.00. The Closing Net Indebtedness was based solely on estimates determined shortly prior to the closing and was not subject to any post-closing true-up or adjustment.

Upon the closing of the Business Combination, AMCI's certificate of incorporation was amended and restated to, among other things, authorize the issuance of 111,000,000 shares, of which 110,000,000 shares are shares of common stock, par value $0.0001 per share and 1,000,000 shares are shares of undesignated preferred stock, par value $0.0001 per share.

In connection with the execution of the Business Combination Agreement, AMCI entered into separate subscription agreements with a number of investors (each a "Subscriber"), pursuant to which the Subscribers agreed to purchase, and AMCI agreed to sell to the Subscribers, an aggregate of 6,500,000 shares of common stock, for a purchase price of $10.00 per share and an aggregate purchase price of $65.0 million, in a private placement pursuant to the subscription agreements (the "PIPE"). The PIPE investment closed simultaneously with the consummation of the Business Combination.

The Business Combination is accounted for as a reverse recapitalization in accordance with GAAP. Under this method of accounting, AMCI was treated as the "acquired" company for financial reporting purposes. See Note 1 "Basis of Presentation" in the accompanying consolidated financial statements for further details. Accordingly, for accounting purposes, the Business Combination was treated as the equivalent of Legacy Advent issuing stock for the net assets of AMCI, accompanied by a recapitalization. The net assets of AMCI are stated at historical cost, with no goodwill or other intangible assets recorded.

The following table reconciles the elements of the Business Combination to the consolidated statement of cash flows and the consolidated statement of changes in equity for the year ended December 31, 2021:

(Amounts in thousands)		Recapitalization
Cash- AMCI's trust and cash (net of redemptions)	$	93,311
Cash – PIPE plus interest		65,000
Less transaction costs and advisory fees paid		(17,188)
Less non-cash warrant liability assumed		(33,115)
Net Business Combination and PIPE financing	**$**	**108,008**

The number of shares of common stock issued immediately following the consummation of the Business Combination:

	Recapitalization
Class A Common Stock of AMCI, outstanding prior to Business Combination	9,061,136
Less Redemption of AMCI shares	(1,606)
Class B Common Stock of AMCI, outstanding prior to Business Combination	5,513,019
Shares issued in PIPE	6,500,000
Business Combination and PIPE financing shares	**21,072,549**
Legacy Advent Shares	25,033,398
Total shares of Common Stock immediately after Business Combination	**46,105,947**

(b) UltraCell, LLC

On February 18, 2021 (the "acquisition date"), pursuant to the terms and conditions of the UltraCell Purchase Agreement, the Company acquired 100% of the issued and outstanding membership units of UltraCell from Bren-Tronics, Inc. The results of UltraCell's operations have been included in the consolidated financial statements since the acquisition date.

The Company has assessed provisions in ASC 805 and concluded that the UltraCell acquisition should be accounted as an acquisition of a business. The Company evaluated whether substantially all the fair value of the gross assets acquired is concentrated in a single identifiable asset or a group of similar identifiable assets and concluded that it is not. Since the "substantially all" threshold is not met, the Company further assessed whether the set acquired includes an input and a substantive process that together significantly contribute to the ability to create outputs. Following its assessment, the Company concluded that the minimum requirements to define UltraCell as a business are met.

UltraCell is an entity specialized in lightweight fuel cells for the portable power market with mature products and cutting-edge technology.

The acquisition consideration transferred totaled $6.0 million, of which $4.0 million was cash and $2.0 million was the fair value of the contingent consideration. The contingent consideration arrangement required the Company to pay $2.0 million of additional cash to UltraCell's former holders of membership interests, if UltraCell entered into certain customer arrangements for sales of products prior to June 30, 2021. On April 16, 2021, Advent paid the additional consideration based on UltraCell achieving completion of the terms of the contingent consideration.

Assets and liabilities at acquisition

The assets acquired and liabilities assumed at the date of acquisition were as follows (amounts in thousands):

Current assets		
Cash and cash equivalents	$	78
Other current assets		658
Total current assets	**$**	**736**
Non-current assets		9
Total assets	**$**	**745**
Current liabilities		110
Non-current liabilities		-
Total liabilities	**$**	**110**
Net assets acquired	**$**	**635**

Goodwill arising on acquisition

Cost of investment	$	6,000
Less: Net assets value		(635)
Consideration to be allocated	**$**	**5,365**
Fair value adjustment - New intangibles		
Trade name "UltraCell"		406
Patented technology		4,328
Total intangibles acquired	**$**	**4,734**
Remaining Goodwill	**$**	**631**

The fair value of the assets acquired, and liabilities assumed was based on a Purchase Price Allocation of UltraCell LLC conducted by an independent third party. The intangible assets recognized are the Trade Name "UltraCell" and the Patented Technology. The fair value measurement of the intangible assets has been performed by applying a combination of market, cost and income approach methods. The Trade Name was valued with the Relief-from-royalty method, which combines market & income approaches. The royalty rate used for the valuation of the Trade Name was 1.3%, which was determined from the market using databases from completed transactions at a global level while the discount rate used was 12.6%. The Patented Technology was valued with the multi period excess earnings method, which is an income approach. The discount rate used for the valuation of the Patented Technology was 11.6%. The Trade Name has an indefinite useful life while the Patented Technology has a useful life of 10 years.

Included in goodwill is the value of assembled workforce, which under FASB ASC topic 805, does not meet either the contractual-legal or the separability criterion in order to be separately valued as an intangible asset. As part of the acquisition, the Company acquired fully trained personnel thereby avoiding the expenditure that would have been required to hire and train equivalent personnel. Therefore, the assemblage cost avoided method was considered the most appropriate method for the valuation of the assembled workforce. The assembled workforce was valued at $0.19 million and has been included in goodwill.

Goodwill is deductible for tax purposes.

(c) Acquisition of SerEnergy and FES

Effective on August 31, 2021, pursuant to the previously announced Share Purchase Agreement (the "Purchase Agreement"), dated as of June 25, 2021, by and between the Company and F.E.R. fischer Edelstahlrohre GmbH, a limited liability company incorporated under the Laws of Germany (the "Seller"), the Company acquired (the "Acquisition") all of the issued and outstanding equity interests in SerEnergy A/S, a Danish stock corporation and a wholly-owned subsidiary of the Seller ("SerEnergy") and fischer eco solutions GmbH, a German limited liability company and a wholly-owned subsidiary of the Seller ("FES") together with certain outstanding shareholder loan receivables. The shareholder loans became intercompany at closing and were eliminated in consolidation.

The Company has assessed provisions in ASC 805 and concluded that the Acquisition should be accounted as an acquisition of a business. The Company evaluated whether substantially all the fair value of the gross assets acquired is concentrated in a single identifiable asset or a group of similar identifiable assets and concluded that it is not. Since the "substantially all" threshold is not met, the Company further assessed whether the set acquired includes an input and a substantive process that together significantly contribute to the ability to create outputs. Following its assessment, the Company concluded that the minimum requirements to define SerEnergy and FES as a business are met.

The results of the SerEnergy's and FES's operations have been included in the consolidated financial statements since the acquisition date.

Pursuant to the Purchase Agreement, the Company acquired SerEnergy and FES, the fuel cell systems business of fischer Group. SerEnergy is a leading manufacturer of high-temperature polymer electrolyte membrane HT-PEM fuel cells and operates facilities in Aalborg, Denmark and in Manila, Philippines. FES operates in Achern, Germany and provides fuel-cell stack assembly and testing as well as the production of critical fuel cell components, including membrane electrode assemblies, bipolar plates and reformers.

As consideration for the transactions contemplated by the Purchase Agreement, the Company paid to the Seller $17.9 million (€15 million) in cash and issued 5,124,846 shares of common stock of the Company to the Seller (the "Share Consideration") on August 31, 2021. The Share Consideration was capped to shares representing 9.999% of the Company's common stock outstanding as of the completion (taking into account the common stock issued as Share Consideration). An additional amount of $4.4 million, representing cash on the balance sheet of the acquired businesses at closing, was a portion of the total consideration in the transaction and subject to finalization by an audit of the acquired businesses. A liability to the seller offsetting the cash acquired is included within "Other current liabilities" (Note 12) on the consolidated balance sheets.

In conjunction with the terms of the Purchase Agreement, the audit of the effective date (closing date) balance sheets of the acquired businesses was completed in the fourth quarter of 2022. The audit resulted in a reduction of the total consideration for the acquired businesses of $2.4 million, although this amount was determined after the measurement period under ASC 805 had ended and was not known at that time. As a result, the liability to be paid to the seller was reduced to $2.0 million as of December 31, 2022 and the Company recognized a gain in relation to this purchase price adjustment within the consolidated statement of operations in the year ended December 31, 2022.

