

**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 _____

Commission File Number 001-33059

Fuel Tech, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State of Incorporation)

20-5657551
(I.R.S. ID)

Fuel Tech, Inc.
27601 Bella Vista Parkway
Warrenville, IL 60555-1617
(630) 845-4500
www.ftek.com

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	FTEK	NASDAQ

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

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange 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 ☐

[Table of Contents](#)

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See 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 financials 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 ☒

As of June 30, 2022, the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was approximately \$32,215,406 based on the closing sale price as reported on the NASDAQ National Market System.

As of February 28, 2023, there were 30,296,297 shares of common stock outstanding.

Documents incorporated by reference:

Portions of the registrant's definitive Proxy Statement for the 2023 Annual Meeting of Shareholders, which will be filed no later than 120 days after the close of the registrant's fiscal year ended December 31, 2022, are incorporated by reference into Part III of this report.

TABLE OF CONTENTS

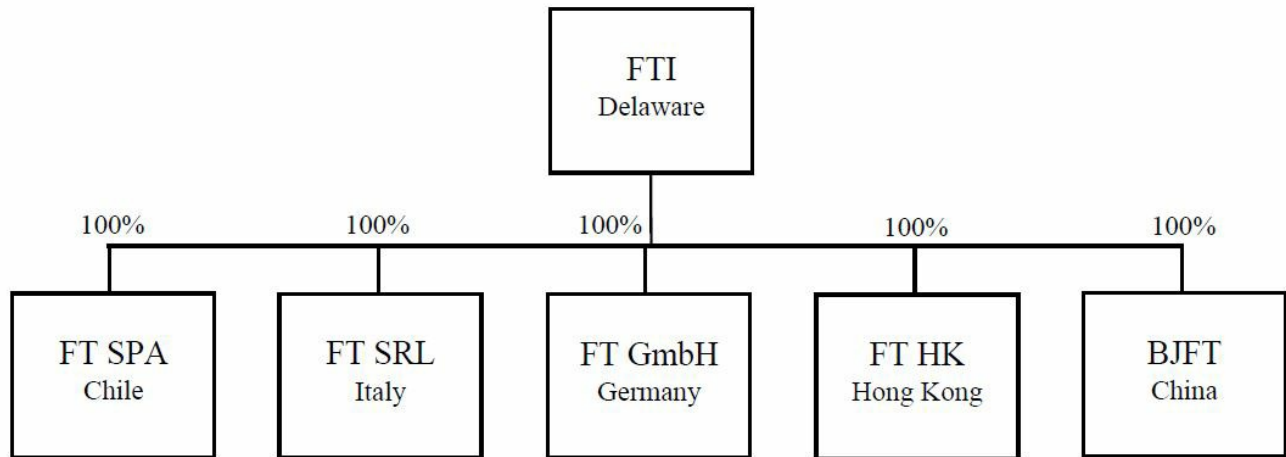
	<u>Page</u>
<u>PART I</u>	
Item 1. Business	3
Item 1A. Risk Factors	7
Item 1B. Unresolved Staff Comments	9
Item 2. Properties	9
Item 3. Legal Proceedings	9
Item 4. Mine Safety Disclosures	9
<u>PART II</u>	
Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchase of Equity Securities	10
Item 6. Reserved	10
Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations	11
Item 7A. Quantitative and Qualitative Disclosures about Market Risk	18
Item 8. Financial Statements and Supplementary Data	19
Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	46
Item 9A. Controls and Procedures	46
Item 9B. Subsequent Events	46
<u>PART III</u>	
Item 10. Directors, Executive Officers and Corporate Governance	47
Item 11. Executive Compensation	47
Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	47
Item 13. Certain Relationships and Related Transactions, and Director Independence	47
Item 14. Principal Accountant Fees and Services	47
<u>PART IV</u>	
Item 15. Exhibits and Financial Statement Schedules	48
Item 16. Form 10-K Summary	49
Signatures and Certifications	50

TABLE OF DEFINED TERMS

<u>Term</u>	<u>Definition</u>
AIG	Ammonia Injection Grid
APC	Air Pollution Control Technology
ASCR®	A trademark used to describe our Advanced Selective Catalytic Reduction process
BACT	Best Available Control Technology
BREF	Best Available Reference Technology. European emission requirements
CFD	Computational Fluid Dynamics
CKM	Chemical Kinetics Modeling
DGI™	Dissolved Gas Infusion
EPA	The United States Environmental Protection Agency
ESP	Electrostatic Precipitator
FGC	Flue Gas Conditioning
FUEL CHEM®	A trademark used to describe our fuel and flue gas treatment processes, including its TIFI® Targeted In-Furnace Injection™ technology to control slagging, fouling, corrosion and a variety of sulfur trioxide-related issues
GSG™	Graduated Straightening Grid
HERT™ High Energy Reagent Technology™	A trademark used to describe one of our SNCR processes for the reduction of NOx
I-NOx®	Systems can include LNB, OFA, and SNCR components, along with SCR technology, AIG, and GSG™ system
NOx	Oxides of nitrogen
NOxOUT®	A trademark used to describe one of our SNCR processes for the reduction of NOx
OFA	Over Fire Air Systems
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
TIFI® Targeted In-Furnace Injection™	A trademark used to describe our proprietary technology that enables the precise injection of a chemical reagent into a boiler or furnace as part of a FUEL CHEM program
UDI™	Urea Direct Injection as the process to provide urea reagent directly into a duct for SCR applications
(U)LNB	Ultra-Low NOx Burner
ULTRA®	A trademark used to describe our process for generating ammonia for use as a Selective Catalytic Reduction reagent

Fuel Tech, Inc. and Subsidiaries

December 31, 2022



FTI	- Fuel Tech, Inc.
FT SPA	- Fuel Tech SpA
FT SRL	- Fuel Tech Srl
FT GmbH	- Fuel Tech GmbH
FT HK	- Fuel Tech (HK) Holding Limited
BJFT	- Beijing Fuel Tech Environmental Technologies Co. Ltd.

PART I

Forward-Looking Statements

This Annual Report on Form 10-K contains “forward-looking statements,” as defined in Section 21E of the Securities Exchange Act of 1934, as amended, that are made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and reflect our current expectations regarding our future growth, results of operations, cash flows, performance and business prospects, and opportunities, as well as assumptions made by, and information currently available to, our management. We have tried to identify forward-looking statements by using words such as “anticipate,” “believe,” “plan,” “expect,” “intend,” “will,” and similar expressions, but these words are not the exclusive means of identifying forward-looking statements.

For us, particular uncertainties that could cause our actual results to be materially different than those expressed in our forward-looking statements include:

- our success in winning new contract awards;
- global economic and geopolitical conditions and related impacts, including spending and demand for our products and global supply chain disruptions and price inflation, will continue to adversely impact our business operations, financial performance, results of operations, financial position, the prices of our securities and the achievement of our strategic objectives;
- changes in macroeconomic and market conditions and market volatility, including inflation, interest rates, and the impact of such changes and volatility on our customer’s financial position and businesses;
- the amount and timing of our cash flows and earnings, which may be impacted by customer, supplier, competitive, contractual and other dynamics and conditions;
- market developments or customer actions that may affect demand and the financial performance of major industries and customers we serve, such as secular, cyclical and competitive pressures in the electric power industry; pricing, the timing of customer investment and other factors in energy markets; and other shifts in the competitive landscape for our products and services;
- operational execution by our businesses, including our success in improving operational performance;
- changes in law, regulation or policy that may affect our businesses;
- our decisions about investments in research and development, and new products, services and platforms, and our ability to launch new products in a cost-effective manner;
- our ability to increase margins through implementation of operational changes, restructuring and other cost reduction measures;
- the impact of actual or potential failures of our products or third-party products with which our products are integrated, and related reputational effects;
- the impact of potential information technology, cybersecurity or data security breaches at our company or third parties; and
- the other factors that are described in “Risk Factors” in this form 10-K report.

These or other uncertainties may cause our actual future results to be materially different than those expressed in our forward-looking statements. We do not undertake to update our forward-looking statements. This document includes certain forward-looking projected financial information that is based on current estimates and forecasts. Actual results could differ materially.

ITEM 1 - BUSINESS

As used in this Annual Report on Form 10-K, the terms “we,” “us,” or “our,” refer to Fuel Tech, Inc. and our wholly owned subsidiaries.

GENERAL

We are a leading technology company engaged in the worldwide development, commercialization and application of state-of-the-art proprietary technologies for air pollution control, process optimization, water treatment and advanced engineering services. These technologies enable our customers to operate efficiently in a cost-effective and environmentally sustainable manner.

- The Company’s nitrogen oxide (NOx) reduction technologies include advanced combustion modification techniques and post-combustion NOx control approaches, including NOxOUT®, HERT™ High Energy Reagent Technology™, and Advanced Selective Non-Catalytic Reduction (SNCR) systems, ASCR® Advanced Selective Catalytic Reduction systems, and I-NOx® Integrated NOx Reduction Systems, which utilize various combinations of these systems, along with the UDI™ Urea Direct Injection system for Selective Catalytic Reduction (SCR) reagent supply, and the ULTRA® process for safe ammonia generation. These technologies have established Fuel Tech as a leader in NOx reduction, with installations on over 1,200 units worldwide.
- Fuel Tech’s Air Pollution Control (APC) technologies include particulate control with Electrostatic Precipitator (ESP) products and services including complete turnkey capability for ESP retrofits, with experience on units up to 700 MW. Flue gas conditioning (FGC) systems include treatment using sulfur trioxide (SO3) and ammonia-based conditioning to improve the performance of ESPs by modifying the properties of fly ash particles. Fuel Tech’s particulate control technologies have been installed on more than 125 units worldwide.
- Our FUEL CHEM technologies revolve around the unique application of chemical injection programs which improve the efficiency, reliability, fuel flexibility, boiler heat rate and environmental status of combustion units by controlling slagging, fouling, corrosion, opacity and acid plume, as well as the formation of sulfur trioxide, ammonium bisulfate, particulate matter, sulfur dioxide, and carbon dioxide. We use our proprietary TIFI® Targeted In-Furnace Injection™ processes to apply specialty chemical programs to units burning a wide variety of fuels including coal, heavy oil, biomass, and municipal waste. These TIFI® programs incorporate design, modeling, equipment, reagent, and service to provide complete customized on-site programs designed to improve plant operations and provide a return on investment in addition to helping meet emission regulatory requirements.
- Water treatment technologies include DGI™ Dissolved Gas Infusion Systems which utilize a patent-pending channel injector and a patent-pending saturator to provide a competitive advantage over conventional water and wastewater treatment aeration. An innovative alternative to current aeration technology among other applications, DGI™ systems can deliver supersaturated oxygen solutions and other gas-water combinations to target process applications or environmental issues. This infusion process has a variety of applications in the water and wastewater segments, including irrigation, treatment of natural waters, supply of oxygen for biological remediation and wastewater odor management. DGI™ technology benefits include improved treatment performance and reduced treatment time, and the potential for reduced energy consumption, along with lower installation and operating costs. The DGI™ technology is currently in the demonstration phase with limited revenues. Third party validation testing of the efficiency of transferring oxygen to a treatment basin has been completed and results have been published.

Many of our products and services rely heavily on our Computational Fluid Dynamics (CFD) and Chemical Kinetics Modeling (CKM) capabilities, which are enhanced by internally developed, high-end visualization software. These capabilities, coupled with our innovative technologies and multi-disciplined team approach, enable us to provide practical solutions to some of our customers’ most challenging issues.

AIR POLLUTION CONTROL (APC)

Regulations and Markets: Domestic

The future growth of our APC technology segment is dependent upon the adoption and enforcement of environmental regulations in the United States (U.S.) and globally. In the U.S., federal and state laws regulating the emission of NOx are the primary driver in our APC technology segment. The principal regulatory drivers currently in effect are as follows:

Clean Air Act (CAA): The CAA requires the U.S. Environmental Protection Agency (EPA) to establish national ambient air quality standards (NAAQS) at levels that are protective of public health with an adequate margin of safety. The six pollutants specified include: Ozone, Particulate Matter, Nitrogen Dioxide, Sulfur Dioxide, Lead, and Carbon Monoxide. The NAAQS provisions require that states comply with ozone and particulate emissions standards. NOx emissions are a precursor to ozone formation and also contribute to fine particulate emissions. Since 1990, EPA rules and programs have been established at the regional and federal level to help states in their mission to define and meet their State Implementation Plans for attainment. The NAAQS ground-level ozone standards that were issued in 1997, were made more stringent in 2008 and again in 2015. The EPA has kept the 2020 NAAQS ozone standard at 70 parts per billion, the same limit as 2015. EPA is evaluating the impact of NOx emissions from upwind sources on downwind states through the Good Neighbor provision of the CAA. The Good Neighbor provision may require upwind sources to provide additional NOx controls to help downwind states meet the 2020 ozone NAAQS requirements over the next several years.

Clean Air Visibility Rule (CAVR): The CAVR, also known as the Regional Haze rule, is part of the Clean Air Act and was finalized in 2005. Under CAVR, certain States are required to submit implementation plans to the EPA to comply with the Regional Haze requirements, and updates are required every five years. A new CAVR was issued in January 2017 which requires states to implement new air pollution controls implementation plans in 2021 and 2022. NOx emissions contribute to ground level ozone which can contribute to localized haze, and many State Implementation Plans are addressing NOx reduction as part of CAVR compliance. The overall obligation of CAVR is to return the U.S. scenic areas to “active” visibility by 2064.

New Unit Permits: New gas fired units for both electricity generation and industrial use will require Best Available Control Technology (BACT) as a permit requirement. SCR technology is very often BACT for NOx, and these permit requirements generate new market opportunities.

Consent Decrees: Consent decree activity through the U.S. Department of Justice or EPA may require emission sources to meet individual requirements. Sources may also agree to specific air pollution requirements with states or environmental groups.

Regulations and Markets: International

We also sell air pollution control systems outside the U.S., specifically in Europe, Latin America, India (under a license agreement) and in the Pacific Rim. The demand for our technologies comes from specific governmental regulations in NOx and particulate matter emission limits which vary by country. We expect that there will be further opportunities to implement our technologies globally in established as well as new geographies in 2023.