Assets and liabilities at acquisition

The assets acquired and liabilities assumed at the date of acquisition were as follows (amounts in thousands):

Current assets		
Cash and cash equivalents	$	4,367
Other current assets		10,252
Total current assets	**$**	**14,619**
Non-current assets		5,388
Total assets	**$**	**20,007**
Current liabilities		5,800
Non-current liabilities		1,180
Total liabilities	**$**	**6,980**
Net assets acquired	**$**	**13,027**

Goodwill arising on acquisition

Cost of investment		
Cash consideration	$	22,236
Share consideration		37,924
Total cost of investment		**60,160**
Less: Net assets value		(13,027)
Original excess purchase price	**$**	**47,133**
Fair value adjustments		
Real Property		76
New intangibles:		
Patents		16,893
Process know-how (IPR&D)		2,612
Order backlog		266
Total intangibles acquired	**$**	**19,771**
Deferred tax liability arising from the recognition of intangibles and real property valuation		(5,452)
Deferred tax assets on tax losses carried forward		3,339
Remaining Goodwill	**$**	**29,399**

The fair value of the assets acquired, and liabilities assumed was based on a Purchase Price Allocation of SerEnergy and FES conducted by an independent third party.

The acquired businesses specialize in the manufacturing of hydrogen fuel cell systems and align with Advent's ability to provide clean power in the stationary, remote, portable and off-grid markets under the "Any Fuel. Anywhere." value proposition. The Company's ability to deliver hydrogen through liquid fuels allows it to have immediate market opportunity today, without having to wait for the global hydrogen infrastructure to develop. The acquisitions also accelerate the Company's strategy to cover the full vertical supply chain with its products and puts the Company in a competitive position to deliver reliable, efficient and cost-effective fuel cell systems with a new product portfolio of the latest high temperature-PEM fuel cells covering a range of 25W to 90kW systems. The acquisitions also make Advent a leading manufacturer of high temperature fuel cells across Europe and Asia. Expanding the business in Europe and Asia is a strategic move and allows the Company to have well-placed production capabilities and market penetration.

Included in goodwill is the value of assembled workforce, which under FASB ASC topic 805, does not meet either the contractual-legal or the separability criterion in order to be separately valued as an intangible asset. As part of the Acquisition, the Company acquired fully trained personnel thereby avoiding the expenditure that would have been required to hire and train equivalent personnel. The assembled workforce included in goodwill was valued at $2.4 million applying the cost approach.

Goodwill is not deductible for tax purposes.

Intangible assets

The intangible assets recognized on the acquisition of SerEnergy and FES are as follows:

Patents

Two groups of patents are assumed to be the most significant drivers of future cash flows. The patents relate to improvements in gaskets, bipolar plates and cooling plates for fuel cells. The fair value of patents was determined by applying the multi-period excess earnings method which is an income approach. The discount rate used for the valuation of patents was 7.2%. Patents are amortized over 10 years since management assumes, that these groups of patents will continue to drive cash flows for 10 years, after which new patents will be of more relevance.

Process know-how (IPR&D)

SerEnergy and FES are currently developing cost reduction initiatives (unpatented know-how) related to membrane electrode assembly, bipolar plates, gaskets, burner/reformer and electronics. This IPR&D is evaluated as a significant asset for the business as it will allow significant cost reduction leading to higher profits in the future. These cost reductions are expected to be introduced beginning in 2023. The multi-period excess earnings method was applied to calculate the fair value of this asset. The discount rate used for the valuation of IPR&D was 10.1%. IPR&D is amortized over its useful life of 6 years, being the average timespan of a generation of fuel cell modules.

Order backlogs

Order backlogs recognized are in respect of two main customers of SerEnergy. The assessment of this asset was based on the total amount of order backlog attributable to these customers. The fair value was determined applying the income approach. Resulting cash flows after tax were discounted to present value by a minimal discount rate as the backlog's timespan is less than a year.

4. Related party disclosures

Balances with related parties

The were no outstanding balances with related parties as of December 31, 2022 and December 31, 2021.

Transactions with related parties

Related parties' transactions are in the normal course of operations and are measured at the amount of consideration established and agreed to by related parties.

The Company executives, Vassilios Gregoriou, Christos Kaskavelis, Emory De Castro, James Coffey and former Chief Financial Officer, William Hunter, each received a signing bonus and transaction bonus upon the consummation of the merger in an aggregate amount of $5.6 million, which is included in administrative and selling expenses in the statement of operations for the year ended December 31, 2021.

5. Accounts receivable, net

Accounts receivable consist of the following:

(Amounts in thousands)	December 31, 2022	December 31, 2021
Accounts receivable from third party customers	$ 1,295	$ 3,550
Less: Allowance for credit losses	(316)	(411)
Accounts receivable, net	**$ 979**	**$ 3,139**

For the years ended December 31, 2022 and 2021, changes in the allowance for credit losses were as follows:

	Years Ended December 31,	
(Amounts in thousands)	2022	2021
Balance at beginning of year	**$ (411)**	**$ (19)**
Additions	(247)	(13)
Assumed at business combination	-	(405)
Income from unused provisions	316	-
Utilized provisions during the year	-	8
Foreign exchange fluctuations	26	18
Balance at end of year	**$ (316)**	**$ (411)**

6. Inventories

Inventories consist of the following:

(Amounts in thousands)	December 31, 2022	December 31, 2021
Raw materials and supplies	$ 7,518	$ 5,361
Work-in-process	547	757
Finished goods	4,787	888
Total	**$ 12,852**	**$ 7,006**
Provision for slow moving inventory	(232)	(48)
Total	**$ 12,620**	**$ 6,958**

The changes in the provision for slow moving inventory is as follows:

(Amounts in thousands)	Year Ended December 31, 2022	Year Ended December 31, 2021
Balance at beginning of year	**$ (48)**	**$ -**
Additions	(204)	-
Assumed at business combination	-	(50)
Foreign exchange fluctuations	20	2
Balance at end of year	**$ (232)**	**$ (48)**

7. Prepaid expenses and other current assets

Prepaid expenses are analyzed as follows:

(Amounts in thousands)	December 31, 2022	December 31, 2021
Prepaid insurance expenses	$ 263	$ 355
Prepaid research expenses	212	495
Prepaid rent expenses	32	99
Other prepaid expenses	181	191
Total	**$ 688**	**$ 1,140**

Prepaid insurance expenses as of December 31, 2022 and 2021 mainly include prepayments to insurers for directors' and officers' insurance services for liabilities that may arise in their capacity as directors and officers of a public entity.

Prepaid research expenses as of December 31, 2022 and 2021 mainly relate to prepayments for expenses under the Cooperative Research and Development Agreement as discussed in Note 19.

Other prepaid expenses as of December 31, 2022 and 2021 mainly include prepayments for professional fees and purchases.

Other current assets are analyzed as follows:

(Amounts in thousands)	December 31, 2022	December 31, 2021
VAT receivable	$ 530	$ 981
Withholding tax	839	108
Grant receivable	265	510
Purchases under receipt	83	274
Guarantees	38	24
Other receivables	524	2,836
Accrued interest income	13	-
	$ 2,292	**$ 4,733**

On March 8, 2021, the Company entered into a lease agreement for 21,401 square feet for use as a product development and manufacturing center at Hood Park in Charlestown, MA. Under the terms of the lease, the Company was reimbursed by the lessor for up to $8.0 million of expenses related to the design and construction of the Company's workspace. During the year ended December 31, 2022, the Company received $8.0 million of reimbursable expenses from the lessor. As of December 31, 2021, other receivables include an amount of $2.6 million relating to the expenses reimbursable by the lessor.

8. Goodwill and Intangible Assets

Goodwill

As of December 31, 2021, the Company had goodwill of $30.0 million related to the acquisitions of UltraCell, SerEnergy, and FES, which is analyzed as follows:

(Amounts in thousands)	
Goodwill on acquisition of UltraCell (Note 3b)	$ 631
Goodwill on acquisition of SerEnergy and FES (Note 3c)	29,399
Total goodwill	**$ 30,030**

The Company performed a qualitative analysis for fiscal year 2022 and determined that triggering events for two of the Company's reporting units, UltraCell and SerEnergy / FES, had occurred which would require testing goodwill and long-lived assets, including definite-lived intangibles, for impairment.

The Company considered the triggering events related to current and expected future economic and market conditions and their impact on the Company, as well as the current revenue forecasts. Given certain market factors, the Company determined that these triggering events had occurred and would require a quantitative analysis to be performed.

As a part of the impairment assessment, the Company reviewed significant fair value input assumptions including revenues, margin, and capital expenditures to reflect current market conditions. Other changes in valuation assumptions included increases in interest rates and market volatility, resulting in higher discount rates.

UltraCell Reporting Unit

In the fourth quarter of 2022, the Company updated the forecasted future cash flows of UltraCell used in the fair value measurement of the intangible assets and goodwill using a combination of market, cost and income approach methods. The royalty rate used for the valuation of the Trade Name was 1.3%, which was determined from the market using databases from completed transactions at a global level while the discount rate increased to 15.0% from 12.6% at the time of the acquisition of UltraCell. The Company determined that the current fair value of the Trade Name was greater than the current carrying value and therefore did not recognize any impairment during the period. The Patented Technology was valued with the multi period excess earnings method, which is an income approach. The discount rate used for the valuation of the Patented Technology increased to 14.0% from 11.6% at the time of acquisition of UltraCell. The Company determined that the undiscounted cash flows related to the Patented Technology was greater than the current carrying value and therefore did not recognize any impairment during the period. The Company believes that its updated long-term forecasted cash flows did not indicate that the fair value of this reporting unit may be below its current carrying value.

SerEnergy and FES Reporting Unit

In the fourth quarter of 2022, the Company updated the forecasted future cash flows of SerEnergy and FES used in the fair value measurement of the intangible assets and goodwill using a combination of market, cost and income approach methods. The Company acquired finite-lived intangible assets, including patents, process know-how, and order backlog as a result of the SerEnergy and FES acquisition. The fair value of patents was determined by applying the multi-period excess earnings method which is an income approach. The discount rate used for the valuation of patents increased to 14.4% from 7.2% at the time of SerEnergy and FES acquisition. The Company determined that the current discounted cash flows related to the patents was ($5.3) million which is below the current carry value. As a result, the Company recorded an impairment charge of $14.6 million related to the patents. The Company determined the undiscounted cash flows attributable to the IPR&D was greater than the current carrying value. As a result, the Company believes that the updated long-term forecast did not indicate impairment related to IPR&D. As of the December 31, 2022, the Company did not hold intangible assets related to order backlogs. The Company determined that the fair value of the reporting unit was $15.5 million utilizing the updated forecast which is less than its current carrying value. As a result, the Company recorded a goodwill impairment charge of $24.3 million.

In the event there are further adverse changes in the Company's projected cash flows and/or further changes in key assumptions, including but not limited to an increase in the discount rate, lower market multiples, lower revenue growth, lower margin, and/or a lower terminal growth rate, the Company may be required to record non-cash impairment charges to its goodwill, other intangibles, and/or long-lived assets. Such non-cash charges could have a material adverse effect on the Company's consolidated statement of operations and balance sheet in the reporting period of the charge. The assessment is sensitive to broader market conditions, including the discount rate and market multiples, and to the Company's estimated future cash flows.

As of December 31, 2022, the Company had goodwill of $5.7 million:

(Amounts in thousands)	Gross Carrying Amount	Cumulative Impairment	Net Carrying Amount
Goodwill on acquisition of UltraCell	$ 631	$ -	$ 631
Goodwill on acquisition of SerEnergy and FES	29,399	(24,288)	5,111
Total goodwill	**$ 30,030**	**$ (24,288)**	**$ 5,742**

Intangible Assets

Information regarding our intangible assets, including assets recognized from our acquisitions, as of December 31, 2022 and 2021 is as follows:

	As of December 31, 2022			
(Amounts in thousands)	Gross Carrying Amount	Accumulated Amortization	Cumulative Impairment	Net Carrying Amount
Indefinite-lived intangible assets:				
Trade name “UltraCell”	$ 406	$ -	$ -	$ 406
Total indefinite-lived intangible assets	**$ 406**	**$ -**	**$ -**	**$ 406**
Finite-lived intangible assets:				
Patents	21,221	(3,068)	(14,634)	3,519
Process know-how (IPR&D)	2,612	(582)	-	2,030
Order backlog	266	(266)	-	-
Software	233	(126)	-	107
Total finite-lived intangible assets	**$ 24,332**	**$ (4,042)**	**$ (14,634)**	**$ 5,656**
Total intangible assets	**$ 24,738**	**$ (4,042)**	**$ (14,634)**	**$ 6,062**

	As of December 31, 2021		
(Amounts in thousands)	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Indefinite-lived intangible assets:			
Trade name “UltraCell”	$ 406	$ -	$ 406
Total indefinite-lived intangible assets	**$ 406**	**$ -**	**$ 406**
Finite-lived intangible assets:			
Patents	21,221	(945)	20,276
Process know-how (IPR&D)	2,612	(147)	2,465
Order backlog	266	(90)	176
Software	122	(101)	21
Total finite-lived intangible assets	**$ 24,221**	**$ (1,283)**	**$ 22,938**
Total intangible assets	**$ 24,627**	**$ (1,283)**	**$ 23,344**

The Company did not record any additions to indefinite-lived intangible assets in the year ended December 31, 2022. In the year ended December 31, 2021, the Company recorded indefinite-lived intangible assets of $0.4 million related to the trade name UltraCell.

In 2021, the Company also recorded $22.9 million (net carrying amount) of amortizing intangible assets, most of which were in connection with the Company’s acquisitions of UltraCell, SerEnergy, and FES. During the year ended December 31, 2022, the Company recorded $0.1 million of amortizing intangible assets related to software. The amortizing intangible assets consist of patents, process know-how *(IPR&D)*, order backlogs, and software which are amortized over 10 years, 6 years, 1 year, and 5 years respectively. The amortization expense for the intangible assets for the years ended December 31, 2022 and 2021 was $2.8 million and $1.2 million, respectively.

Amortization expense is recorded on a straight-line basis. Assuming constant foreign currency exchange rates and no change in the gross carrying amount of the intangible assets, future amortization expense related to the Company's intangible assets subject to amortization as of December 31, 2022 is expected to be as follows:

(Amounts in thousands)		
Fiscal Year Ended December 31,		
2023	$	891
2024		891
2025		891
2026		891
2027		734
Thereafter		1,358
Total	**$**	**5,656**

9. Property, plant and equipment, net

Property, plant and equipment, net, consisted of the following:

(Amounts in thousands)		**December 31, 2022**		**December 31, 2021**
Land, Buildings & Leasehold Improvements	$	1,977	$	1,888
Machinery		8,155		8,756
Equipment		4,687		4,091
Assets under construction		10,436		431
	$	**25,255**	**$**	**15,166**
Less: accumulated depreciation		(7,317)		(6,581)
Total	**$**	**17,938**	**$**	**8,585**

During the year ended December 31, 2022, additions to property, plant and equipment of $10.4 million, primarily consisted of assets under construction related to the Hood Park facility. During the year ended December 31, 2021, additions to property, plant and equipment of $3.9 million include leasehold improvements, machinery, office and other equipment and assets under construction. Upon acquisition of SerEnergy and FES, the Company acquired property and equipment with a net book value of $5.4 million (Note 3).

Assets under construction mainly relate to the design and construction of Company's leased premises at Hood Park in Charlestown, as discussed in Note 7. Completed assets are transferred to their respective asset classes, and depreciation begins when an asset is ready for its intended use. During the year ended December 31, 2022, the Company transferred $0.1 million of assets under construction to machinery and equipment.

Depreciation expense during the years ended December 31, 2022 and 2021 was $1.5 million and $0.6 million respectively.

During the year ended December 31, 2022, the Company recognized a loss of $0.2 million due to the disposal of machines and equipment no longer in use at Advent Technologies GmbH's manufacturing facility. At the time of disposal, the machines and equipment had a carrying value of $0.6 million and accumulated depreciation of $0.4 million. The loss is included in other expenses in the statement of operations for the year ended December 31, 2022.

There are no collaterals or other commitments on the Company's property, plant and equipment.

10. Other non-current assets

Other non-current assets as of December 31, 2022 and 2021 are mostly comprised of advances to suppliers for the acquisition of fixed assets of $4.9 million and $2.2 million, respectively. As of December 31, 2022, other non-current assets also included the letter of credit of $0.8 million related to the Hood Park facility.

11. Trade and other payables:

Trade and other payables include balances of suppliers and consulting service providers. Other payables included $1.2 million for executive severance at December 31, 2021.