The European Union published the Best Available Reference Technology (BREF) emission guidelines in mid 2017 which continue to be implemented gradually starting from large utility boilers and down to industrial units. The 2017 BREF guidelines reduced NOx limit values by up to 25% which required an upgrade of the first-generation NOx abatement systems, and that has presented new opportunities for Fuel Tech, especially on biomass and waste incineration plants. The projects were slow to implement due to the coronavirus (COVID-19) pandemic related restrictions and lock downs, however, the pace of implementation picked up in 2022 and that is expected to continue in 2023. New system opportunities are also being identified and followed in chemical production and petrochemical industries. European engineering companies are supplying power generation and flue gas treatment systems to industrial and utility customers globally. Fuel Tech's NOx control technologies can be integrated into these systems.

In South Africa, the state-owned utility Eskom is slowly refurbishing aging ESPs and adding FGC technology to further improve ESP performance. Fuel Tech is well placed to compete for this business with our local partner Lesedi.

The Indian government adopted a less stringent NOx emission standard for legacy power plants than what was initially agreed to in 2015 as part of the Paris Agreement. As a result, SNCR systems will be limited to waste-to-energy and industrial units for the foreseeable future. The government has prioritized sulfur oxide abatement over NOx abatement for the near term. Particulate matter emission reductions continue to be an area of focus in the country and that presents an ongoing opportunity for Fuel Tech's FGC technology application which utilizes sulfur trioxide and ammonia injection. These technologies will be implemented through a collaboration with our local partner ISGEC.

Elsewhere in Southeast Asia, particulate emissions due to poor performing ESPs are being mitigated. Power generators in several countries like Vietnam, Malaysia and the Philippines are actively looking for corrective options. In Taiwan, there is a push to convert coal fired units to burn biomass. This presents Fuel Tech with opportunities to bring our ASNCR, SCR, Ultra and FGC technologies to these markets.

Products

Our NOx reduction and particulate control technologies are installed worldwide on over 1,200 combustion units, including utility, industrial and municipal solid waste applications. Our products include customized NOx control systems and our patented ULTRA® technology, which converts urea-to-ammonia on site and provides safe reagent for use in SCR systems.

- **SCR Systems and Services:** Our SCR systems control NOx emissions from industrial and utility sources including boilers, incinerators, kilns, reformers and many other types of heat recovery equipment firing coal, natural gas, oil, and a variety of process gases and waste fuels. The SCR systems typically include urea or ammonia storage and delivery subsystems, reagent injection systems in the form of an Ammonia Injection Grid (AIG), catalyst reactor vessel and SCR catalyst. In addition, other related services, including start-ups, maintenance support and general consulting services for SCR systems, AIG design and tuning to help optimize catalyst performance, and catalyst management services to help optimize catalyst life, are now offered to customers around the world. We also specialize in CFD models, which simulate fluid flow by generating a virtual replication of real-world geometry and operating inputs. We design flow corrective devices, such as turning vanes, ash screens, static mixers and our patented GSG™ Graduated Straightening Grid. Our SCR systems utilize urea or ammonia as the SCR catalyst reagent to achieve NOx reductions of up to 85% from industrial combustion sources.
- **ULTRA® Technology:** Our ULTRA® process is designed to convert urea to ammonia safely and economically for use as a reagent in the SCR process for NOx reduction. Recent local objections in the ammonia permitting process have raised concerns regarding the safety of ammonia shipment and storage in quantities sufficient to supply SCR. In addition, the Department of Homeland Security has characterized anhydrous ammonia as a Toxic Inhalation Hazard commodity. The safe conversion of urea to ammonia just prior to injection into the flue gas duct is particularly important near densely populated cities, major waterways, harbors or islands, or where the storage or transport of anhydrous or aqueous ammonia is a safety concern. UDI™ Urea Direct Injection systems utilize direct injection of urea reagent without the need for an ammonia injection grid.
- **SNCR Systems:** Our NOxOUT® and HERT™ SNCR processes use urea or ammonia reagent injected into a variety of combustion furnaces to reduce NOx by up to 25% - 50% for utilities and by potentially significantly greater amounts for industrial units. Capital costs ranging from \$5 - \$20/kW for utility boilers and with total annualized operating costs range from \$1,000 - \$2,000/ton of NOx removed. Advanced SNCR systems are also available to improve performance and minimize reagent costs through in-furnace monitoring and an advanced control system.
- **I-NOx® Systems:** Our I-NOx® systems can include burner modifications and SNCR components combined with SCR technology. Together, these systems provide up to 90% NOx reduction at significantly lower capital and operating costs than conventional SCR systems while providing greater operational flexibility to plant operators. The capital costs for I-NOx® systems can range from \$30 - \$150/kW depending on boiler size and configuration, which is significantly less than that of conventional SCRs, which can cost \$300/kW or more, while operating costs are competitive with those experienced by conventional SCR systems.
- **ESP Processes and Services:** ESP technologies for particulate control include ESP products and services including ESP Inspection Services, Performance Modeling, and Performance and Efficiency Upgrades, along with complete turnkey capability for ESP retrofits. FGC systems include treatment using sulfur trioxide (SO3) and ammonia-based systems to improve the performance of ESPs by modifying the properties of fly ash particles. Our ULTRA® technology can provide the ammonia system feed requirements for FGC applications as a safe alternative to ammonia reagent-based systems. FGC systems offer a lower capital cost approach to improving ash particulate capture versus the alternative of installing larger ESPs or utilizing fabric filter technology to meet targeted emissions and opacity limits. Fuel Tech's particulate control technologies have been installed on more than 125 units worldwide.

A market factor for the APC product line is the continued use of coal and the growth of biomass for global electricity production. The growth of natural gas in the U.S. for industrial applications has increased the need for SCR technology since it often meets the definition of BACT and is required on new industrial units.

Sales of APC products were \$10.6 million and \$6.9 million for the years ended December 31, 2022 and 2021, respectively.

APC Competition

Competition with our NOx reduction suite of products may be expected from companies supplying SCR Systems, SNCR systems, ESP retrofits and FGC technologies. In addition, we experience competition in the urea-to-ammonia conversion market.

The SCR process is an effective and proven method of control for removal of NOx up to 90%. SCR systems have a high capital cost of \$300+/kW on retrofit coal applications. Companies including GE, Babcock Power, Babcock & Wilcox (B&W) Company, CECO Environmental and Mitsubishi are active SCR system and reagent feed system providers.

The use of both urea and ammonia as the reagent for the SNCR process can reduce NOx by 30% - 70%, depending on a number of factors. Ammonia can be effective on incinerators and on Circulating Fluidized Bed combustion units, but has limited applicability for most utility boilers, where urea is dominant. The ammonia-based systems utilize either anhydrous or aqueous ammonia, both of which are hazardous substances. Competitors for ammonia based SNCR include CECO Environmental, B&W, and Yara, with CECO Environmental and B&W for urea based SNCR systems.

ESP retrofit competitors include B&W and Southern Environmental. FGC competition includes Wahlco, Inc. and Chemithon, Inc.

Lastly, with respect to urea-to-ammonia conversion technologies, our controlled urea decomposition system competes with Hamon and Wahlco, which manufacture a system that hydrolyzes urea under high temperature and pressure.

APC Backlog

Consolidated APC segment backlog at December 31, 2022 was \$8.2 million versus backlog at December 31, 2021 of \$9.1 million. The Company expects to recognize revenue on approximately \$7.9 million of the backlog over the next 12 months with the remaining recognized thereafter.

FUEL CHEM

Product and Markets

The FUEL CHEM® technology segment revolves around the unique application of specialty chemicals to improve the efficiency, reliability and environmental status of plants operating in the electric utility, industrial, pulp and paper, waste-to-energy, university and district heating markets. FUEL CHEM programs are currently in place on combustion units in North America, Mexico and Europe, treating a wide variety of solid and liquid fuels, including coal, heavy oil, black liquor, biomass and municipal waste.

Central to the FUEL CHEM approach is the introduction of chemical reagents, such as magnesium hydroxide, to combustion units via in-body fuel application (pre-combustion) or via direct injection (post-combustion) utilizing our proprietary TIFI® technology. By attacking performance-hindering problems, such as slagging, fouling and corrosion, as well as the formation of sulfur trioxide (SO3), and ammonium bisulfate, our programs offer numerous operational, financial and environmental benefits to owners of boilers, furnaces and other combustion units.

A key market factor for this product line is the continued use of coal for global electricity production. In 2022, coal accounted for approximately 20% of all U.S. electricity generation and roughly 39% of global electricity generation. The global value is up from 37% in 2021, however 2022 was unique relative to higher natural gas pricing and future increases in coal usage are not expected to be the long-term trend. Major coal consumers include the U.S., China and India. Additional market dynamics include a growing, worldwide utilization of biomass for both steam and electrical production, and the continued use of heavy fuel oil for power generation. The principal markets for this product line are electric power plants burning coals with slag-forming constituents such as sodium, iron and high levels of sulfur. Sodium is typically found in the Powder River Basin coals of Wyoming and Montana. Iron is typically found in coals produced in the Illinois Basin region. High sulfur content is typical of Illinois Basin coals and certain Appalachian coals. High sulfur content can give rise to unacceptable levels of SO3 formation especially in plants with SCR systems and flue gas desulfurization units (scrubbers). As coal units strive to compete in electricity supply markets, lower cost, higher slagging fuels can create more operational challenges which TIFI® Programs can help mitigate. The current Mexican government is utilizing more indigenous fuel sources for power generation because the international market for high sulfur fuel oil (what Mexico produces) has been significantly reduced with the adoption of the new International Maritime Organization restrictions. Fuel Tech's TIFI® systems can help with SO3 mitigation at these oil-fired power generation units.

The combination of slagging coals and SO3-related issues, such as "blue plume" formation, air pre-heater fouling and corrosion, SCR fouling and the proclivity to suppress certain mercury removal processes, represents an attractive market potential for Fuel Tech.

Sales of the FUEL CHEM products were \$16.3 million and \$17.4 million, for the years ended December 31, 2022 and 2021, respectively.

Competition

Competition for our FUEL CHEM product line includes chemicals sold by specialty chemical companies, such as Imerys, Environmental Energy Services, Inc., and SUEZ Water Technologies. No technologically comparable substantive competition currently exists for our TIFI® technology, which is designed primarily for slag control and SO3 abatement, but there can be no assurance that such lack of substantive competition will continue.

INTELLECTUAL PROPERTY

The majority of our products are protected by U.S. and non-U.S. patents. We own 63 granted patents worldwide including 25 US patents and 38 non-US patents. We have 7 patent applications pending: including 3 in the U.S. and 4 in non-U.S. jurisdictions. These patents and applications cover some 31 inventions, 14 associated with our NOx reduction business, 12 associated with the FUEL CHEM business, and five associated with water treatment. Our granted patents have expiration dates ranging from March of 2024 to October of 2040.

Management believes that the protection provided by the numerous claims in the above referenced patents or patent applications is substantial and affords us a significant competitive advantage in our business. Accordingly, any significant reduction in the protection afforded by these patents or any significant development in competing technologies could have a material adverse effect on our business.

EMPLOYEES

At December 31, 2022, we had 66 employees, 61 in North America and five in Europe. We enjoy good relations with our employees and are not a party to any labor management agreement.

HUMAN CAPITAL RESOURCES

We manage our Company according to a set of core principles. Included among these are respect for the individual, aspiring to excellence, safety and security, and appropriate reward for outstanding effort. We have put in place an employee compensation plan that recognizes hard work with above average salaries and equity incentive awards. We have returned to face-to-face work in our day-to-day activities, but we have implemented training and provided guidance for our teams to operate safely even in a face-to-face environment. As a technology company, we prize and reward educational achievement. Among our employees are found a large cohort of doctorates as well as other advanced degrees and professional certifications. We expect that these approaches to managing and empowering our human capital will continue to guide our progress in the future.

AVAILABLE INFORMATION

We are a fully integrated company using a suite of advanced technologies to provide boiler optimization, efficiency improvement and air pollution reduction and control solutions to utility and industrial customers worldwide. Originally incorporated in 1987 under the laws of the Netherlands Antilles as Fuel-Tech N.V., we were domesticated in the United States on September 30, 2006, and continue as a Delaware corporation with our corporate headquarters at 27601 Bella Vista Parkway, Warrenville, Illinois, 60555-1617. Fuel Tech maintains an Internet website at www.flek.com. Our Annual Report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to those reports filed or furnished pursuant to Section 13(a) of the Exchange Act are made available through our website as soon as reasonably practical after we electronically file or furnish the reports to the Securities and Exchange Commission. Our website also contains our Corporate Governance Guidelines and Code of Ethics and Business Conduct, as well as the charters of the Audit, Compensation, and Nominating and Corporate Governance committees of the Board of Directors. All of these documents are available in print without charge to stockholders who request them. Information on our website is not incorporated into this report.

ITEM 1A - RISK FACTORS

The following is a discussion of the material risk factors; however, they may not be the only risks that we may face. The risks described below should not be considered a complete list of potential risks that we face, and additional risks and uncertainties not currently known to us or that we currently consider immaterial may also negatively impact our business. If any of these risks develop into actual or expected events, our business, financial condition, results of operations or cash flows could be materially and adversely affected, and, as a result, the trading price of our common stock could decline. You should carefully consider the risk factors described below, together with the other information included in this Annual Report on Form 10-K, before you decide to invest in our securities. Please read the cautionary notice regarding forward-looking statements under the heading "Forward-Looking Statements."

RISKS RELATED TO OUR PRODUCTS AND PRICING

Our Product Portfolio Lacks Diversification

We have two broad technology segments that provide advanced engineering solutions to meet the pollution control, efficiency improvement, and operational optimization needs of coal and natural gas-fired energy-related facilities worldwide. They are as follows:

- The Air Pollution Control technology segment includes technologies to reduce NOx emissions in flue gas generated by the firing of natural gas or coal from boilers, incinerators, furnaces and other stationary combustion sources. These include Over Fire Air (OFA) systems, NOxOUT® and HERT™ SNCR systems, and SCR systems. Our SCR systems can also include AIG, and GSG™ systems to provide high NOx reductions at significantly lower capital and operating costs than conventional SCR systems. ULTRA® technology creates ammonia at a plant site using safe urea for use with any SCR application. ESP technologies make use of electrostatic precipitator products and services to reduce particulate matter. FGC systems are chemical injection systems offered in markets outside the U.S. and Canada to enhance electrostatic precipitator and fabric filter performance in controlling particulate emissions.
- The FUEL CHEM® technology segment which uses chemical processes in combination with advanced CFD and CKM boiler modeling for the control of slagging, fouling, corrosion, opacity and other sulfur trioxide-related issues in coal-fired furnaces and boilers through the addition of chemicals into the furnace using TIFI® Targeted In-Furnace Injection™ technology.

An adverse development in our advanced engineering solutions business as a result of competition, technological change, government regulation, customers converting to use natural gas or other fuels, or any other factor could have a significantly greater impact than if we maintained more diverse operations.

We Face Substantial Competition

Competition in the Air Pollution Control market comes from competitors utilizing their own NOx reduction processes, including SCR systems, SNCR systems, Low NOx Burners, Over-Fire Air systems, ammonia and urea based delivery systems for SNCR and SCR, which do not infringe our patented or proprietary technologies. Indirect competition will also arise from business practices such as the purchase rather than the generation of electricity, fuel switching, closure or de-rating of units, and sale or trade of pollution credits and emission allowances. Utilization by customers of such processes or business practices or combinations thereof may adversely affect our pricing and participation in the NOx control market if customers elect to comply with regulations by methods other than the purchase of our Air Pollution Control products. See Item 1 "Products" and "APC Competition" in the *Air Pollution Control* segment overview.

Competition for our FUEL CHEM markets include chemicals sold by specialty chemical companies, such as Imerys, Environmental Energy Services, Inc., and SUEZ Water Technologies.

Our Dependence Upon Fixed-price Contracts Could Adversely Affect our Operating Results.

The majority of our air pollution control projects are currently performed on a fixed-price basis. Under a fixed-price contract, we agree on the price that we will receive for the entire project, based upon a defined scope, which includes specific assumptions and project criteria. If our estimates of the costs to complete the project are below the actual costs that we incur, our margins will decrease, or we may incur a loss. The revenue, cost and gross profit realized on a fixed-price contract will often vary from the estimated amounts because of unforeseen conditions or changes in job conditions and variations in labor and equipment productivity over the term of the contract. While our fixed-price contracts are typically not individually material to our operating results, if we are unsuccessful in mitigating these risks, we may realize gross profits that are different from those originally estimated and incur reduced profitability or losses on projects. Depending on the size of a project, these variations from estimated contract performance could have a significant effect on our operating results. In general, turnkey contracts to be performed on a fixed-price basis involve an increased risk of significant variations. Generally, our contracts and projects vary in length, depending on the size and complexity of the project, project owner demands and other factors. The foregoing risks are exacerbated for projects with longer-term durations and the inherent difficulties in estimating costs and of the interrelationship of the integrated services to be provided under these contracts whereby unanticipated costs or delays in performing part of the contract can have compounding effects by increasing costs of performing other parts of the contract.

Customers May Cancel or Delay Projects.

Customers may cancel or delay projects for reasons beyond our control. Our orders normally contain cancellation provisions that permit us to recover our costs, and, for most contracts, a portion of our anticipated profit in the event a customer cancels an order. If a customer elects to cancel an order, we may not realize the full amount of revenues included in our backlog. If projects are delayed, the timing of our revenues could be affected and projects may remain in our backlog for extended periods of time. Revenue recognition occurs over long periods of time and is subject to unanticipated delays. If we receive relatively large orders in any given quarter, fluctuations in the levels of our quarterly backlog can result because the backlog in that quarter may reach levels that may not be sustained in subsequent quarters.

Our Operating Results May Be Adversely Affected by Product Pricing

The onset of significant competition for either of the technology segments might require us to lower our product prices in order to remain competitive and have a corresponding adverse impact on our realized gross margins and operating profitability. See the risk factor entitled "We Face Substantial Competition" above.

Our Customer Base Is Highly Concentrated

A small number of customers have historically accounted for a significant portion of our revenues. During 2022, our five largest customers accounted for approximately 61% of our net revenues, with our largest customer accounting for approximately 22% of our net revenues. There can be no assurance that all significant customers will continue to purchase our products in the same quantities that they have in the past. The loss of any one of our significant customers or a material reduction in sales to a significant customer could have a material adverse effect on our sales and results of operations.

RISKS RELATED TO OUR BUSINESS

Our Financial Performance May Vary Significantly From Period to Period.

Our annual revenues and earnings have varied in the past and are likely to vary in the future. Our contracts generally stipulate customer specific delivery terms and may have contract cycles of a year or more, which subjects these contracts to many factors beyond our control. In addition, contracts that are significantly larger in size than our typical contracts tend to intensify their impact on our annual operating results. Furthermore, as a significant portion of our operating costs are fixed, an unanticipated decrease in our revenues, a delay or cancellation of orders in backlog, or a decrease in the demand for our products, may have a significant impact on our annual operating results. Therefore, our annual operating results may be subject to significant variations and our operating performance in one period may not be indicative of our future performance.

Energy Transition

The strategic priorities and financial performance of our businesses are subject to market and other dynamics related to decarbonization, which can pose risks in addition to opportunities for those businesses. Given the nature of our businesses and the industries we serve, we must anticipate and respond to market, technological, regulatory and other changes driven by broader trends related to decarbonization efforts in response to climate change. These changes present both risks and opportunities for our businesses, many of which provide products and services to customers in sectors like power generation that have historically been carbon intensive and will remain important to efforts globally to lower greenhouse gas emissions for decades to come. For example, the significant decreases in recent years in the levelized cost of energy for renewable sources of power generation (such as wind and solar), along with ongoing changes in government, investor, customer and consumer policies, commitments, preferences and considerations related to climate change, in some cases have adversely affected, and are expected to continue to affect, the demand for and the competitiveness of products and services related to carbonaceous fuel-based power generation, including sales of new air pollution control equipment and the utilization and servicing needs for existing power plants. Continued shifts toward greater penetration by renewables in both new capacity additions and the proportionate share of power generation, particularly depending on the pace and timeframe for such shifts across different markets globally, could have a material adverse effect on our business and our consolidated results.

Our Manufacturing Operations Are Dependent on Third-party Suppliers.

Although we are not dependent on any one supplier, we are dependent on the ability of our third-party suppliers to supply our raw materials, as well as certain specific component parts. The third-party suppliers upon which we depend may default on their obligations to us due to bankruptcy, insolvency, lack of liquidity, adverse economic conditions, operational failure, fraud, loss of key personnel, or other reasons. We cannot assure that our third-party suppliers will dedicate sufficient resources to meet our scheduled delivery requirements or that our suppliers will have sufficient resources to satisfy our requirements during any period of sustained demand. Failure of suppliers to supply, or delays in supplying, our raw materials or certain components, or allocations in the supply of certain high demand raw components, for any reason, including, without limitation, disruptions in our suppliers' business activities due to cybersecurity incidents, terrorist activity, public health crises (such as coronavirus), fires or other natural disasters could materially adversely affect our operations and ability to meet our own delivery schedules on a timely and competitive basis. Additionally, our third-party suppliers may provide us with raw materials or component parts that fail to meet our expectations or the expectations of our customers, which could subject us to product liability claims, other claims and litigation.

Our Use of Subcontractors Could Potentially Harm our Profitability and Business Reputation.

Occasionally we act as a prime contractor in some of the engineered projects we undertake. In our capacity as lead provider and when acting as a prime contractor, we perform a portion of the work on our projects with our own resources and typically subcontract activities such as manufacturing and installation work. In our industry, the lead contractor is normally responsible for the performance of the entire contract, including subcontract work. Thus, when acting as a prime contractor, we are subject to risk associated with the failure of one or more subcontractors to perform as anticipated.

We employ subcontractors at various locations around the world to meet our customers' needs in a timely manner, meet local content requirements and reduce costs. Subcontractors perform all of our manufacturing for customers. The use of subcontractors decreases our control over the performance of these functions and could result in project delays, escalated costs and substandard quality. These risks could adversely affect our profitability and business reputation. In addition, many of our competitors, who have greater financial resources and greater bargaining power than we have, use the same subcontractors that we use and could potentially influence our ability to hire these subcontractors. If we were to lose relationships with key subcontractors, our business could be adversely impacted.

Operational Execution

Operational challenges could have a material adverse effect on our business, reputation, financial position, results of operations and cash flows. The Company's financial results depend on the successful execution of our businesses' operating plans across all steps of the engineering and design, manufacture, installation and service lifecycle. We continue working to improve the operations and execution of our businesses and our ability to make the desired improvements will be a significant factor in our overall financial performance. Operational failures in any of our business segments that result in quality problems or potential product, environmental, health or safety risks, could have a material adverse effect on our business, reputation, financial position and results of operations. In addition, for some large-scale projects we may be required by our customer to take on the full scope of engineering, procurement, construction or other services. These types of projects often pose unique risks related to their location, scale, complexity, duration and pricing or payment structure. Performance issues or schedule delays can arise due to inadequate technical expertise, unanticipated project modifications, developments at project sites, environmental, health and safety issues, execution by or coordination with suppliers, subcontractors or consortium partners, financial difficulties of our customers or significant partners or compliance with government regulations, and these can lead to cost overruns, contractual penalties, liquidated damages and other adverse consequences. Operational, quality or other issues at large projects, or across our projects portfolio more broadly, can adversely affect our business, reputation or results of operations.

We Rely on Several Key Employees Whose Absence or Loss Could Disrupt our Operations or Be Adverse to our Business.

We are highly dependent on the experience of our management in the continuing development of our operations. The loss of the services of certain of these individuals would have a material adverse effect on our business. Although we have employment and non-competition agreements with certain of our key employees, as a practical matter, those agreements will not assure the retention of our employees, and we may not be able to enforce all of the provisions in any employment or non-competition agreement. Our future success will depend in part on our ability to attract and retain qualified personnel to manage our development and future growth. We cannot guarantee that we will be successful in attracting and retaining such personnel. Our failure to recruit additional key personnel could have a material adverse effect on our financial condition, results of operations and cash flows.

Cybersecurity

Increased cybersecurity requirements, vulnerabilities, threats and more sophisticated and targeted computer crime pose a risk to our systems, networks, products, solutions, services and data. Increased global cybersecurity vulnerabilities, threats, computer viruses and more sophisticated and targeted cyber-related attacks such as ransomware, as well as cybersecurity failures resulting from human error and technological errors, pose a risk to the security of Fuel Tech and its customers', partners', suppliers' and third-party service providers' infrastructure, products, systems and networks and the confidentiality, availability and integrity of Fuel Tech's and its customers' data. As the perpetrators of such attacks become more capable, and as critical infrastructure is increasingly becoming digitized, the risks in this area continue to grow. There can be no assurance that our efforts to mitigate cybersecurity risks by employing a number of measures, including employee training, monitoring and testing, vulnerability testing and maintenance of protective systems and contingency plans, will be sufficient to prevent, detect and limit the impact of cyber-related attacks, and we remain vulnerable to known or unknown threats. A significant cyber-related attack could result in other negative consequences, including damage to our reputation or competitiveness, remediation, increased digital infrastructure or other costs that are not covered by insurance, litigation or regulatory action.

We May Not Be Able to Successfully Protect our Patents and Proprietary Rights

We hold licenses to or own a number of patents for our products and processes. In addition, we also have numerous patent applications pending both in the U.S. and abroad. There can be no assurance that any of our pending patent applications will be granted or that our outstanding patents will not be challenged, overturned or otherwise circumvented by competitors. In foreign markets, the absence of harmonized patent laws makes it more difficult to ensure consistent respect for our patent rights in emerging markets. In addition, certain critical technical information relating to our products which is not patented is held as trade secret, and protected by trade secret laws and restrictions on disclosure contained in our confidentiality and licensing agreements. There can be no assurance that such protections will prove adequate or that we will have adequate remedies against contractual counterparties for disclosure of our trade secrets or other violations of our intellectual property rights. See Item 1 above under the caption "Intellectual Property."

Our Results May Be Affected By Foreign Operations

We currently have foreign operations predominantly in Europe with our offices located in Gallarate, Italy. The future business opportunities in this market are dependent on the continued implementation and enforcement of regulatory policies that will benefit our technologies, the acceptance of our engineering solutions in such markets, the ability of potential customers to utilize our technologies on a competitive, cost-effective basis, and our ability to protect and enforce our intellectual property rights.

We May Not Be Able to Purchase Raw Materials on Commercially Advantageous Terms

Our FUEL CHEM technology segment is dependent, in part, upon a supply of magnesium hydroxide. Any adverse changes in the availability of this chemical will likely have an adverse impact on ongoing operation of our FUEL CHEM programs. On March 4, 2009, we entered into a Restated Product Supply Agreement (PSA) with Martin Marietta Magnesia Specialties, LLC (MMMS) in order to assure the continuance of a stable supply from MMMS of magnesium hydroxide products for our requirements in the U.S. and Canada. The term of the PSA expires on December 31, 2023. Pursuant to the PSA, MMMS supplies us with magnesium hydroxide products manufactured pursuant to our specifications and we have agreed to purchase from MMMS, and MMMS has agreed to supply, 100% of our requirements for such magnesium hydroxide products for our customers who purchase such products for delivery in the U.S. and Canada. There can be no assurance that we will be able to obtain a stable source of magnesium hydroxide in markets outside the U.S.

RISKS RELATED TO OUR INDUSTRY

Demand for Our APC and FUEL CHEM Products is Affected by External Market Factors

Reduced coal and natural gas-fired electricity demand across the U.S. has led to production declines. Contributing factors to this decline in coal-fired generation were: 1) lower natural gas prices which allowed utility operators to increase the amount of power generated from natural gas plants, 2) increased cost of environmental compliance with current environmental regulations, 3) constrained funding for capital projects, and 4) the increased production of electricity from renewable sources, such as wind and solar.

Our Business Is Dependent on Continuing Air Pollution Control Regulations and Enforcement

Our business is significantly impacted by and dependent upon the regulatory environment surrounding the electricity generation market. Our business will be adversely impacted to the extent that regulations are repealed or amended to significantly reduce the level of required NOx or particulate matter reduction, or to the extent that regulatory authorities delay or otherwise minimize enforcement of existing laws. Additionally, long-term changes in environmental regulation that threaten or preclude the use of coal or other fossil fuels as a primary fuel source for electricity production which result in the reduction or closure of a significant number of fossil fuel-fired power plants may adversely affect our business, financial condition and results of operations. See Item 1 above under the caption “*Regulations and Markets*” in the *Air Pollution Control* segment overview.

GENERAL RISK FACTORS

There Is Still Significant Uncertainty Related to the COVID-19 Pandemic; Future Pandemics Could Pose Similar Challenges

The continued prevalence of the COVID-19 pandemic around the world presents significant risks to the Company, not all of which the Company is able to fully evaluate or even foresee at the current time. The COVID-19 pandemic has affected the Company's operations in the years ended December 31, 2022 and 2021, although the impact of the pandemic is difficult to quantify, and may continue to do so indefinitely hereafter. The Company has experienced, and may continue to experience, delays in supply of critical equipment, reductions in demand for certain of our products as several accounts remained offline due to soft electricity demand and unplanned outage activities and due to the delay or abandonment of ongoing or anticipated projects due to the customers', suppliers' and other third parties' financial distress or concern regarding the volatility of global markets.