12. Other current liabilities

As of December 31, 2022 and 2021, other current liabilities consist of the following:

(Amounts in thousands)	December 31, 2022	December 31, 2021
Accrued expenses (1)	$ 1,522	$ 5,903
Other short-term payables (2)	2,260	4,590
Taxes and duties payable	285	1,236
Provision for unused vacation	300	424
Accrued provision for warranties, current portion (Note 16)	213	208
Social security funds	88	84
Overtime provision	35	70
Total	**$ 4,703**	**$ 12,515**

(1) Accrued expenses are analyzed as follows:

(Amounts in thousands)	December 31, 2022	December 31, 2021
Accrued bonus	$ -	$ 3,603
Accrued construction fees	476	1,285
Accrued expenses for legal and consulting fees	159	334
Accrued payroll fees	142	129
Other accrued expenses	745	552
Total	**$ 1,522**	**$ 5,903**

Accrued construction fees as of December 31, 2022 and 2021 relate to accrued fees for the design and construction of the Company's leased workspace at Hood Park in Charlestown, as discussed in Note 7. Other accrued expenses mainly consist of accrual of staff expenses and audit fees.

(2) Other short-term payables as of December 31, 2022 and 2021 include an amount of $2.0 million and $4.4 million, respectively, which is payable to F.E.R. fischer Edelstahlrohre GmbH to complete the acquisition of SerEnergy and FES, as discussed in Note 3(c).

13. Leases

The Company enters into operating lease agreements for the use of real estate and certain other equipment. The Company determines if an arrangement contains a lease at inception, which is the date on which the terms of the contract are agreed to and the agreement creates enforceable rights and obligations. The impacts of accounting for operating leases are included in Right-of-use assets, Operating lease liabilities, and Long-term operating lease liabilities in the Company's consolidated balance sheets.

On February 5, 2021, the Company entered into a lease agreement by and among the Company, in its capacity as tenant, and BP Hancock LLC, a Delaware limited liability company, in its capacity as landlord. The lease provides for the rental by the Company of office space at 200 Clarendon Street, Boston, MA 02116 for use as the Company's executive offices. Under the terms of the lease, the Company leases 6,041 square feet at an initial fixed annual rent of $0.5 million. The term of the lease is for five years (unless terminated as provided in the lease) and commenced on April 1, 2021. The Company provided security in the form of a security deposit in the amount of $0.1 million which is included in Other non-current assets on the consolidated balance sheet as of December 31, 2022 and December 31, 2021.

Additionally, the Company's subsidiaries, Advent Technologies S.A., UltraCell LLC, Advent Technologies A/S and Advent Green Energy Philippines, Inc., have in place rental agreements for the lease of office and factory spaces.

On March 8, 2021, the Company entered into a lease for 21,401 square feet as a product development and manufacturing center at Hood Park in Charlestown, MA. Under the terms of the lease, the Company will pay an initial fixed annual rent of $1.5 million. The lease has a term of eight years and five months , with an option to extend for five years, and commenced in October 2022. The Company is obliged to provide security in the form of a security deposit in the amount of $0.8 million before commencement of the lease.

On August 31, 2021, the Company through its wholly-owned subsidiary, FES, entered into a lease agreement by and among the Company, in its capacity as lessee, and fischer group SE & Co. KG, having its registered seat in Achern, in its capacity as lessor. The lease provides for the rental by the Company of office space, workspace and outdoor laboratory at 77855 Achern, Im Gewerbegebiet 7 for use by FES. Under the terms of the lease, the Company leases 1,017 square feet at a monthly basic rate of €7,768 plus VAT. The Company provided security in the form of a parent guarantee for a maximum amount of €30,000.

Rental expense for all operating leases was $1.6 million and $0.8 million for the years ended December 31, 2022 and 2021, respectively. For the year ended December 31, 2022, rental expense for short-term leases was $0.2 million.

As of December 31, 2022, the right of use assets, net associated with operating leases was $4.1 million.

Other information related to the operating leases are presented in the following table:

	Year ended December 31, 2022
Cash payments (in thousands)	$ 1,605
Weighted average remaining lease term (years)	6.7
Weighted average discount rate	7.1%

As of December 31, 2022, undiscounted maturities of operating lease liabilities are as follows (amounts in thousands):

	Operating Leases
Fiscal Year Ended December 31,	
2023	$ 2,425
2024	2,334
2025	2,284
2026	1,930
2027	1,699
Thereafter	4,927
Total undiscounted lease payments	**15,599**
Less imputed interest	(3,517)
Total discounted lease payments	**$ 12,082**

Upon adoption of ASU 2016-02, *Leases* (Topic 842), the Company's aggregate annual lease obligations includes leases with reasonably assured renewals. The aggregate minimum annual lease rentals as of December 31, 2021 for the remaining contractual term of non-cancelable leases under ASC 840 were as follows (amounts in thousands):

Fiscal Year Ended December 31,	
2022	$ 1,458
2023	2,300
2024	2,283
2025	2,319
2026	1,942
Thereafter	6,351
Total	**$ 16,653**

14. Private Placement Warrants and Working Capital Warrants

In connection with the Business Combination, the Company assumed 3,940,278 Private Placement Warrants issued upon AMCI's initial public offering. In addition, upon the closing of the Business Combination, the working capital loan provided by AMCI's Sponsor to AMCI was converted into 400,000 Working Capital Warrants, which were also assumed. The terms of the Working Capital Warrants are the same as those of the Private Placement Warrants.

As of December 31, 2022 and 2021, the Company had an aggregate of 4,340,278 Private Placement Warrants and Working Capital Warrants outstanding. Each Private Placement Warrant and Working Capital Warrant entitles the registered holder to purchase one share of Common Stock at a price of $11.50 per share, subject to adjustment, at any time commencing 30 days after the completion of the Business Combination. The Public Warrants expire five years after the closing of the Business Combination or earlier upon redemption or liquidation.

The Private Placement Warrants and Working Capital Warrants are identical to the Public Warrants, except that the Private Placement Warrants and Working Capital Warrants and the common stock issuable upon the exercise of those warrants were not transferable, assignable or salable until 30 days after the completion of a Business Combination, subject to certain limited exceptions. Additionally, the Private Placement Warrants and Working Capital Warrants are exercisable on a cashless basis and be non-redeemable so long as they are held by the initial purchasers or their permitted transferees. If those warrants are held by someone other than the initial purchasers or their permitted transferees, they will be redeemable by the Company and exercisable by such holders on the same basis as the Public Warrants. As of December 31, 2022, the Private Placement Warrants and Working Capital Warrants are held by its initial purchasers.

According to the provisions of the Private Placement Warrants and Working Capital Warrants warrant agreements, the exercise price and number of shares of common stock issuable upon exercise of those warrants may be adjusted in certain circumstances including in the event of a stock dividend, or recapitalization, reorganization, merger or consolidation. Private Placement Warrants and Working Capital Warrants are classified as liabilities in accordance with the Company's evaluation of the provisions of ASC 815-40-15, which provides that a warrant is not indexed to the issuer's common stock if the terms of the warrant require an adjustment to the exercise price upon a specified event and that event is not an input to the fair value of the warrant with a fixed exercise price and fixed number of underlying shares.

15. Employee benefits

Employee Tax-Deferred Savings Plans

The Company offers a 401(k) savings plan (the "401(k) Plan") to all full-time employees that provides for tax-deferred salary deductions for eligible employees (beginning the first month following an employee's hire date). Employees may choose to make voluntary contributions of their annual compensation to the 401(k) Plan, limited to an annual maximum amount as set periodically by the IRS. Employee contributions are fully vested when made. Under the 401(k) Plan, there is no option available to the employee to receive or purchase the Company's common stock. Matching contributions of 5% under the 401(k) Plan aggregated $0.3 and $0.1 million for the years ended December 31, 2022 and 2021, respectively.

Employee Defined Benefit Plans

Under Greek labor law, employees are entitled to staff leaving indemnity in the event of dismissal or retirement with the amount of payment varying in relation to the employee's compensation, length of service and manner of termination (dismissed or retired). Employees who resign or are dismissed with cause are not entitled to staff leaving indemnity. The provision for retirement obligations is classified as defined benefit plan under ASC 715-30 and is based on an actuarial valuation.

As of December 31, 2022 and 2021, the defined benefit obligation presented in the consolidated balance sheets was $0.1 million and $0.1 million, respectively.