Management cannot predict the full impact of the COVID-19 pandemic on the Company's sales and marketing channels and supply chain, and, as a result, the ultimate extent of the effects of the COVID-19 pandemic on the Company is highly uncertain and will depend on future developments. Such effects could exist for an extended period of time even after the pandemic ends and any future such pandemic could have similar or greater challenges.

Geopolitical and Unexpected Events May Impact New or Existing Projects and Prices and Availability of Raw Materials, Energy and Other Materials.

These events may also impact energy and regulatory policy nationally or regionally for the impacted regions. Such disruptions could have a material adverse effect on our business and financial results.

ITEM 1B - UNRESOLVED STAFF COMMENTS

None

ITEM 2 - PROPERTIES

We own an office building in Warrenville, Illinois, which has served as our corporate headquarters since June 23, 2008. This facility, with approximately 40,000 square feet of office space, is sufficient to meet our requirements for the foreseeable future.

We also operate from leased office facilities and we do not segregate any of these leased facilities by operating business segment. The terms of the Company's primary lease arrangements as of December 31, 2022 are as follows:

- The Gallarate, Italy building lease, for approximately 1,335 square feet, runs through April 30, 2025. This facility serves as the operating headquarters for our European operations.
- The Aurora, IL warehouse lease, for approximately 11,000 square feet, runs through December 31, 2023. This facility serves as an outside warehouse facility.
- The Overland Park, KS lease, for approximately 600 square feet, runs through October 15, 2024. This facility serves primarily as a sales office.

ITEM 3 - LEGAL PROCEEDINGS

From time to time we are involved in litigation with respect to matters arising from the ordinary conduct of our business. In the opinion of management, based upon presently available information, either adequate provision for anticipated costs have been accrued or the ultimate anticipated costs will not materially affect our consolidated financial position, results of operations, or cash flows.

See Note 9 "Commitments and Contingencies" in the Notes to the Consolidated Financial Statements in this Annual Report on Form 10-K.

ITEM 4 - MINE SAFETY DISCLOSURES

Not Applicable

PART II

ITEM 5 - MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASE OF EQUITY SECURITIES

Market

Our common stock has been traded since September 1993 on The NASDAQ Stock Market, Inc, where it trades under the symbol FTEK.

Holders

As of February 28, 2023, there were 62 holders of record of our common stock, which does not include the number of beneficial owners whose common stock was held in street name or through fiduciaries.

Dividends

We have never paid cash dividends on the common stock and have no current plan to do so in the foreseeable future. The declaration and payment of dividends on the common stock is subject to the discretion of our Board of Directors. The decision of the Board of Directors to pay future dividends will depend on general business conditions, the effect of a dividend payment on our financial condition, and other factors the Board of Directors may consider relevant. The current policy of the Board of Directors is to reinvest earnings in operations to promote future growth.

ITEM 6 - RESERVED

ITEM 7 - MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS *(amounts in thousands of dollars)***Overview**

In 2022, the Company continued to experience a challenging operational environment resulting from the ongoing substitution of gas-fired and renewable energy plants for coal-fired installations and the ongoing impacts of geopolitical events and the coronavirus (COVID-19) global pandemic. We continue to invest in the development of new technologies to expand our product offerings into the water and waste-water treatment market. The Board approved a plan to invest excess capital to provide returns on excess cash while preserving capital and managing liquidity. In June 2022, \$10 million was transferred to the investment account and an additional \$10 million was transferred in December 2022. Our capital resources are sufficient for our immediate and longer-term needs and we continue to enjoy the services and support of a dedicated workforce. We expect that our cost control efforts will maintain our existing levels of operating expenditures and the diminishing effects of the pandemic should lead to an improved market outlook.

COVID-19 Pandemic and Geopolitical Events

The effects of COVID-19 have presented significant risks to the Company. The COVID-19 pandemic has affected the Company's operations during the twelve months ended December 31, 2022 and 2021. Although the impact of the pandemic is difficult to quantify, the Company has experienced, and may continue to experience, supply chain issues, travel restrictions, and reductions in demand for certain of our products due to the delay or abandonment of ongoing or anticipated projects due to our customers', suppliers' and other third parties' financial distress or concern regarding the volatility of global markets. Geopolitical events and global economic sanctions resulting from the ongoing conflict between Russia and Ukraine may impact new or existing projects and the prices and availability of raw materials, energy and other materials. These events may also impact energy and regulatory policy nationally or regionally for the impacted regions. In addition, we have experienced and are experiencing varying levels of inflation resulting in part from increased shipping and transportation costs, raw material costs, and labor costs. Management cannot predict the full impact of the COVID-19 pandemic and geopolitical events on the Company's sales and marketing channels and supply chain, and as a result, the ultimate extent of the effects on the Company are highly uncertain and will depend on future developments. Such effects could exist for an extended period of time. The Company continues to monitor the potential impacts on the business.

Key Operating Factors

Our FUEL CHEM® segment performed well in 2022, but experienced a decline in revenues and segment operating profits compared to 2021. FUEL CHEM faced some headwinds due to the loss of one customer from permanent plant retirement and the reduction in demand from other customers due to unfavorable climate conditions and to operating and maintenance scheduling.

Our APC business experienced improvement in 2022, compared to 2021, due to the execution of projects awarded in the second half of 2021 and in 2022. We are also encouraged by the pace and depth of our business development activities, which reflects an increased focus on global emissions protocols across a variety of fuel sources. Our Consolidated APC backlog at year end was \$8,245 and our global sales pipeline has increased to \$50 -75 million range.

Background

We have two broad technology segments that provide advanced engineered solutions to meet the pollution control, efficiency improvement and operational optimization needs of energy-related facilities worldwide. They are as follows:

Air Pollution Control Technologies

The Air Pollution Control technology segment includes technologies to reduce NOx emissions in flue gas generated by the firing of natural gas or coal from boilers, incinerators, furnaces and other stationary combustion sources. These include SCR systems, NOxOUT and HERT™ SNCR systems, and OFA systems. Our SCR systems can also include AIG, and GSG™ systems to provide high NOx reductions at significantly lower capital and operating costs than conventional SCR systems. ULTRA® technology creates ammonia at a plant site using safe urea for use with any SCR application. ESP technologies make use of electrostatic precipitator products and services to reduce particulate matter. FGC systems are chemical injection systems offered in markets outside the U.S. and Canada to enhance electrostatic precipitator and fabric filter performance in controlling particulate emissions. We distribute our products through our direct sales force and third-party sales agents.

FUEL CHEM Technologies

The FUEL CHEM technology segment, which uses chemical processes in combination with advanced CFD and CKM boiler modeling, for the control of slagging, fouling, corrosion, opacity and other sulfur trioxide-related issues in coal-fired furnaces and boilers through the addition of chemicals into the furnace using TIFI® Targeted In-Furnace Injection™ technology. Fuel Tech sells its FUEL CHEM program through its direct sales force and agents to industrial and utility power-generation facilities. FUEL CHEM programs have been installed on combustion units in North America, Europe, China, and India, treating a wide variety of solid and liquid fuels, including coal, heavy oil, biomass and municipal waste. The FUEL CHEM program improves the efficiency, reliability and environmental status of plants operating in the electric utility, industrial, pulp and paper, waste-to-energy, university and district heating markets and offers numerous operational, financial and environmental benefits to owners of boilers, furnaces and other combustion units.

The key market dynamic for both technology segments is the continued use of fossil fuels, especially coal, as the principal fuel source for global electricity production. In 2022, coal accounted for approximately 20% of all U.S. electricity generation and roughly 39% of global electricity generation. The global value is up from 37% in 2021, however 2022 was unique relative to higher natural gas pricing and future increases in coal usage are not expected to be the long-term trend. Major coal consumers include China, the U.S. and India.

Critical Accounting Policies and Estimates

The consolidated financial statements are prepared in accordance with accounting principles generally accepted in the U.S. (GAAP), which require us to make estimates and assumptions. We believe that, our accounting policies (see Note 1 to the consolidated financial statements), involve a higher degree of judgment, estimates and assumptions and are deemed critical. We routinely discuss our critical accounting policies with the Audit Committee of the Board of Directors.

Revenue Recognition

The Company recognizes revenue when control of the promised goods or services is transferred to our customers, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. The majority of our contracts have a single performance obligation as the promise to transfer the individual goods or services is not separately identifiable from other promises in the contracts and, therefore, not distinct. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Sales, value add, and other taxes we collect concurrent with revenue-producing activities are excluded from revenue.

FUEL CHEM

Revenues from the sale of chemical products are recognized when control transfers to customer upon shipment or delivery of the product based on the applicable shipping terms. We generally recognize revenue for these arrangements at a point in time based on our evaluation of when the customer obtains control of the promised goods or services.

On occasion, Fuel Tech will engineer and sell its chemical pumping equipment. These projects are similar in nature to the APC projects described below and for those projects where control transfers over time, revenue is recognized based on the extent of progress towards completion of the single performance obligation.

For projects containing multiple performance obligations, the Company allocates the transaction price based on the estimated standalone selling price. The Company must develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in the contract. The Company utilizes key assumptions to determine the stand-alone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs. Variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated are consistent with the amounts the Company would expect to receive for the satisfaction of each performance obligation.

The consideration allocated to each performance obligation is recognized as revenue when control is transferred for the related goods or services. For performance obligations which consist of licenses and other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

The Company receives payments from its customers based on billing schedules established in each contract. Up-front payments and fees are recorded as deferred revenue upon receipt or when due until the Company performs its obligations under these arrangements. Amounts are recorded as accounts receivable when the Company's right to consideration is unconditional.

Air Pollution Control Technology

Fuel Tech's APC contracts are typically six to eighteen months in length. A typical contract will have three or four critical operational measurements that, when achieved, serve as the basis for us to invoice the customer via progress billings. At a minimum, these measurements will include the generation of engineering drawings, the shipment of equipment and the completion of a system performance test.

As part of most of its contractual APC project agreements, Fuel Tech will agree to customer-specific acceptance criteria that relate to the operational performance of the system that is being sold. These criteria are determined based on modeling that is performed by Fuel Tech personnel, which is based on operational inputs that are provided by the customer. The customer will warrant that these operational inputs are accurate as they are specified in the binding contractual agreement. Further, the customer is solely responsible for the accuracy of the operating condition information; typically all performance guarantees and equipment warranties granted by us are voidable if the operating condition information is inaccurate or is not met.

Since control transfers over time, revenue is recognized based on the extent of progress towards completion of the single performance obligation. Fuel Tech uses the cost-to-cost input measure of progress for our contracts since it best depicts the transfer of assets to the customer which occurs as we incur costs on our contracts. Under the cost-to-cost input measure of progress, the extent of progress towards completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. Revenues are recorded proportionally as costs are incurred. Costs to fulfill include all internal and external engineering costs, equipment charges, inbound and outbound freight expenses, internal and site transfer costs, installation charges, purchasing and receiving costs, inspection costs, warehousing costs, project personnel travel expenses and other direct and indirect expenses specifically identified as project- or product-line related, as appropriate (e.g. test equipment depreciation and certain insurance expenses). Unexpected or unknown costs could affect the timing of revenue recognition and the cumulative profitability of the related projects.

Fuel Tech's APC product line also includes ancillary revenue for post contractual goods and services. Revenue associated with these activities are recognized at a point in time when delivery of goods or completion of the service obligation is performed.

Fuel Tech has installed over 1,200 units with APC technology and normally provides performance guarantees to our customers based on the operating conditions for the project. As part of the project implementation process, we perform system start-up and optimization services that effectively serve as a test of actual project performance. We believe that this test, combined with the accuracy of the modeling that is performed, enables revenue to be recognized prior to the receipt of formal customer acceptance.

As of December 31, 2022 and 2021, we had no construction contracts in progress that were identified as a loss contract.

The timing of revenue recognition, billings and cash collections results in billed accounts receivable, unbilled receivables (contract assets), and customer advances and deposits (contract liabilities) on the consolidated balance sheets. In our Air Pollution Control technology segment, amounts are billed as work progresses in accordance with agreed-upon contractual terms. Generally, billing occurs subsequent to revenue recognition, resulting in contract assets. These assets are reported on the consolidated balance sheet on a contract-by-contract basis at the end of each reporting period. At December 31, 2022, 2021, and 2020 contract assets for APC technology projects were approximately \$3,082 and \$1,277, and \$2,079, respectively, and at December 31, 2020, contract assets for the FUEL CHEM technology segment were approximately \$269, and are included in accounts receivable on the consolidated balance sheets. There were no contract assets for the FUEL CHEM technology segment as of December 31, 2022 and 2021.

However, the Company will periodically bill in advance of costs incurred before revenue is recognized, resulting in contract liabilities. These liabilities are reported on the consolidated balance sheet on a contract-by-contract basis at the end of each reporting period. Contract liabilities were \$372, \$390, and \$850 at December 31, 2022, 2021, and 2020, respectively, and are included in other accrued liabilities on the consolidated balance sheets.

Allowance for Doubtful Accounts

The allowance for doubtful accounts is management's best estimate of the amount of credit losses in accounts receivable. The allowance for doubtful accounts balance can be impacted by unforeseen collectability issues. In order to control and monitor the credit risk associated with our customer base, we review the credit worthiness of customers on a recurring basis. Factors influencing the level of scrutiny include the level of business the customer has with us, the customer's payment history and the customer's financial stability. Receivables are considered past due if payment is not received by the date agreed upon with the customer, which is normally 30 days after invoice. Representatives of our management team review all past due accounts on a bi-weekly basis to assess collectability. At the end of each reporting period, the allowance for doubtful accounts balance is reviewed relative to management's collectability assessment and is adjusted if deemed necessary through a corresponding charge or credit to bad debt expense, which is included in selling, general, and administrative expenses in the consolidated statements of operations. Bad debt write-offs are made when management believes it is probable a receivable will not be recovered.

Inventories

Inventories consist primarily of equipment constructed for resale and spare parts and are stated at the lower of cost or net realizable value, using the weighted-average cost method. Usage is recorded in cost of sales in the period that parts were issued to a project or used to service equipment. Inventories are carried at weighted average cost and periodically evaluated to identify obsolete or otherwise impaired parts that are written off when management determines usage is not probable. The Company estimates the balance of excess and obsolete inventory by analyzing inventory by age using last used and original purchase date and the existing sales pipeline for which the inventory could be used.