The changes in the defined benefit obligation for the years ended December 31, 2022 and 2021 were as follows:

	Years Ended December 31, 2022	Years Ended December 31, 2021
Liability at beginning of year	**$ 90,066**	**$ 33,676**
Interest cost	628	195
Service cost	26,109	5,159
Actuarial (gains) / losses	(38,902)	56,241
Foreign exchange fluctuations	(5,405)	(5,205)
Liability at end of year	**$ 72,496**	**$ 90,066**

For the years ended December 31, 2022 and 2021, the amounts included in the consolidated statements of operations and in the consolidated statements of comprehensive income (loss) were as follows:

	Years Ended December 31, 2022	Years Ended December 31, 2021
Amounts included on the consolidated statements of operations:		
Interest cost	$ 628	$ 195
Service cost	26,109	5,159
	$ 26,737	**$ 5,354**

	Years Ended December 31, 2022		Years Ended December 31, 2021	
Amounts included on the consolidated statements of comprehensive income (loss):				
Actuarial (gains) / losses	$	(38,902)	$	56,241
	$	**(38,902)**	**$**	**56,241**

Methodology

ASC 715 requires that retirement benefit arrangements should be classified as defined benefit or defined contribution plans. Defined contribution plans are accounted for on a cash basis, i.e., the Net Periodic Benefit Cost in any period is equal to the employer cash contributions. The accounting treatment of defined benefit plans is more complicated and requires actuarial valuations because the standard requires the costs of defined benefit plans to be attributed to periods of employee service.

The Retirement Indemnities Plan (under Greek Law 4093) has been classified by the Company as unfunded defined benefit plans for ASC 715 accounting purposes.

The actuarial methodology uses an approach which considers the benefits in respect of service completed before the valuation date (past service) separately from benefits in respect of service expected to be completed after the valuation date (future service). This approach enables us to determine the defined benefit obligation and the cost of the benefits accruing in the year following the valuation date.

The calculation is based on the Projected Unit Credit method.

Actuarial Assumptions

The actuarial assumptions are the best estimates at the valuation date and are taken into account at the calculation of the Defined Benefit Obligation.

The principal actuarial assumptions used are:

Financial Assumptions	**Valuation Date December 31, 2022**	**Valuation Date December 31, 2021**
Discount rate	2.90%	0.75%
Future salary increases	2.40%	1.80%
Inflation	2.20%	1.80%

Demographic Assumptions	**Valuation Date December 31, 2022**	**Valuation Date December 31, 2021**
Mortality[(1)]	EVK 2000 (male and female)	
Disability[(1)]	50% EVK 2000	
Retirement age limits[(2)]	As defined by the Greek main insurance institution for each employee.	
Turnover[(3)]	0.00%	

(1) Mortality Table: The mortality rate of employees is defined according to EVK 2000 (male and female), which is widely accepted as unbiased.
(2) Turnover Rates: For the purposes of the actuarial study, the turnover rate was estimated based on the Company's historical data, estimated future development and long-term economic trends.
(3) Retirement ages are those provided by primary Greek insurance carrier and depend mainly on sex, class of worker, having incorporated the latest additions to the age limits of Greek Laws 4093/2012 and 4336/2015.

Sensitivity Analysis

The sensitivity analysis of defined benefit obligation against changes in principal assumptions is as follows:

	Effect on liability in financial year 2022		
	Change in assumption by	**Increase in assumption**	**Decrease in assumption**
Discount rate	0.50%	-9%	+10%
Annual salary increase	0.50%	+6%	-8%

16. Other long-term liabilities

Other long-term liabilities as of December 31, 2022 and 2021 mainly include an amount of $0.8 million and $0.8 million, respectively, being the non-current portion of a total accrued warranty reserve of $1.0 million and $1.0 million, respectively. The Company accrues a warranty reserve of 8% of the sale price of the fuel cells sold, typically for 2 years. Warranty reserve is released when repairs or replacements are carried out in relation to items under warranties or when the warranty period for the fuel cell expires. The portion of the warranty reserve expected to be incurred within the next 12 months is included within Other current liabilities (Note 12), while the remaining balance is included within Other long-term liabilities on the consolidated balance sheets.

17. Stockholders' Equity / (Deficit)

Shares Authorized

As of December 31, 2022, the Company had authorized a total of 111,000,000 shares for issuance with 110,000,000 shares designated as common stock, par value $0.0001 per share and 1,000,000 shares designated as preferred stock, par value $0.0001 per share.

Common Stock

On April 9, 2021, 22,798 shares of common stock were issued in connection with the exercise of public warrants discussed below.

On August 31, 2021, 5,124,846 shares of common stock were issued in connection with the share consideration for the acquisition of SerEnergy and FES discussed in Note 3(c).

On April 29, 2022, 9,652 shares of common stock were issued in connection with the Company's 2021 Equity Incentive Plan (the "Plan").

On May 5, 2022, 348,962 shares of common stock were issued in connection with the Plan.

On June 13, 2022, 9,652 shares of common stock were issued in connection with the Plan.

On June 29, 2022, 9,652 shares of common stock were issued in connection with the Plan.

On August 26, 2022, 31,351 shares of common stock were issued in connection with the Plan.

On September 2, 2022, 54,860 shares of common stock were issued in connection with the Plan.

As of December 31, 2022 and December 31, 2021, there were 51,717,720 and 51,253,591 shares of issued and outstanding common stock with a par value of $0.0001 per share, respectively.

Public Warrants

In connection with the Business Combination, the Company assumed the Public Warrants issued upon AMCI's initial public offering.

As of December 31, 2020, the Company had 22,052,077 Public Warrants outstanding. Each Public Warrant entitles the registered holder to purchase one share of common stock at a price of $11.50 per share, subject to adjustment, at any time commencing 30 days after the completion of the Business Combination. The Public Warrants will expire five years after the completion of the Business Combination or earlier upon redemption or liquidation. During the second quarter of 2021, certain warrant holders exercised their option to purchase an additional 22,798 shares at $11.50 per share. These exercises generated $262,177 additional proceeds to the Company and increased the Company's shares outstanding by 22,798 shares. Following these exercises, as of December 31, 2022, the Company's Public Warrants amounted to 22,029,279.

Once the warrants become exercisable, the Company may redeem the Public Warrants:

– in whole and not in part;

– at a price of $0.01 per warrant;

– upon not less than 30 days' prior written notice of redemption;

– if, and only if, the reported last sale price of the Company's common stock equals or exceeds $18.00 per share for any 20 trading days within a 30-trading day period ending three business days before the Company sends the notice of redemption to the warrant holders; and

– if, and only if, there is a current registration statement in effect with respect to the shares of common stock underlying such warrants.

If the Company calls the Public Warrants for redemption, management will have the option to require all holders that wish to exercise the Public Warrants to do so on a "cashless basis," as described in the warrant agreement. The exercise price and number of shares of common stock issuable upon exercise of the warrants may be adjusted in certain circumstances including in the event of a stock dividend, or recapitalization, reorganization, merger or consolidation. However, the warrants will not be adjusted for issuance of common stock at a price below its exercise price. In addition, the warrant agreement provides that in case of a tender offer or exchange that involves 50% or more of the Company's stockholders, the Public Warrants may be settled in cash, equity securities or other assets depending on the kind and amount received per share by the holders of the common stock in such consolidation or merger that affirmatively make such election.

The Public Warrants are classified in equity in accordance with the Company's evaluation of the provisions of ASC 480 and ASC 815. The Company analyzed the terms of the Public Warrants and concluded that there are no terms that provide that the warrant is not indexed to the issuer's common stock. The Company also analyzed the tender offer provision discussed above and considering that upon the Closing of the Business Combination the Company has a single class of common shares, concluded that the exception discussed in ASC 815-40-25 applies, and thus equity classification is not precluded.

Stock-Based Compensation Plans

2021 Equity Incentive Plan

The Company's Board of Directors and shareholders previously approved the Plan to reward certain employees and directors of the Company. The Plan has been established to advance the interests of the Company by providing for the grant to Participants of Stock and Stock-based Awards. The maximum number of shares of common stock that may be delivered in satisfaction of Awards under the Plan is 6,915,892 shares.

Stock Options

Pursuant to and subject to the terms of the Plan the Company entered into separate Stock Option Agreements with each participant according to which each participant is granted an option (the "Stock Option") to purchase up to a specific number of shares of common stock set forth in each agreement with an exercise price equal to the market price of Company's common stock at the date of grant. Stock Options have been granted during the year ended December 31, 2022 as follows:

	Number of Shares	Strike Price	Grant Date Fair Value
Granted on March 18, 2022	328,167	$ 2.94	$ 2.32
Granted on July 12, 2022	410,000	$ 2.74	$ 2.39
Granted on September 7, 2022	71,850	$ 2.92	$ 2.19
Total stock options granted in 2022	**810,017**		

The following table presents the assumptions used to estimate the fair value of the stock options as of the Grant Date:

	Assumptions		
	Stock options granted on March 18, 2022	Stock options granted on July 12, 2022	Stock options granted on September 7, 2022
Expected volatility	96.7%	118.3%	87.1%
Risk-free rate	2.2%	3.0%	3.3%
Time to maturity	6.25 years	6.25 years	6.25 years

The Stock Options are granted to each participant in connection with their employment with the Company. The Stock Options vest on a graded basis over four years. The Company has a policy of recognizing compensation cost on a straight-line basis over the total requisite service period for the stock options. The Company recognized compensation cost of $3.5 million and $2.4 million in respect of Stock Options granted, which is included in administrative and selling expenses in the consolidated statement of operations for the years ended December 31, 2022 and 2021, respectively. The Company also has a policy of accounting for forfeitures when they occur.

The following table summarizes the activities for the Company's unvested stock options for the year ended December 31, 2022:

	Number of options	Weighted Average Exercise Price	Weighted Average Grant Date Fair Value	Weighted Average Remaining Vesting Period	Aggregate Intrinsic Value(1)
Unvested as of December 31, 2021	**2,624,894**	**$ 9.63**	**$ 4.88**		
Granted	810,017	$ 2.84	$ 3.45		
Vested	(647,191)	$ 9.66	$ 4.88		
Forfeited	(104,538)	$ 4.91	$ 3.26		
Unvested as of December 31, 2022	**2,683,182**	**$ 7.75**	**$ 4.18**	**1.43 years**	**$ -**

(1) The aggregate intrinsic value is calculated as the difference between the closing market price of $1.81 per share of the Company's common stock on December 30, 2022 and the exercise price, times the number of stock options where the closing stock price is greater than the exercise price that would have been received by the option holders had all option holders exercised their options on that date.

As of December 31, 2022, there was $8.5 million of unrecognized compensation cost related to unvested stock options. This amount is expected to be recognized over the remaining vesting period of stock options.

Restricted Stock Units

Pursuant to and subject to the terms of the Plan the Company entered into separate Restricted Stock Units (“RSUs”) with each participant. On the grant date of RSUs, the Company grants to each participant a specific number of RSUs as set forth in each agreement, giving each participant the conditional right to receive without payment one share of common stock. The RSUs are granted to each participant in connection with their ongoing employment with the Company. The Company has in place Restricted Stock Unit Agreements that vest within one year and Restricted Stock Unit Agreements that vest on a graded basis over four years. The Company has a policy of recognizing compensation cost on a straight-line basis over the total requisite service period. The Company recognized compensation cost of $6.9 million and $5.3 million in respect of RSUs, which is included in administrative and selling expenses in the consolidated statement of operations for the years ended December 31, 2022 and 2021, respectively. The Company also has a policy of accounting for forfeitures when they occur.

Restricted Stock Units have been granted during the year ended December 31, 2022 as follows:

	Number of Shares	Grant Date Fair Value
Granted on March 18, 2022	328,167	$ 2.94
Granted on June 8, 2022	193,548	$ 1.55
Granted on July 12, 2022	410,000	$ 2.74
Granted on September 7, 2022	71,850	$ 2.92
Total restricted stock units granted in 2022	**1,003,565**	

The following table summarizes the activities for our unvested RSUs for the year ended December 31, 2022:

	Number of Shares	Weighted Average Grant Date Fair Value	Weighted Average Remaining Vesting Period	Aggregate Intrinsic Value (1)
Unvested as of December 31, 2021	**2,702,099**	**$ 9.65**		
Granted	1,003,565	$ 2.59		
Vested	(695,451)	$ 9.71		
Forfeited	(132,702)	$ 6.07		
Unvested as of December 31, 2022	**2,877,511**	**$ 7.34**	**1.46 years**	**$ 5,208,297**

(1) The aggregate intrinsic value is calculated based on the fair value of $1.81 per share of the Company’s common stock on December 31, 2022 due to the fact that the restricted stock units carry a $0 purchase price.

As of December 31, 2022, there was $15.7 million of unrecognized compensation cost related to unvested RSUs. This amount is expected to be recognized over the remaining vesting period of Restricted Stock Unit Agreements.

Accumulated Other Comprehensive Loss

Other comprehensive income (loss) is defined as other changes in stockholders' equity that do not represent transactions with stockholders or in the Company's stock. Changes in accumulated other comprehensive loss were as follows:

(Amounts in thousands)	Accumulated Foreign Currency Translation Adjustments	Accumulated Actuarial Gains / (Losses)	Total Accumulated Other Comprehensive Income (Loss)
Balance as of December 31, 2020	**$ 112**	**$ -**	**$ 112**
Other comprehensive (loss)	(1,329)	(56)	(1,385)
Balance as of December 31, 2021	**$ (1,217)**	**$ (56)**	**$ (1,273)**
Other comprehensive (loss)	(1,370)	39	(1,331)
Balance as of December 31, 2022	**$ (2,587)**	**$ (17)**	**$ (2,604)**

18. Revenue

Revenue is analyzed as follows:

(Amounts in thousands)	Years Ended December 31, 2022	2021
Sales of goods	$ 6,387	$ 6,695
Sales of services	1,450	374
Total revenue from contracts with customers	**$ 7,837**	**$ 7,069**

The timing of revenue recognition is analyzed as follows:

(Amounts in thousands)	Years Ended December 31,	
Timing of revenue recognition	**2022**	**2021**
Revenue recognized at a point in time	$ 7,578	$ 6,409
Revenue recognized over time	259	660
Total revenue from contracts with customers	**$ 7,837**	**$ 7,069**

As of December 31, 2022 and 2021, Advent recognized contract assets of $0.1 million and $1.6 million, respectively, on the consolidated balance sheets.

As of December 31, 2022 and 2021, Advent recognized contract liabilities of $1.0 million and $1.1 million, respectively, in the consolidated balance sheets. During the years ended December 31, 2022 and 2021, the Company recognized the amount of $0.1 million and $0.2 million in revenues.

The aggregate amount of the transaction price allocated to the performance obligations that are unsatisfied as of December 31, 2022 and 2021 are $0 and $2.5 million, respectively.

19. Collaborative Arrangements

Cooperative Research and Development Agreement

In August 2020, the Company entered into a Cooperative Research and Development Agreement ("CRADA") with Triad National Security, LLC ("TRIAD"), Alliance for Sustainable Energy LLC ("ASE"), and Brookhaven Science Associates ("BSA"). The purpose of this project is to build a fuel cell prototype that moves this technology closer to commercial readiness which was sanctioned by the Los Alamos National Laboratory and the National Renewable Energy Laboratory. The Government's estimated total contribution, which is provided through TRIAD's, ASE's, and BSA's respective contracts with the Department of Energy is $1.2 million, subject to available funding. As a part of the CRADA, the Company is required to contribute $1.2 million in cash and $0.6 million of in-kind contributions, such as personnel salaries. The cash payments are capitalized and amortized on a straight-line basis over the life of the contract. In-kind contributions are expensed as incurred. To date, the Company has not recognized any revenue from the CRADA.

Expenses from Collaborative Arrangements

For the years ended December 31, 2022 and 2021 an amount of $1.4 million and $0.7 million, respectively, has been recognized in research and development expenses line on the consolidated statements of operations.

20. Convertible Bond Loan

On May 25, 2022, Advent SA and UNIFUND entered into an agreement to finance Cyrus with a convertible Bond Loan of €1.0 million. As a part of this transaction, Advent SA offered €0.3 million in bond loans with an annual interest rate of 8%. The term of the loan is three years and there is a surcharge of 2.5% for overdue interest.

Cyrus business relates to the research and experimental development in natural sciences and mechanics, the construction of pumps and hydrogen compressors and the wholesale of compressors. Hydrogen compressors are critical part of the Hydrogen Refueling Stations (HRS) to be used by transport applications. Cyrus has developed a prototype Metal Hydride Compressor which offers unique advantages. The proceeds from the Bond Loan are to cover Cyrus's working capital needs in the context of its operation and the product development.

Mandatory conversion of the Bond Loan will occur in the event of qualified financing which is equivalent to a share capital increase by Cyrus in the first three years from the execution of the Bond Loan agreement with a total amount over €3 million which is covered by third parties unrelated to the basic shareholders or by investors related to them.