Assessment of Potential Impairments of Goodwill and Intangible Assets

Goodwill is not amortized, but rather is reviewed annually (in the fourth quarter) or more frequently if indicators arise, for impairment. We do not have any indefinite-lived intangible assets other than goodwill. Such indicators include a decline in expected cash flows, a significant adverse change in legal factors or in the business climate, unanticipated competition, a decrease in our market capitalization to an amount less than the carrying value of our assets, or slower growth rates, among others.

Goodwill is allocated among and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. We have two reporting units: the FUEL CHEM segment and the APC technology segment. Goodwill is only related to the FUEL CHEM segment.

Our evaluation of goodwill impairment involves first assessing qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. We may bypass this qualitative assessment, or determine that based on our qualitative assessment considering the totality of events and circumstances including macroeconomic factors, industry and market considerations, current and projected financial performance, a sustained decrease in our share price, or other factors, that additional impairment analysis is necessary. This additional analysis involves comparing the current fair value of a reporting unit to its carrying value. Fuel Tech uses a discounted cash flow (DCF) model to determine the current fair value of its FUEL CHEM reporting unit as this methodology was deemed to best quantify the present values of our expected future cash flows and yield a fair value that should be in line with the aggregate market value placed on the outstanding common stock as reflected by the current stock price multiplied by the outstanding shares of common stock. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including markets and market share, sales volumes and prices, costs to produce and working capital changes. Events outside our control, specifically market conditions that impact revenue growth assumptions, could significantly impact the fair value calculated. Management considers historical experience and all available information at the time the fair values of its reporting units are estimated. However, actual fair values that could be realized in an actual transaction may differ from those used to evaluate the impairment of goodwill.

The application of our DCF model in estimating the fair value of each reporting segment is based on the 'net asset' approach to business valuation. In using this approach for each reportable segment, we forecast segment revenues and expenses out to perpetuity and then discount the resulting cash flows to their present value using an appropriate discount rate. The forecast considers, among other items, the current and expected business environment, expected changes in the fixed and variable cost structure as the business grows, and a revenue growth rate that we feel is both achievable and sustainable. The discount rate used is composed of a number of identifiable risk factors, including equity risk, company size, and certain company-specific risk factors such as our debt-to-equity ratio, among other factors, that when added together, results in a total return that a prudent investor would demand for an investment in our Company.

In the event the estimated fair value of a reporting unit per the DCF model is less than the carrying value, additional analysis would be required. The additional analysis would compare the carrying amount of the reporting unit's goodwill with the implied fair value of that goodwill. The implied fair value of goodwill is the excess of the fair value of the reporting unit over the fair values assigned to all of the assets and liabilities of that unit as if the reporting unit was acquired in a business combination and the fair value of the reporting unit represented the purchase price.

The Company utilizes Accounting Standards Update (ASU) 2017-04, Intangibles-Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment for the annual goodwill impairment test.

Fuel Tech performed its annual goodwill impairment analysis for its FUEL CHEM reporting unit as of October 1, 2022 and determined that no impairment of goodwill existed within the FUEL CHEM technology segment.

Impairment of Long-Lived Assets and Amortizable Intangible Assets

Long-lived assets, including property and equipment and intangible assets, are reviewed for impairment when events and circumstances indicate that the carrying amount of the assets (or asset group) may not be recoverable. If impairment indicators exist, we perform a more detailed analysis and an impairment loss is recognized when either estimated future undiscounted cash flows expected to result from the use of the asset (or asset group) and its eventual disposition are less than the carrying amount or the determined fair value is less than the carrying amount. This process of analyzing impairment involves examining the operating condition of individual assets (or asset group) and estimating a fair value based upon current condition, relevant market factors and the remaining estimated operational life compared to the asset's remaining depreciable life. Quoted market prices and other valuation techniques are used to determine expected fair value. Due to the existence of impairment indicators, we performed a more detailed analysis of potential long-lived and intangible asset impairment in the APC technology asset group during the fourth quarter of 2022 and determined no impairment exists. There was no impairment recorded during 2022.

A significant portion of our property and equipment is comprised of assets deployed at customer locations relating to our FUEL CHEM technology asset group, and due to the shorter-term duration over which this equipment is depreciated, the likelihood of impairment is mitigated. The discontinuation of a FUEL CHEM program at a customer site would most likely result in the re-deployment of all or most of the affected assets to another customer location rather than an impairment.

Valuation Allowance for Deferred Income Taxes

Deferred tax assets represent deductible temporary differences and net operating loss and tax credit carryforwards. A valuation allowance is recognized if it is more likely than not that some portion of the deferred tax asset will not be realized. At the end of each reporting period, management reviews the realizability of the deferred tax assets. As part of this review, we consider if there are taxable temporary differences that could generate taxable income in the future, if there is the ability to carry back the net operating losses or credits, if there is a projection of future taxable income, and if there are any tax planning strategies that can be readily implemented. As required by ASC 740 "Income Taxes", a valuation allowance must be established when it is more likely than not that all or a portion of a deferred tax asset will not be realized. This assessment resulted in a valuation allowance on our deferred tax assets of \$15,627 and \$14,950 at December 31, 2022 and 2021, respectively.

Stock-Based Compensation

We recognize compensation expense for employee equity awards ratably over the requisite service period of the award, adjusted for estimated forfeitures.

We utilize the Black-Scholes option-pricing model to estimate the fair value of stock option awards. Determining the fair value of stock options using the Black-Scholes model requires judgment, including estimates for (1) risk-free interest rate - an estimate based on the yield of zero-coupon treasury securities with a maturity equal to the expected life of the option; (2) expected volatility - an estimate based on the historical volatility of our common stock for a period equal to the expected life of the option; and (3) expected life of the option - an estimate based on historical experience including the effect of employee terminations.

Recently Issued Accounting Pronouncements

In June 2016, the Financial Accounting Standards Board (FASB) issued ASU 2016-13, Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, which amends the current accounting guidance and requires the measurement of all expected losses based on historical experience, current conditions and reasonable and supportable forecasts. For trade receivables, loans, and other financial instruments, we will be required to use a forward-looking expected loss model rather than the incurred loss model for recognizing credit losses which reflects losses that are probable. The standard will become effective for interim and annual periods beginning on January 1, 2023 for Fuel Tech. Application of the amendments is through a cumulative-effect adjustment to retained earnings as of the effective date. The Company is finalizing the impact of adoption, but we do not believe the adoption of this standard will have a material impact on our financial statements. Beginning on January 1, 2023, Fuel Tech will use the caption Allowance for Credit Losses and our expected credit loss model to calculate the allowance.

2022 versus 2021

Highlights for the year ended December 31, 2022, compared to 2021:

	For the years ended December 31,					
	2022		2021		Change	
Revenues	\$	26,941	\$	24,261	\$	2,680
Costs and expenses:						
Cost of sales		15,298		12,363		2,935
Selling, general and administrative		12,275		12,055		220
Research and development		895		1,332		(437)
Total costs and expenses		28,468		25,750		2,718
Operating loss		(1,527)		(1,489)		(38)
Interest expense		(17)		(19)		2
Interest income		202		6		196
Other (expense) income, net		(46)		1,570		(1,616)
(Loss) income before income taxes		(1,388)		68		(1,456)
Income tax expense		(54)		(14)		(40)
Net (loss) income	\$	(1,442)	\$	54	\$	(1,496)

Revenues

Revenues for the years ended December 31, 2022 and 2021 were \$26,941 and \$24,261, respectively. The year-over-year increase of \$2,680 or 11%, was driven by the increase in revenue in our APC technology segment in our U.S. and Italy operations, partially offset by a decrease in our FUEL CHEM technology segment. Our U.S. revenues increased by \$796, or 4%, from \$19,515 in 2021 to \$20,311 in 2022, and our international revenues increased by \$1,884, or 40%, from \$4,746 in 2021 to \$6,630 in 2022.

Revenues for the APC technology segment were \$10,597 for the year ended December 31, 2022, an increase of \$3,701, or 54%, versus fiscal 2021. The increase in APC revenue for the twelve-month period ending December 31, 2022 in comparison to the prior year amount was principally related to the timing of project execution and new APC orders. Consolidated APC backlog was \$8,245 and \$9,119 at December 31, 2022 and 2021, respectively. Our backlog at December 31, 2022 consists of U.S. domestic projects totaling \$6,358 and international projects totaling \$1,887.

Revenues for the FUEL CHEM technology segment for the year ended December 31, 2022 were \$16,344, a decrease of \$1,021, or 6%, versus fiscal 2021. The decrease in FUEL CHEM revenue was due to the loss of one customer due to permanent plant retirement, dispatch/demand, and unforeseen plant outages. We remain focused on attracting new customers in our FUEL CHEM business, for both coal and non-coal applications. Our ability to attract new coal customers continues to be affected by the electric demand market and fuel switching as a result of low natural gas prices.

Cost of sales and gross margin

Consolidated cost of sales for the years ended December 31, 2022 and 2021 were \$15,298 and \$12,363, respectively. Consolidated gross margin percentages for the years ended December 31, 2022 and 2021 were 43% and 49%, respectively. The gross margins for the APC technology segment decreased to 35% in 2022 from 49% in 2021. The overall decrease in gross margin in the APC technology segment is primarily due to product and project mix and supply chain costs. Gross margin percentage for the FUEL CHEM technology segment remained flat at 49% for the years ended December 31, 2022 and 2021.

Selling, general and administrative

Selling, general and administrative expenses for the years ended December 31, 2022 and 2021 were \$12,275 and \$12,055, respectively. The increase of \$220, or 2%, is attributed to the following:

- An increase in employee related costs of \$651
- An increase in travel expense of \$59
- A decrease in office and administrative costs relating to our foreign subsidiaries of \$216
- A decrease in other administrative costs of \$119
- A decrease in depreciation of \$121
- A decrease in professional services of \$34

Depreciation and Amortization

Depreciation and amortization are calculated using the straight-line method and included in selling, general and administrative expense. For the years ended December 31, 2022 and 2021, the Company recorded depreciation of \$352 and \$584 and amortization of \$88 and \$157, respectively.

Research and development

Research and development expenses were \$895 and \$1,332 for the years ended December 31, 2022 and 2021, respectively. The decreases in expenditures were related to reduced employee related costs and timing of execution on current project initiatives. The expenditures in our research and development expenses were focused on new product development efforts in the pursuit of commercial applications for technologies outside of our traditional markets, and in the development and analysis of new technologies that could represent incremental market opportunities. This includes water treatment technologies and more specifically, our DGI™ Dissolved Gas Infusion Systems, an innovative alternative to current aeration technology. This infusion process has a variety of applications in the water and wastewater segments, including irrigation, treatment of natural waters, supply of oxygen for biological remediation and wastewater odor management. DGI™ technology benefits include improved treatment performance and reduced treatment time, and the potential for reduced energy consumption, along with lower installation and operating costs. Third party validation testing of the efficiency of transferring oxygen to a treatment basin has been completed and results have been published.

Interest income

Interest income was \$202 for the year ended December 31, 2022 compared to \$6 for the same period in 2021. Interest income increased due to the interest income on the held-to-maturity (HTM) debt securities and money market funds.

Other (expense) income, net

Other expense, net was \$46 for the year ended December 31, 2022 compared to Other income, net of \$1,570 in 2021. The change of \$1,616 is due primarily to the forgiveness of the Paycheck Protection Program (PPP) Loan in 2021 for \$1,556 of principal and \$10 of accrued interest.

Income tax benefit (expense)

For the year ended December 31, 2022, we recorded an income tax expense of \$54 on pre-tax loss of \$1,388. Our effective tax rates were -3.9% and 20.6% for the years ended December 31, 2022 and 2021, respectively. For the year ended December 31, 2021, we recorded an income tax expense of \$14 on pre-tax income of \$68. The effective tax rate for the year ended December 31, 2022 differed from the federal statutory rate of 21% as a result of establishing a deferred tax liability associated with a certain book-to-tax timing difference.

Liquidity and Sources of Capital

At December 31, 2022, we had cash and cash equivalents of \$23,328 (which includes \$10,768 of cash equivalents) and working capital of \$31,059 versus cash and cash equivalents of \$35,893 (excluding restricted cash of \$1,161) and working capital of \$38,242 at December 31, 2021. We have no outstanding debt other than our outstanding letters of credit, under our Investment Collateral Security agreement with BMO Harris Bank, N.A. (the Investment Collateral Security agreement), which does not have any financial covenants. We expect to continue operating under this arrangement for the foreseeable future.

Operating activities used cash of \$4,139 for the year ended December 31, 2022, primarily due to an increase in accounts receivable balances of \$4,448, an increase in prepaid expenses and other assets of \$314, and an adjustment for non-cash items from our net loss from continuing operations for the provision for doubtful accounts of \$106, partially offset by increases in accounts payable balances of \$1,159 and accrued liabilities and other non-current liabilities of \$355, and adjustments for non-cash items from our net loss from continuing operations for depreciation and amortization of \$440 and stock compensation expense of \$224.

Operating activities provided cash of \$761 for the year ended December 31, 2021, primarily due to a decrease in accounts receivable balances of \$3,794, a decrease in prepaid expenses and other assets of \$634, and add backs of non-cash items from our net income from continuing operations for depreciation and amortization of \$741, stock compensation expense of \$82, and loss on sale of equipment of \$54, partially offset by decreases in our accrued liabilities and other non-current liabilities of \$1,404 and accounts payable balances of \$772, an increase in inventory of \$252, and adjustments for non-cash items from our net income from continuing operations for the gain on the PPP Loan forgiveness of \$1,556 and provision for doubtful accounts of \$619.

Investing activities used cash of \$9,483 and \$84 for the years ended December 31, 2022 and 2021, respectively. Investing activities for the years ended December 31, 2022 primarily consisted of purchases of HTM debt securities as investments and the purchases of equipment, partially offset by the maturity of one HTM debt security.

Financing activities used \$17 and provided \$23,977 of cash for the years ended December 31, 2022 and 2021. In 2021, the Company issued common stock in connection with the private placement offering. Proceeds from the private placement offering were \$25,812, partially offset by the costs related to the offering of \$1,783. In 2020, the Company received a Paycheck Protection Plan loan of \$1,556.