21. Income Taxes

The components of loss before income taxes for the years ended December 31, 2022 and 2021 were as follows:

	Years Ended December 31,	
(Amounts in thousands)	**2022**	**2021**
Domestic	$ (18,198)	$ (12,853)
Foreign	(58,109)	(8,593)
	$ (76,307)	**(21,446)**

The components of income tax provision (benefit) for the years ended December 31, 2022 and 2021 were as follows:

	Year Ended December 31,	
(Amounts in thousands)	**2022**	**2021**
Federal:		
Current	$ -	$ -
Deferred	-	-
Total federal income tax (benefit) provision	**-**	**-**
State:		
Current	-	-
Deferred	-	-
Total state income tax (benefit) provision	**-**	**-**
International (Non-US):		
Current	(728)	(72)
Deferred	(1,242)	(851)
Total international income tax (benefit) provision	**(1,970)**	**(923)**
Total income tax (benefit) provision	**$ (1,970)**	**$ (923)**

Income tax (benefit) provision differs from the amount that would be provided by applying the statutory U.S. corporate income tax rate of 21% for the years ended December 31, 2022 and 2021 due to the following items:

	Years Ended December 31,	
(Amounts in thousands)	2022	2021
Current tax at U.S. statutory rate	$ (16,024)	$ (4,504)
Effect of state tax	(946)	(2,322)
Effect of valuation allowance	10,255	9,309
Warranty Liability	(1,969)	(4,776)
Effect of non-US income tax rates	(3,402)	940
Officers Compensation	-	-
Effect of non-deductible expenses	-	-
Transaction expenses	12	428
Credits	-	-
Impairment	6,904	-
Stock compensation	2,159	282
Other, net	1,041	(280)
Total income tax (benefit) provision	**$ (1,970)**	**$ (923)**

Deferred tax assets and liabilities are recognized for the anticipated future tax effects of temporary differences between the financial statement basis and the tax basis of the Company's assets and liabilities at the applicable tax rates in effect. The principal components of Company's deferred tax assets (liabilities) as of December 31, 2022, and 2021 include the following:

(Amounts in thousands)	December 31, 2022	December 31, 2021
Deferred Tax Assets:		
Net operating loss carryforwards	$ 20,186	$ 12,673
Reserves and accruals	13	932
Stock compensation	1,199	1,771
Lease Liability	3,306	-
Sec 174 Cap	887	-
Other	295	23
Total deferred tax assets before valuation allowance	**$ 25,886**	**$ 15,399**
Less: Valuation Allowance	(21,998)	(11,773)
Total deferred tax assets, net of valuation allowance	**$ 3,888**	**$ 3,626**
Deferred Tax Liabilities:		
Fixed assets	(199)	(12)
Lease ROA	(3,268)	-
Intangibles	(383)	(4,833)
Other	(38)	(35)
Total deferred tax liabilities	**$ (3,888)**	**$ (4,880)**
Net deferred tax assets/(liabilities)	**$ -**	**$ (1,254)**

A valuation allowance for deferred tax assets is recorded when it is more likely than not that some or all of the benefit from the deferred tax asset will not be realized. The Company provides a valuation allowance to offset deferred tax assets for net operating losses incurred during the year and for other deferred tax assets where, in the Company's opinion, it is more likely than not that the financial statement benefit of these losses will not be realized. The Company's valuation allowance increased by approximately $10.2 million during the year ended December 31, 2022 mainly due to net operating losses generated during the period.

As of December 31, 2022, the Company had U.S. federal and state net operating loss carryforwards of $46.9 million and $43.7 million, respectively, which may be used to offset future taxable income, if any. As of December 31, 2021, the Company had U.S. federal and state net operating loss carryforwards of $28.2 million and $27.2 million, respectively, which may be used to offset future taxable income, if any. The Company's U.S. federal and state net operating loss carryforwards begin to expire in 2033 and the U.S. federal net operating losses generated in 2018- 2022 can be carried forward indefinitely. As of December 31, 2022, the Company had U.S. federal and state credit carryforwards of $0.2 million and $0.1 million, respectively, which may be used to offset future taxable income, if any. The Company's U.S. federal and state credit carryforwards begin to expire in 2043. The Company's ability to utilize these net operating loss carryforwards and tax credit carryforwards may be limited in the future if the Company experiences an ownership change pursuant to Internal Revenue Code Section 382 and 383. An ownership change occurs when the ownership percentages of 5% or greater stockholders change by more than 50% over a three-year period.

The Company also has net operating loss carryforwards in Greece of approximately $7.6 million that begin to expire in 2026, in Denmark of approximately $15.0 million that can be carried forward indefinitely, in Germany of approximately $18.1 million that can be carried forward indefinitely, and in Philippines of approximately $0.6 million that begin to expire in 2025.

As of December 31, 2022 and 2021, the Company had $0.1 million of gross unrecognized tax benefits, which would impact the effective tax rate, if recognized. A reconciliation of unrecognized tax benefits is as follows:

	Years Ended December 31,	
(Amounts in thousands)	**2022**	**2021**
Balance at beginning of year	$ 135	$ 135
Increase in tax positions for current year	-	-
Decrease in tax positions for prior year	-	-
Lapse in statute of limitations	-	-
Balance at end of year	$ 135	$ 135

The Company's policy is to classify interest and penalties, if any, as components of the income tax provision in the consolidated statement of operations. The Company has not recorded any interest or penalty in the years ended December 31, 2022 and 2021. The Company considers many factors when evaluating and estimating its tax positions and the impact on income tax expense, which may require periodic adjustments, and which may not accurately anticipate actual outcomes. It is reasonably possible that the amount of the unrecognized benefit with respect to certain of the Company's unrecognized tax positions will significantly increase or decrease within the next twelve months. However, based on the uncertainties associated with finalizing audits with the relevant tax authorities including formal legal proceedings, it is not possible to reasonably estimate the impact of any such change.

The Company conducts business globally and, as a result, files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. In the normal course, the Company is subject to examinations by taxing authorities throughout the world. The material jurisdictions in which the Company is subject to potential examination include the United States, Denmark, Germany, Greece, and the Philippines. As of December 31, 2022, the Company is no longer subject to examinations by tax authorities for years before 2018 in the U.S., Denmark, and the Philippines. The Company's 2017 and subsequent tax years remain open to examination by the German Federal Central Tax Office and the Company's 2016 and subsequent tax years remain open to examination by the Greek Independent Authority for Public Revenue. Carryforward attributes that were generated prior to tax years mentioned may still be adjusted upon examination by certain jurisdiction tax authorities if they either have been, or will be, utilized in a future period.

The Company's foreign subsidiaries have incurred losses since inception and the Company has no undistributed earnings as of December 31, 2022.

22. Segment Reporting and Information about Geographical Areas

Reportable Segments

The Company develops and manufactures high-temperature proton exchange membranes ("HT-PEM" or "HT-PEMs") and fuel cell systems for the off-grid and portable power markets and plans to expand into the mobility market. The Company's current revenue is derived from the sale of fuel cell systems and from the sale of MEAs, membranes, and electrodes for specific applications in the fuel cell and energy storage (flow battery) markets. The research and development activities are viewed as another product line that contributes to the development, design, production and sale of fuel cell products; however, it is not considered a separate operating segment. The Company has identified one business segment.

Geographic Information

The following table presents revenues, by geographic location (based on the location of the entity selling the product) for the years ended December 31, 2022 and 2021:

	Years Ended December 31,	
(Amounts in thousands)	2022	2021
North America	$ 4,509	$ 4,165
Europe	2,589	2,291
Asia	739	613
Total net sales	**$ 7,837**	**$ 7,069**

23. Commitments and contingencies:

Litigation

The Company is subject to legal and regulatory actions that arise from time to time in the ordinary course of business. The assessment as to whether a loss is probable or reasonably possible, and as to whether such loss or a range of such loss is estimable, often involves significant judgment about future events.

There is no material pending or threatened litigation against the Company that remains outstanding as of December 31, 2022.

Guarantee letters

The Company had contingent liabilities in relation to performance guarantee letters and other guarantees provided to third parties that arise from its normal business activity and from which no substantial charges are expected to arise. As of December 31, 2021, issued letters of guarantee amount to $2.7 million. As of December 31, 2022, the Company did not hold any letters of guarantee.

Contractual obligations

In December 2021, the Company entered into a supply agreement by and among the Company, in its capacity as Customer, and BASF New Business GmbH, in its capacity as Seller. The supply agreement provides for the purchase by the Company of 21,000m2 (Minimum Quantity) of membrane from BASF during the contract duration from January 1, 2022 until December 31, 2025.