The effects of the COVID-19 global pandemic have presented significant risks to the Company, not all of which the Company is able to fully evaluate or even foresee at the current time. Although the impact of the pandemic is difficult to quantify, the Company has experienced, and may continue to experience, reductions in demand for certain of our products due to the delay or abandonment of ongoing or anticipated projects due to our customers', suppliers' and other third parties' financial distress or concern regarding the volatility of global markets. Other direct or indirect COVID-19 related effects, such as supply chain disruptions and travel restrictions, have been impacting operations and financial performance to varying degrees. We continue to monitor our liquidity needs and in response to our recent periods of declines in revenue and net losses have taken measures to reduce expenses and restructure operations which we feel are necessary to ensure we maintain sufficient working capital and liquidity to operate the business and invest in our future. We have evaluated our ongoing business needs, and considered the cash requirements of our base business of Air Pollution Control and FUEL CHEM, as well as our efforts to wind-down our APC operations in China. This evaluation included consideration of the following: a) customer and revenue trends in our APC and FUEL CHEM business segments, b) current operating structure and expenditure levels, and c) the costs of winding down our APC operations in China as well as other research and development initiatives. Based on this analysis, management believes that currently we have sufficient cash and working capital to operate our base APC and FUEL CHEM businesses. We believe our current cash position and net cash flows expected to be generated from operations are adequate to fund planned operations of the Company for the next 12 months.

We expect capital expenditures in 2023 for the DGI business, maintenance of field equipment, computer and systems, and general office equipment. We expect to fund our capital expenditures with cash from operations or cash on hand.

In June 2022, the Board of Directors approved an investment plan that would hold \$10,000 in funds at BMO Harris Bank (BMO Harris) to be invested in held-to-maturity debt securities of United States (US) Treasuries, including Notes, Bonds, and Bills, or US Government Agency securities. In December 2022, the Board of Directors approved an additional investment of \$10,000. The funds would be held in money market funds until they are invested in those securities. The investments would be structured to create a maturity "ladder" where the proceeds from maturities are re-invested to maintain a balance of short- and long-term investments based on the expected business needs. Maturities will be between three and thirty-six months. This strategy allows the Company to provide returns on excess cash, while managing liquidity and minimizing exposure to interest rate fluctuations.

On February 11, 2021, Fuel Tech entered into a securities purchase agreement to issue and sell, in a private placement, 5,000,000 shares of Common Stock and 2,500,000 warrants exercisable for a total of 2,500,000 shares of Common Stock with an exercise price of \$5.10 per Warrant Share, at a purchase price of \$5.1625 per Share and associated warrant. The gross proceeds to the Company from the Private Placement were \$25,812, before deducting placement agent fees and offering expenses of \$1,783.

On April 17, 2020, the Company received \$1,556 in loan proceeds from the PPP, established pursuant to the Coronavirus Aid, Relief, and Economic Security Act and administered by the U.S. Small Business Administration (SBA). On January 8, 2021 the Company received full forgiveness from the SBA for the entire balance of loan proceeds used to fund its qualified payroll expenses. When the loan was forgiven, the Company reduced the non-current liability by the amount forgiven and recorded other income in the Consolidated Statement of Operations.

On June 30, 2022, the Company entered into the Investment Collateral Security agreement to use for the sole purpose of issuing standby letters of credit, which replaces the Cash Collateral Security agreement with BMO Harris Bank, N.A. (the Former Collateral agreement). The Investment Collateral Security agreement requires us to pledge our investments as collateral for 150% of the aggregate face amount of outstanding standby letters of credit. The Company pays 250 basis points on the face values of outstanding letters of credit. There are no financial covenants set forth in the Investment Collateral Security agreement. At December 31, 2022, the Company had outstanding standby letters of credit totaling approximately \$689 under the Investment Collateral Security agreement. At December 31, 2022, the investments held as collateral totaled \$1,034. Fuel Tech is committed to reimbursing the issuing bank for any payments made by the bank under these instruments. The outstanding standby letters of credit mature as follows:

	Total	2023	2024	2025	Thereafter
Standby letters of credit and bank guarantees	\$ 689	\$ 444	\$ 245	\$ —	\$ —
Total	\$ 689	\$ 444	\$ 245	\$ —	\$ —

On June 19, 2019, the Company entered into the Former Collateral agreement to use for the sole purpose of issuing standby letters of credit. The Former Collateral agreement requires us to pledge as cash collateral 105% of the aggregate face amount of outstanding standby letters of credit. The Company paid 250 basis points on the face values of outstanding letters of credit. There were no financial covenants set forth in the Former Collateral agreement. At December 31, 2022, the Company had no outstanding standby letters of credit under the Former Collateral agreement.

ITEM 7A - QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our earnings and cash flow are subject to fluctuations due to changes in foreign currency exchange rates. We do not enter into foreign currency forward contracts or into foreign currency option contracts to manage this risk due to the nature of the transactions involved.

We are also exposed to changes in interest rates primarily due to our debt arrangement (refer to Note 11 to the consolidated financial statements). A hypothetical 100 basis point adverse move in interest rates along the entire interest rate yield curve would not have a materially adverse effect on interest expense during the year ended December 31, 2022.

ITEM 8 - FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Report of Independent Registered Public Accounting Firm

Stockholders and the Board of Directors of Fuel Tech, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Fuel Tech, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive loss, stockholders' equity and cash flows for the years then ended, and the related notes to the consolidated financial statements (collectively, the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

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 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.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Impairment of Goodwill

As described in Note 1 of the financial statements, goodwill is tested for impairment at least annually as of the first day of the Company's fourth quarter, or more frequently if events or changes in circumstances indicate that the carrying value may not be recoverable. The Company's evaluation of goodwill impairment involves the comparison of the fair value of the Company's reporting units to their carrying values. The Company uses a discounted cash flow analysis to determine the current fair value of the Company's FUEL CHEM reporting unit. This requires management to make significant estimates and assumptions including estimates of future growth rates, operating margins and discount rates based on the estimated weighted average cost of capital for the business. Changes in these assumptions could have a significant impact on the fair value, which could have an impact on the conclusion of impairment, if any.

The Company performed its impairment analysis as of October 1, 2022. As part of the impairment assessment, the Company's management determined that the fair value of the FUEL CHEM reporting unit exceeded its carrying value. As a result, no impairment charge was recorded in the consolidated statement of operations for the year ended December 31, 2022. Key financial assumptions used to determine the discounted cash flows of the reporting unit were developed by management.

We identified the evaluation of goodwill impairment as a critical audit matter because of the significant assumptions and judgments made by management within the discounted cash flow analysis used to determine the fair value of the Company's FUEL CHEM reporting unit. Auditing the reasonableness of management's key assumptions, including revenue growth rates, operating margins, and discount rates involved a high degree of auditor judgment and an increased effort, including the use of our fair value specialists.

Our audit procedures related to revenue growth rates, operating margins, and discount rates used to evaluate the Company's FUEL CHEM reporting unit for impairment included the following, among others:

- With the assistance of our fair value specialists, we evaluated the reasonableness of the discount rate and tested the relevance and reliability of source information underlying the determination of the rate, tested the mathematical accuracy of the calculation, and developed a range of independent estimates and compared those to the rate selected by management.
- We evaluated reasonableness of management's forecasted revenue growth rates and operating margins by comparing to historical results and industry forecasts.
- We evaluated management's ability to accurately forecast revenue and operating margins by comparing management's prior forecasts to actual results.
- We evaluated the impact of changes to significant assumptions on the determination of whether impairment exists.

Revenue Recognition

As described in Note 1 of the financial statements, revenue for the Company's Air Pollution Control technology contracts is recognized based on the extent of progress towards completion of the contract compared to the estimated effort to complete the contract. The Company uses a cost-to-cost input method of measuring progress on these contracts. Under the cost-to-cost input measure of progress, the extent of progress towards completion is measured based on the ratio of costs incurred to date to the estimated costs at completion of the performance obligation. Revenues are recorded proportionally as costs are incurred.

We identified revenue recognition over time for the Company's Air Pollution Control technology contracts as a critical audit matter because of certain significant assumptions management makes when measuring progress, including assumptions related to expected total costs to complete the contract. Auditing these assumptions involved a high degree of auditor judgement and an increase in audit effort due to the impact these assumptions have on the amount of revenue recognized.

Our audit procedures related to the evaluation of management's estimation of revenue recognized include the following, among others:

- We evaluated management's ability to accurately forecast project costs by comparing management's prior forecasts of estimated costs to actual results.
- We selected a sample of customer contracts and evaluated management's calculation of revenue recognized over time by performing the following procedures:
 - Evaluating whether contract terms that may affect revenue recognition were identified and properly considered and performance obligations were appropriately identified.
 - Obtaining and reviewing contracts with customers, including change orders to evaluate whether the transaction price was appropriately identified.
 - Testing management's revenue recognition calculation model for mathematical accuracy.
 - Assessing the validity of data used in the model for completeness and accuracy by agreeing, on a sample basis, key data inputs to source documents, including job costing reports and project budgets.

/s/ RSM US LLP

We have served as the Company's auditor since 2010.

Chicago, Illinois
March 7, 2023

Fuel Tech, Inc.
Consolidated Balance Sheets
(in thousands of dollars, except share and per-share data)

	December 31,	
	2022	2021
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 23,328	\$ 35,893
Restricted cash	—	891
Short-term investments	2,981	—
Accounts receivable, net	7,729	3,259
Inventories, net	392	348
Prepaid expenses and other current assets	1,395	1,074
Total current assets	35,825	41,465
Property and equipment, net	4,435	4,609
Goodwill	2,116	2,116
Other intangible assets, net	397	448
Restricted cash	—	270
Right-of-use operating lease assets	197	242
Long-term investments	6,360	—
Other assets	794	824
Total assets	<u>\$ 50,124</u>	<u>\$ 49,974</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 2,710	\$ 1,561
Accrued liabilities:		
Operating lease liabilities - current	125	113
Employee compensation	1,105	688
Other accrued liabilities	826	861
Total current liabilities	4,766	3,223
Operating lease liabilities - non-current	66	122
Deferred income taxes	177	139
Other liabilities	274	290
Total liabilities	5,283	3,774
Commitments and contingencies (Note 9)		
Stockholders' equity:		
Common stock, \$.01 par value, 40,000,000 shares authorized, 31,272,303 and 31,227,300 shares issued, and 30,296,297 and 30,263,791 shares outstanding in 2022 and 2021, respectively	313	312
Additional paid-in capital	164,422	164,199
Accumulated deficit	(115,991)	(114,549)
Accumulated other comprehensive loss	(1,728)	(1,604)
Nil coupon perpetual loan notes	76	76
Treasury stock, at cost (Note 5)	(2,251)	(2,234)
Total stockholders' equity	44,841	46,200
Total liabilities and stockholders' equity	<u>\$ 50,124</u>	<u>\$ 49,974</u>

See notes to consolidated financial statements.

Fuel Tech, Inc.
Consolidated Statements of Operations
(in thousands of dollars, except share and per-share data)

	For the years ended December 31,	
	2022	2021
Revenues	\$ 26,941	\$ 24,261
Costs and expenses:		
Cost of sales	15,298	12,363
Selling, general and administrative	12,275	12,055
Research and development	895	1,332
Total costs and expenses	28,468	25,750
Operating loss	(1,527)	(1,489)
Interest expense	(17)	(19)
Interest income	202	6
Other (expense) income, net	(46)	1,570
(Loss) income before income taxes	(1,388)	68
Income tax expense	(54)	(14)
Net (loss) income	\$ (1,442)	\$ 54
Net (loss) income per common share:		
Basic net (loss) income per common share	\$ (0.05)	\$ 0.00
Diluted net (loss) income per common share	\$ (0.05)	\$ 0.00
Weighted-average number of common shares outstanding:		
Basic	30,289,000	29,585,000
Diluted	30,289,000	29,694,000

See notes to consolidated financial statements.

Fuel Tech, Inc.
Consolidated Statements of Comprehensive Loss
(in thousands of dollars)

	For the years ended December 31,	
	2022	2021
Net (loss) income	\$ (1,442)	\$ 54
Other comprehensive loss:		
Foreign currency translation adjustments	(124)	(234)
Total other comprehensive loss	(124)	(234)
Comprehensive loss	\$ (1,566)	\$ (180)

See notes to consolidated financial statements.

Fuel Tech, Inc.
Consolidated Statements of Stockholders' Equity
(in thousands of dollars or shares, as appropriate)

	Common Stock		Additional Paid-in	Accumulated	Accumulated Other	Nil Coupon	Treasury	Total
	Shares	Amount	Capital	Deficit	Comprehensive Loss	Perpetual Loan Notes	Stock	
Balance at December 31, 2020	25,229	262	140,138	(114,603)	(1,370)	76	(2,182)	\$ 22,321
Net income				54				54
Foreign currency translation adjustments					(234)			(234)
Stock compensation expense			82					82
Common stock issued in connection with private placement, net	5,000	50	23,979					24,029
Common stock issued upon vesting of restricted stock units	50							
Treasury shares withheld	(15)						(52)	(52)
Balance at December 31, 2021	30,264	312	164,199	(114,549)	(1,604)	76	(2,234)	\$ 46,200
Net loss				(1,442)				(1,442)
Foreign currency translation adjustments					(124)			(124)
Stock compensation expense			224					224
Common stock issued upon vesting of restricted stock units	45	1	(1)					-
Treasury shares withheld	(13)						(17)	(17)
Balance at December 31, 2022	30,296	\$ 313	\$ 164,422	\$ (115,991)	\$ (1,728)	\$ 76	\$ (2,251)	\$ 44,841

See notes to consolidated financial statements.

Fuel Tech, Inc.
Consolidated Statements of Cash Flows
(in thousands of dollars)

	For the years ended December 31,	
	2022	2021
OPERATING ACTIVITIES		
Net (loss) income	\$ (1,442)	\$ 54
Adjustments to reconcile net (loss) income to net cash (used in) provided by operating activities:		
Depreciation	352	584
Amortization	88	157
Loss on sale of equipment	—	54
Non-cash interest income on held-to-maturity securities	(5)	—
Provision for doubtful accounts, net of recoveries	(106)	(619)
Deferred income taxes	38	5
Stock-based compensation, net of forfeitures	224	82
Gain of forgiveness on Paycheck Protection Plan Loan	—	(1,556)
Changes in operating assets and liabilities:		
Accounts receivable	(4,448)	3,794
Inventories	(45)	(252)
Prepaid expenses, other current assets and other non-current assets	(314)	634
Accounts payable	1,159	(772)
Accrued liabilities and other non-current liabilities	360	(1,404)
Net cash (used in) provided by operating activities	(4,139)	761
INVESTING ACTIVITIES		
Purchases of equipment and patents	(206)	(84)
Purchases of debt securities	(9,777)	—
Maturities of debt securities	500	—
Net cash used in investing activities	(9,483)	(84)
FINANCING ACTIVITIES		
Proceeds from sale of common stock issued in connection with private placement	—	25,812
Costs related to sale of common stock issued in connection with private placement	—	(1,783)
Taxes paid on behalf of equity award participants	(17)	(52)
Net cash (used in) provided by financing activities	(17)	23,977
Effect of exchange rate fluctuations on cash	(87)	(206)
Net (decrease) increase in cash, cash equivalents and restricted cash	(13,726)	24,448
Cash, cash equivalents and restricted cash at beginning of period	37,054	12,606
Cash, cash equivalents and restricted cash at end of period	\$ 23,328	\$ 37,054
Supplemental Cash Flow Information:		
Cash paid for:		
Cash income taxes paid (received), net	\$ 14	\$ (51)

See notes to consolidated financial statements.

Notes to Consolidated Financial Statements

(in thousands of dollars, except share and per-share data)

1. ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

Organization

Fuel Tech, Inc. and subsidiaries ("Fuel Tech", the "Company", "we", "us" or "our") develops and provides proprietary technologies for air pollution control, process optimization, water treatment, and advanced engineering services. Our primary focus is on the worldwide marketing and sale of Air Pollution Control (APC) technologies and our FUEL CHEM program.

The Company's nitrogen oxide (NOx) reduction technologies reduce nitrogen oxide emissions from boilers, furnaces and other stationary combustion sources. To reduce NOx emissions, our technologies utilize advanced combustion modification techniques and post-combustion NOx control approaches including non-catalytic, catalytic and combined systems. The Company also provides solutions for the mitigation of particulate matter, including particulate control with electrostatic precipitator products and services, and using Flue Gas Conditioning (FGC) systems which modify the ash properties of particulate for improved collection efficiency. Our FUEL CHEM program is based on proprietary TIFI® Targeted In-Furnace™ Injection technology, in combination with advanced Computational Fluid Dynamics (CFD) and Chemical Kinetics Modeling (CKM) boiler modeling, in the unique application of specialty chemicals to improve the efficiency, reliability, fuel flexibility, boiler heat rate, and environmental status of combustion units by controlling slagging, fouling, corrosion, and opacity. Water treatment technologies include DGI™ Dissolved Gas Infusion Systems which utilize a patent-pending channel injector to deliver supersaturated oxygen solutions and other gas-water combinations to target process applications or environmental issues. This infusion process has a variety of applications in the water and wastewater segments, including irrigation, treatment of natural waters, supply of oxygen for biological remediation, and wastewater odor management.

Our business is materially dependent on the continued existence and enforcement of air quality regulations, particularly in the U.S. We have expended significant resources in the research and development of new technologies in building our proprietary portfolio of air pollution control, fuel and boiler treatment chemicals, computer modeling and advanced visualization technologies. Many of Fuel Tech's products and services rely heavily on the Company's CFD modeling capabilities, which are enhanced by internally developed, high-end visualization software.

International revenues were \$6,630 and \$4,746 for the years ended December 31, 2022 and 2021, respectively. These amounts represented 25% and 20% of Fuel Tech's total revenues for the respective periods of time. Foreign currency changes did not have a material impact on the calculation of these percentages. We have foreign offices in Beijing, China and Gallarate, Italy.

Basis of Presentation

The consolidated financial statements include the accounts of Fuel Tech and its wholly owned subsidiaries.

The consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the U.S. (GAAP). The books and records of subsidiaries located in foreign countries are maintained according to generally accepted accounting principles in those countries. Upon consolidation, the Company evaluates the differences in accounting principles and determines whether adjustments are necessary to convert the foreign financial statements to the accounting principles upon which the consolidated financial statements are based. All intercompany transactions have been eliminated.

On the Consolidated Statements of Operations of this Annual Report on Form 10-K, the presentation of interest income has been updated for 2021 to conform to the current year's presentation. The amount for interest income was previously presented with interest expense under the caption Interest expense, net on the Consolidated Statements of Operations.

COVID-19 Pandemic and Geopolitical Events

The effects of the coronavirus (COVID-19) global pandemic have presented significant risks to the Company that have had direct and indirect impacts on our results of operations during the twelve months ended December 31, 2022 and 2021. Although the impact of the pandemic is difficult to isolate and quantify, the Company has experienced, and may continue to experience, supply chain issues, travel restrictions, and reductions in demand for certain of products due to the delay or abandonment of ongoing or anticipated projects due to our customers', suppliers' and other third parties' financial distress or concern regarding the volatility of global markets.

Geopolitical events and global economic sanctions resulting from the ongoing conflict between Russia and Ukraine may impact new or existing projects and the prices and availability of raw materials, energy and other materials. These events may also impact energy and regulatory policy nationally or regionally for the impacted regions. In addition, we have experienced and are experiencing varying levels of inflation resulting in part from increased shipping and transportation costs, raw material costs, and labor costs.

Management cannot predict the full impact of the COVID-19 pandemic and geopolitical events on the Company's sales and marketing channels and supply chains, and, as a result, the ultimate extent of the effects on the Company are highly uncertain and will depend on future developments. Such effects could exist for an extended period of time. The Company continues to monitor the potential impacts on the business.

Private Placement Offering

On February 11, 2021, Fuel Tech entered into a securities purchase agreement (the “Purchase Agreement”) with certain institutional investors pursuant to which the Company agreed to issue and sell, in a private placement (the “Private Placement”), (i) 5,000,000 shares (the “Shares”) of common stock, (ii) and 2,500,000 warrants (the “Warrants”) exercisable for a total of 2,500,000 shares of common stock (the “Warrant Shares”) with an exercise price of \$5.10 per Warrant Share, at a purchase price of \$5.1625 per Share and associated warrant. The gross proceeds to the Company from the Private Placement were \$25,812, before deducting placement agent fees and offering expenses of \$1,783. Subject to certain ownership limitations, the Warrants are immediately exercisable upon issuance and expire on the five and one-half year anniversary of the effective date of the registration statement registering the Warrant Shares for resale. In addition, the Company issued to the placement agent Warrants to purchase up to 350,000 shares of common stock. The Placement Agent Warrants are exercisable at an exercise price of \$6.45 per share of common stock and expire on the five and one-half year anniversary of the effective date of the registration statement registering the Shares and Warrant Shares for resale.

Liquidity

We have experienced net losses in recent years. We continue to monitor our liquidity needs and have taken measures to reduce expenses and restructure operations, which we feel are necessary to ensure we maintain sufficient working capital and liquidity to operate the business and invest in our future. As a result, we have evaluated our ongoing business needs, and considered the cash requirements of our APC and FUEL CHEM businesses. This evaluation included consideration of the following: a) customer and revenue trends in our APC and FUEL CHEM business segments, b) current operating structure and expenditure levels, c) current availability of working capital, and d) support for our research and development initiatives. We believe our current cash position and net cash flows expected to be generated from operations are adequate to fund planned operations of the Company for the next 12 months.

Use of Estimates

The preparation of the financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. The Company uses estimates in accounting for, among other items, revenue recognition, allowance for doubtful accounts, income tax provisions, excess and obsolete inventory reserve, impairment of long-lived assets, and warranty expenses. Actual results could differ from those estimates.

Fair Value Measurements

The carrying values of cash and cash equivalents, accounts receivable, and accounts payable are reasonable estimates of their fair value due to their short-term nature.

We apply authoritative accounting guidance for fair value measurements of financial and non-financial assets and liabilities. This guidance defines fair value, establishes a consistent framework for measuring fair value and expands disclosure for each major asset and liability category measured at fair value on either a recurring or nonrecurring basis and clarifies that fair value is 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. 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 liability. As a basis for considering such assumptions, the standard establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value as follows:

- Level 1 – Observable inputs to the valuation methodology such as quoted prices in active markets for identical assets or liabilities
- Level 2 – Inputs to the valuation methodology including quoted prices for similar assets or liabilities in active markets, quoted prices for identical assets or liabilities in inactive markets, inputs other than quoted prices that are observable for the asset or liability, and inputs that are derived principally from or corroborated by observable market data by correlation or other means
- Level 3 – Significant unobservable inputs in which there is little or no market data, which require the reporting entity to develop its own estimates and assumptions or those expected to be used by market participants. Generally, these fair value measures are model-based valuation techniques such as discounted cash flows, option pricing models, and other commonly used valuation techniques

Transfers between levels of the fair value hierarchy are recognized based on the actual date of the event or change in circumstances that caused the transfer. We had no assets or liabilities that were valued using level 2 or level 3 inputs and therefore there were no transfers between levels of the fair value hierarchy during the periods ended December 31, 2022 and 2021.

Cash, cash equivalents and restricted cash

We consider all highly liquid debt investments with original maturities from the date of purchase of three months or less as cash equivalents. Cash equivalents include investments in money market funds. At December 31, 2022, we had cash on hand of approximately \$675 at our Beijing, China subsidiary that is subject to certain local regulations that may limit the immediate availability of these funds outside of China. Cash on hand at our Italy subsidiary totaled approximately \$300 at December 31, 2022. Cash on hand at our Chilean subsidiary totaled approximately \$225 at December 31, 2022.

Restricted cash as of December 31, 2021 represents funds that are restricted to satisfy any amount borrowed against the Company's Cash Collateral Security agreement with BMO Harris Bank N.A (Cash Collateral Security agreement). In June 2022, the Company replaced the former Cash Collateral Security agreement with an Investment Collateral Security agreement with BMO Harris Bank N.A (Investment Collateral Security agreement) where existing standby letters of credit are collateralized by amounts held in the Company's investment funds (see Note 11).

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the Consolidated Balance Sheet that sum to the total of the same such amounts shown in the Consolidated Statements of Cash Flows:

	December 31, 2022	December 31, 2021
Cash	\$ 12,560	\$ 35,893
Cash equivalents	10,768	—
Restricted cash included in current assets	—	891
Restricted cash included in long-term assets	—	270
Total cash, cash equivalents, and restricted cash shown in the Consolidated Statements of Cash Flows	\$ 23,328	\$ 37,054

Investments

In June 2022, the Board of Directors approved a plan to invest up to \$10,000 of excess capital in debt securities, or held in money market funds until such investments can be made, with BMO Harris Bank N.A (BMO Harris). In December 2022, the Board of Directors approved an additional transfer of \$10,000 of excess capital into the investment account. The funds deposited in December 2022 have not been invested in debt securities as of December 31, 2022 and are included in cash equivalents. A portion of the funds invested are restricted as collateral under the Investment Collateral Security agreement (see Note 11). At December 31, 2022, the amount of funds collateralized under the Investment Collateral Security agreement is \$1,034 relating to existing standby letters of credit with varying maturity dates and expire no later than December 31, 2024.

Our investments in debt securities consist of United States (US) Treasury securities, including Notes, Bonds, and Bills, and US Government Agency securities, which are designated as held-to-maturity (HTM) and stated at amortized cost. The Company has the positive intent and ability to hold these investments to maturity and does not expect to sell any debt securities before maturity to settle an obligation under the Investment Collateral Security agreement. The maturities of our HTM investments range from three to thirty-six months. HTM debt investments with original maturities of approximately three months or less from the date of purchase are classified within cash and cash equivalents. HTM debt investments with original maturities at the date of purchase greater than approximately three months and remaining maturities of less than one year are classified as short-term investments. HTM debt investments with remaining maturities beyond one year are classified as long-term investments. Interest income, including amortization of premium and accretion of discount, are included on the Consolidated Statements of Operations in Interest income under the effective yield method. Accrued interest is included in Prepaid expenses and other current assets on the Consolidated Balance Sheets.

The following table provides the amortized cost, gross unrealized gains and losses, and fair value of our HTM debt securities at December 31, 2022:

Held-to-maturity debt securities:	
Amortized cost	\$ 9,341
Gross unrecognized gains	—
Gross unrecognized losses	(168)
Fair value	\$ 9,173

Our investments in debt securities consist of United States (US) Treasury securities, including Notes, Bonds, and Bills, and US Government Agency securities. Due to the creditworthiness of the entities issuing these securities, there is no impairment recorded related to the unrealized losses.

The following table provides the amortized cost and fair value of debt securities by maturities at December 31, 2022:

	Amortized Cost	Fair Value
Within one year	\$ 2,981	\$ 2,957
After one year through two years	4,919	4,807
After two years through three years	1,441	1,409
Total	\$ 9,341	\$ 9,173

Foreign Currency Risk Management

Our earnings and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. We do not enter into foreign currency forward contracts or into foreign currency option contracts to manage this risk due to the nature of the transactions involved.

Accounts Receivable

Accounts receivable consist of amounts due to us in the normal course of our business, are not collateralized, and normally do not bear interest. Accounts receivable includes contract assets, billings occurring subsequent to revenue recognition under Accounting Standards Codification (ASC) 606 *Revenue from Contracts with Customers*. At December 31, 2022 and 2021, unbilled receivables were approximately \$3,082 and \$1,277, respectively. Refer to Note 2 for further detail.

Allowance for Doubtful Accounts

The allowance for doubtful accounts is our management's best estimate of the amount of credit losses in accounts receivable. In order to control and monitor the credit risk associated with our customer base, we review the credit worthiness of customers on a recurring basis. Factors influencing the level of scrutiny include the level of business the customer has with Fuel Tech, the customer's payment history, and the customer's financial stability. At the end of each reporting period, the allowance for doubtful accounts balance is reviewed relative to management's collectability assessment and is adjusted if deemed necessary. Bad debt write-offs are made when management believes it is probable a receivable will not be recovered. The table below sets forth the components of the Allowance for Doubtful Accounts for the years ended December 31.

Year	Balance at January 1	Provision charged to expense	Write-offs / Recoveries	Balance at December 31
2021	\$ 835	\$ 227	\$ (839)	\$ 223
2022	\$ 223	\$ (19)	\$ (94)	\$ 110

Prepaid expenses and other current assets

Prepaid expenses and other current assets include Chinese banker acceptances of \$0 and \$55 as of December 31, 2022 and 2021, respectively. These are short-term commitments of typically three to six months for future payments and can be redeemed at a discount or applied to future vendor payments.

Inventories

Inventories consist primarily of equipment constructed for resale and spare parts and are stated at the lower of cost or net realizable value, using the weighted-average cost method. At December 31, 2022 and 2021, inventory included equipment constructed for resale of \$207 and \$227, respectively, and spare parts, net of reserves of \$185 and \$121, respectively. Usage is recorded in cost of sales in the period that parts were issued to a project or used to service equipment. Equipment constructed for resale that is in process is recorded in Other assets. In process equipment for inventory recorded as other assets was \$634 and \$627 as of December 31, 2022 and 2021 respectively.