In May 2022, the Company entered into a supply agreement by and among the Company, in its capacity as Customer, and De Nora Deutschland GmbH (“De Nora”), in its capacity as Seller. The supply agreement provides for the purchase by the Company of 3,236 (Minimum Quantity) of electrodes from De Nora during the contract duration from May 3, 2022 until June 24, 2023.

In June 2022, the Company entered into a supply agreement by and among the Company, in its capacity as Customer, and Shin-Etsu Polymer Singapore Pte, Ltd (“Shin-Etsu”), in its capacity as Seller. The supply agreement provides for the purchase by the Company of 318,400 pieces (Minimum Quantity) of bipolar plates from Shin-Etsu during the contract duration from June 1, 2022 until June 30, 2024.

The following table summarizes our contractual obligations as of December 31, 2022:

Fiscal Year Ended December 31,	Quantity (electrodes)	Quantity (pieces)	Quantity (m2)	Price (Amounts in thousands)
2023	1,202	188,800	4,000	$ 4,246
2024	-	108,000	6,000	2,604
2025	-	-	8,000	2,133
Total	**1,202**	**296,800**	**18,000**	**$ 8,983**

24. Net income / (loss) per share

Net income (loss) per share is computed by dividing net income by the weighted-average number of shares of common stock outstanding during the year.

The following table sets forth the computation of the basic and diluted net income / (loss) per share for the years ended December 31, 2022 and 2021:

(Amounts in thousands, except share and per share amounts)	Years Ended December 31, 2022	Years Ended December 31, 2021
Numerator:		
Net loss	$ (74,337)	$ (20,523)
Denominator:		
Basic weighted average number of shares	51,528,703	45,814,868
Diluted weighted average number of shares	51,528,703	45,814,868
Net loss per share:		
Basic	$ (1.44)	(0.45)
Diluted	$ (1.44)	(0.45)

Basic net income / (loss) per share is computed by dividing net income / (loss) for the periods presented by the weighted-average number of common shares outstanding during these periods.

Diluted net income /(loss) per share is computed by dividing the net income / (loss), by the weighted average number of common shares outstanding for the periods, adjusted for the dilutive effect of shares of common stock equivalents resulting from the assumed exercise of the Public Warrants, Private Placements Warrants, Working Capital Warrants, Stock Options and Restricted Stock Units. The treasury stock method was used to calculate the potential dilutive effect of these common stock equivalents.

As the Company incurred losses for the years ended December 31, 2022 and 2021, the effect of including any potential common shares in the denominator of diluted per-share computations would have been anti-dilutive; therefore, basic and diluted losses per share are the same.

25. Subsequent Events

On January 9, 2023, the Company entered into a sublease agreement by and among the Company, in its capacity as sublandlord, BP Hancock LLC, a Delaware limited liability company, in its capacity as landlord, and Hughes Boston, Inc. (“Hughes”), in its capacity as subtenant. The sublease provides for the rental by Hughes of office space at 200 Clarendon Street, Boston, MA02116. Under the terms of the sublease, Hughes subleases 6,041 square feet at an initial fixed annual rent of $0.6 million and will increase 3.0% on each anniversary of the sublease commencement date. The term of the sublease is through March 2026 (unless terminated as provided in the sublease) and the sublease commencement date was February 1, 2023.

On March 6, 2023, the Company filed a petition (the “Petition”) in the Delaware Court of Chancery (the “Court of Chancery”) under Section 205 of the Delaware General Corporation Law (the “DGCL”) seeking validation of the Company’s Second Amended and Restated Certificate of Incorporation (the “Current Certificate of Incorporation”), which increased the number of shares of Common Stock authorized for issuance from 100 million to 110 million and re-designated the Class A Common Stock as Common Stock. The matter is captioned In Re Advent Technologies Holdings, Inc. (C.A. No. 2023-0280-LWW (Del. Ch.). The Petition was filed to resolve potential uncertainty with respect to those matters arising from a recent Court of Chancery ruling in the case of Garfield v. Boxed, Inc., No. 2022-0132-MTZ, 2022 WL 17959766 (Del. Ch. Dec. 27, 2022). The Court of Chancery set a hearing date for March 29, 2023.

On March 29, 2023, the hearing took place and the Court of Chancery approved the Company’s request for relief. The Court of Chancery then entered an order under Section 205 of the DGCL on March 29, 2023 (1) declaring the Company’s Current Certificate of Incorporation, including the filing and effectiveness thereof, as validated and effective retroactive to the date of its filing with the Office of the Secretary of State of the State of Delaware on February 4, 2021, and all amendments effected thereby, and (2) ordering that the Company’s securities (and the issuance of the securities) described in the Petition and any other securities issued in reliance on the validity of the Current Certificate of Incorporation are validated and declared effective, each as of the original issuance dates.

26. Supplemental Quarterly Information (Unaudited)

The following tables reflect the Company’s unaudited condensed consolidated statements of operations for each of the quarterly periods in 2022 and 2021:

(Amounts in USD thousands, except share and per share amounts)	Three Months Ended, December 31, 2022	September 30, 2022	June 30, 2022	March 31, 2022
Revenue, net	$ 1,957	$ 2,399	$ 2,225	$ 1,256
Cost of revenues	(2,455)	(2,339)	(2,270)	(1,517)
Gross profit / (loss)	**(498)**	**60**	**(45)**	**(261)**
Income from grants	449	294	209	508
Research and development expenses	(2,458)	(2,547)	(2,642)	(2,149)
Administrative and selling expenses	(9,258)	(8,203)	(7,956)	(10,498)
Amortization of intangible assets	(651)	(696)	(718)	(699)
Credit loss – customer contracts	(1,116)	-	-	-
Gain from purchase price adjustment	2,370	-	-	-
Impairment loss – intangible assets and goodwill	(38,922)	-	-	-
Operating loss	**(50,084)**	**(11,092)**	**(11,152)**	**(13,099)**
Fair value change of warrant liability	2,127	(911)	(217)	8,376
Finance income / (expenses), net	61	-	1	(10)
Foreign exchange gains / (losses), net	(40)	(33)	(1)	(17)
Other income / (expenses), net	4	1	(218)	(3)
Loss before income taxes	**(47,932)**	**(12,035)**	**(11,587)**	**(4,753)**
Income taxes	307	567	439	657
Net loss	**$ (47,625)**	**$ (11,468)**	**$ (11,148)**	**$ (4,096)**
Net loss per share				
Basic loss per share	**$ (0.92)**	**$ (0.22)**	**$ (0.22)**	**$ (0.08)**
Basic weighted average number of shares	**51,717,720**	**51,660,133**	**51,476,822**	**51,253,591**
Diluted loss per share	**$ (0.92)**	**$ (0.22)**	**$ (0.22)**	**$ (0.08)**
Diluted weighted average number of shares	**51,717,720**	**51,660,133**	**51,476,822**	**51,253,591**

(Amounts in USD thousands, except share and per share amounts)	Three Months Ended, December 31, 2021	September 30, 2021	June 30, 2021	March 31, 2021
Revenue, net	$ 2,903	$ 1,674	$ 1,003	$ 1,489
Cost of revenues	(2,744)	(1,646)	(669)	(347)
Gross profit / (loss)	**159**	**28**	**334**	**1,142**
Income from grants	197	508	86	38
Research and development expenses	(1,980)	(893)	(639)	(29)
Administrative and selling expenses	(14,318)	(13,041)	(6,596)	(7,922)
Amortization of intangibles	(717)	(310)	29	(187)
Operating loss	**(16,659)**	**(13,708)**	**(6,786)**	**(6,958)**
Fair value change of warrant liability	6,909	2,422	3,646	9,766
Finance income / (expenses), net	(24)	(14)	(3)	(10)
Foreign exchange gains / (losses), net	(42)	(15)	(10)	24
Other income / (expenses), net	(62)	(16)	10	84
Loss before income taxes	**(9,878)**	**(11,331)**	**(3,143)**	**2,906**
Income taxes	872	51	-	-
Net loss	**$ (9,006)**	**$ (11,280)**	**$ (3,143)**	**$ 2,906**
Net loss per share				
Basic loss per share	**$ (0.18)**	**$ (0.23)**	**$ (0.07)**	**$ 0.08**
Basic weighted average number of shares	**51,253,591**	**48,325,164**	**46,126,490**	**37,769,554**
Diluted loss per share	**$ (0.18)**	**$ (0.23)**	**$ (0.07)**	**$ 0.07**
Diluted weighted average number of shares	**51,253,591**	**48,325,164**	**46,126,490**	**40,987,346**