Inventories are periodically evaluated to identify obsolete or otherwise impaired parts and are written off when management determines usage is not probable. The Company estimates the balance of excess and obsolete inventory by analyzing inventory by age using last used and original purchase date and existing sales pipeline for which the inventory could be used. The table below sets forth the components of the Excess and Obsolete Inventory Reserve for the years ended December 31.

Year	Balance at January 1	Provision charged to expense	Write-offs / Recoveries	Balance at December 31
2021	\$ 907	\$ —	\$ 20	\$ 927
2022	\$ 927	\$ —	\$ —	\$ 927

Foreign Currency Translation and Transactions

Assets and liabilities of consolidated foreign subsidiaries are translated into U.S. dollars at exchange rates in effect at year end. Revenues and expenses are translated at average exchange rates prevailing during the year. Gains or losses on foreign currency transactions and the related tax effects are reflected in net income. The resulting translation adjustments are included in stockholders' equity as part of accumulated other comprehensive loss.

Accumulated Other Comprehensive Loss

	December 31,	
	2022	2021
Foreign currency translation		
Balance at beginning of period	\$ (1,604)	\$ (1,370)
Other comprehensive loss:		
Foreign currency translation adjustments (1)	(124)	(234)
Balance at end of period	\$ (1,728)	\$ (1,604)
Total accumulated other comprehensive loss	<u>\$ (1,728)</u>	<u>\$ (1,604)</u>

(1) In all periods presented, there were no tax impacts related to functional currency translation adjustments.

Research and Development

Research and development costs are expensed as incurred. Research and development projects funded by customer contracts are reported as part of cost of goods sold. Internally funded research and development expenses are reported as operating expenses.

Product/System Warranty

We typically warrant our air pollution control products and systems against defects in design, materials and workmanship for one to two years. A provision for estimated future costs relating to warranty expense is recorded when the products/systems become commercially operational.

Goodwill

Goodwill is evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. Goodwill of our reporting units is assigned upon acquisition after considering the nature of the net assets giving rise to the goodwill and how each reporting unit would enjoy the benefits and synergies of the net assets acquired. We have two reporting units for goodwill evaluation purposes: the FUEL CHEM technology segment and the APC technology reporting unit. There is no goodwill associated with our APC technology reporting unit. The entire goodwill balance of \$2,116 was allocated to the FUEL CHEM technology reporting unit as of December 31, 2022 and 2021.

Goodwill is tested for impairment at least annually as of the first day of our fourth quarter, or more frequently if events or changes in circumstances indicate that the carrying value may not be recoverable. Our evaluation of goodwill impairment involves first assessing qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. We may bypass this qualitative assessment, or determine that based on our qualitative assessment considering the totality of events and circumstances including macroeconomic factors, industry and market considerations, current and projected financial performance, a sustained decrease in our share price, or other factors, that additional impairment analysis is necessary. This additional analysis involves comparing the current fair value of our reporting units to their carrying values. We use a discounted cash flow (DCF) model to determine the current fair value of our FUEL CHEM reporting unit. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including markets and market share, sales volumes and prices, costs to produce and working capital changes. Management considers historical experience and all available information at the time the fair values of its reporting units are estimated. However, actual fair values that could be realized in an actual transaction may differ from those used to evaluate the impairment of goodwill. Fuel Tech performed its annual goodwill impairment analysis as of October 1, 2022 and determined that no impairment of goodwill existed. The Company did not recognize a charge for goodwill impairment for the periods ended December 31, 2022 and 2021.

Other Intangible Assets

Management reviews other finite-lived intangible assets, patent assets, trade names, and lease assets for impairment when events or changes in circumstances indicate the carrying amount of an asset or asset group may not be recoverable. In the event that impairment indicators exist, a further analysis is performed and if the sum of the expected undiscounted future cash flows resulting from the use of the asset or asset group is less than the carrying amount of the asset or asset group, an impairment loss equal to the excess of the asset or asset group's carrying value over its fair value is recorded. Management considers historical experience and all available information at the time the estimates of future cash flows are made, however, the actual cash values that could be realized may differ from those that are estimated.

During the years ended December 31, 2022 and 2021, Fuel Tech recorded no patent or trademark abandonment charges.

Third-party costs related to the development of patents are included within other intangible assets on the consolidated balance sheets. The third-party costs capitalized as patent costs during the years ended December 31, 2022 and 2021 were \$37 and \$52, respectively. Third-party costs are comprised of legal fees that relate to the review and preparation of patent disclosures and filing fees incurred to present the patents to the required governing body.

Our intellectual property portfolio has been a significant building block for the APC and FUEL CHEM technology segments. The patents are essential to the generation of revenue for our businesses and are essential to protect us from competition in the markets in which we serve. These costs are being amortized on the straight-line method over the period beginning with the patent issuance date and ending on the patent expiration date. Patent maintenance fees are charged to operations as incurred.

Amortization expense from continuing operations for intangible assets was \$88 and \$157 for the years ended December 31, 2022 and 2021, respectively. The table below shows the amortization period and other intangible asset cost by intangible asset as of December 31, 2022 and 2021, and the accumulated amortization and net intangible asset value in total for all other intangible assets.

Description of Other Intangibles	Amortization Period (years)	2022			2021		
		Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Patent assets	1 - 20	803	(406)	397	789	(341)	448
Total		\$ 803	\$ (406)	\$ 397	\$ 789	\$ (341)	\$ 448

The table below shows the estimated future amortization expense for intangible assets:

Year	Estimated Amortization Expense
2023	\$ 60
2024	52
2025	31
2026	31
2027	31
Thereafter	192
Total	\$ 397

Property and Equipment

Property and equipment is stated at historical cost and does not include capital in process expenditures yet to be capitalized. Provisions for depreciation are computed by the straight-line method, using estimated useful lives that range based on the nature of the asset. Leasehold improvements are depreciated over the shorter of the associated lease term or the estimated useful life of the asset. Depreciation expense was \$352 and \$584 for the years ended December 31, 2022 and 2021, respectively. The table below shows the depreciable life and cost by asset class as of December 31, 2022 and 2021, and the accumulated depreciation and net book value in total for all classes of assets.

Description of Property and Equipment	Depreciable Life (years)	2022	2021
Land		\$ 1,050	\$ 1,050
Building	39	3,950	3,950
Building and leasehold improvements	3 - 39	2,626	2,626
Field equipment	3 - 4	11,882	11,787
Computer equipment and software	2 - 3	2,117	2,099
Furniture and fixtures	3 - 10	1,306	1,308
Vehicles	5	32	32
Construction in process		29	—
Total cost		22,992	22,852
Less accumulated depreciation		(18,557)	(18,243)
Total net book value		\$ 4,435	\$ 4,609

Property and equipment is reviewed for impairment when events and circumstances indicate that the carrying amount of the assets (or asset group) may not be recoverable. If impairment indicators exist, we perform a more detailed analysis and an impairment loss is recognized when estimated future undiscounted cash flows expected to result from the use of the asset (or asset group) and its eventual disposition are less than the carrying amount. This process of analyzing impairment involves examining the operating condition of individual assets (or asset group) and estimating a fair value based upon current condition, relevant market factors and remaining estimated operational life compared to the asset's remaining depreciable life. Quoted market prices and other valuation techniques are used to determine expected cash flows.

Revenue Recognition

The Company recognizes revenue when control of the promised goods or services is transferred to our customers, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. The majority of our contracts have a single performance obligation as the promise to transfer the individual goods or services is not separately identifiable from other promises in the contracts and, therefore, not distinct. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Sales, value add, and other taxes we collect concurrent with revenue-producing activities are excluded from revenue.

Air Pollution Control Technology

Fuel Tech's APC contracts are typically six to eighteen months in length. A typical contract will have three or four critical operational measurements that, when achieved, serve as the basis for us to invoice the customer via progress billings. At a minimum, these measurements will include the generation of engineering drawings, the shipment of equipment and the completion of a system performance test.

As part of most of its contractual APC project agreements, Fuel Tech will agree to customer-specific acceptance criteria that relate to the operational performance of the system that is being sold. These criteria are determined based on modeling that is performed by Fuel Tech personnel, which is based on operational inputs that are provided by the customer. The customer will warrant that these operational inputs are accurate as they are specified in the binding contractual agreement. Further, the customer is solely responsible for the accuracy of the operating condition information; typically all performance guarantees and equipment warranties granted by us are voidable if the operating condition information is inaccurate or is not met.

Since control transfers over time, revenue is recognized based on the extent of progress towards completion of the single performance obligation. Fuel Tech uses the cost-to-cost input measure of progress for our contracts since it best depicts the transfer of assets to the customer which occurs as we incur costs on our contracts. Under the cost-to-cost input measure of progress, the extent of progress towards completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. Revenues are recorded proportionally as costs are incurred. Costs to fulfill include all internal and external engineering costs, equipment charges, inbound and outbound freight expenses, internal and site transfer costs, installation charges, purchasing and receiving costs, inspection costs, warehousing costs, project personnel travel expenses and other direct and indirect expenses specifically identified as project- or product-line related, as appropriate (e.g. test equipment depreciation and certain insurance expenses).

Fuel Tech's APC product line also includes ancillary revenue for post contractual goods and services. Revenue associated with these activities are recognized at point in time when delivery of goods or completion of the service obligation is performed.

Fuel Tech has installed over 1,200 units with APC technology and normally provides performance guarantees to our customers based on the operating conditions for the project. As part of the project implementation process, we perform system start-up and optimization services that effectively serve as a test of actual project performance. We believe that this test, combined with the accuracy of the modeling that is performed, enables revenue to be recognized prior to the receipt of formal customer acceptance.

FUEL CHEM

Revenues from the sale of chemical products are recognized when control transfers to customer upon shipment or delivery of the product based on the applicable shipping terms. We generally recognize revenue for these arrangements at a point in time based on our evaluation of when the customer obtains control of the promised goods or services.

On occasion, Fuel Tech will engineer and sell its chemical pumping equipment. These projects are similar in nature to the APC projects described above and for those projects where control transfers over time, revenue is recognized based on the extent of progress towards completion of the single performance obligation.

For projects containing multiple performance obligations, the Company allocates the transaction price based on the estimated standalone selling price. The Company must develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in the contract. The Company utilizes key assumptions to determine the stand-alone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs. Variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated are consistent with the amounts the Company would expect to receive for the satisfaction of each performance obligation.

The consideration allocated to each performance obligation is recognized as revenue when control is transferred for the related goods or services. For performance obligations which consist of licenses and other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

The Company receives payments from its customers based on billing schedules established in each contract. Up-front payments and fees are recorded as deferred revenue upon receipt or when due until the Company performs its obligations under these arrangements. Amounts are recorded as accounts receivable when the Company's right to consideration is unconditional.

Cost of Sales

Cost of sales includes all internal and external engineering costs, equipment and chemical charges, inbound and outbound freight expenses, internal and site transfer costs, installation charges, purchasing and receiving costs, inspection costs, warehousing costs, project personnel travel expenses and other direct and indirect expenses specifically identified as project- or product line-related, as appropriate (e.g., test equipment depreciation and certain insurance expenses). Certain depreciation and amortization expenses related to tangible and intangible assets, respectively, are allocated to cost of sales. We classify shipping and handling costs in cost of sales in the consolidated statements of operations.

Selling, General and Administrative Expenses

Selling, general and administrative expenses primarily include the following categories except where an allocation to the cost of sales line item is warranted due to the project- or product-line nature of a portion of the expense category: salaries and wages, employee benefits, non-project travel, insurance, legal, rent, accounting and auditing, recruiting, telephony, employee training, Board of Directors' fees, auto rental, office supplies, dues and subscriptions, utilities, real estate taxes, commissions and bonuses, marketing materials, postage and business taxes. Departments comprising the selling, general and administrative line item primarily include the functions of executive management, finance and accounting, investor relations, regulatory affairs, marketing, business development, information technology, human resources, sales, legal and general administration.

Income Taxes

The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision for income taxes represents income taxes paid or payable (or received or receivable) for the current year plus the change in deferred taxes during the year. Deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid, and result from differences between the financial and tax bases of our assets and liabilities and are adjusted for changes in tax rates and tax laws when enacted. Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carryback periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and our experience with similar operations. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances.

Tax benefits related to uncertain tax positions taken or expected to be taken on a tax return are recorded when such benefits meet a more likely than not threshold. Otherwise, these tax benefits are recorded when a tax position has been effectively settled, which means that the statute of limitation has expired or the appropriate taxing authority has completed their examination even though the statute of limitations remains open. Interest and penalties related to uncertain tax positions are recognized as part of the provision for income taxes and are accrued beginning in the period that such interest and penalties would be applicable under relevant tax law until such time that the related tax benefits are recognized.

Leases

The Company applies the provisions of ASC 842, Leases. The Company determines if an arrangement is a lease at inception by evaluating whether the arrangement conveys the right to use an identified asset and whether the Company obtains substantially all of the economic benefits from and has the ability to direct the use of the asset. Right-of-use (ROU) assets and lease liabilities are recognized at the lease commencement date based on the present value of the future minimum lease payments over the lease term. Operating ROU assets also include the impact of any lease incentives. Operating leases are included in right-of-use operating lease assets, operating lease liabilities - current, and operating lease liabilities - non-current on our Consolidated Balance Sheets.

Operating lease ROU assets and operating lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term at commencement date. As most of our leases do not provide an implicit rate, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of future payments. The operating lease ROU asset also includes any lease payments made and excludes lease incentives and initial direct costs incurred. Our lease terms may include options to extend or terminate the lease when it is reasonably certain that we will exercise that option. Lease expense for minimum lease payments is recognized on a straight-line basis over the lease term.

We have lease agreements with lease and non-lease components, and we elected the practical expedient to not separate lease and non-lease components for the majority of our leases. For certain equipment leases, such as vehicles, we account for the lease and non-lease components as a single lease component. We also elected the practical expedient for leases with an initial term of 12 months or less.

Stock-Based Compensation

Our stock-based employee compensation plan, referred to as the Fuel Tech, Inc. 2014 Long-Term Incentive Plan (Incentive Plan), was adopted in May 2014 and allows for awards to be granted to participants in the form of non-qualified stock options, incentive stock options, stock appreciation rights, restricted stock, restricted stock units, performance awards, and bonuses or other forms of share-based or non-share-based awards or combinations thereof. Participants in the Incentive Plan may be our directors, officers, employees, consultants or advisors (except consultants or advisors in capital-raising transactions) as the directors determine are key to the success of our business. There are a maximum of 5,600,676 shares that may be issued or reserved for awards to participants under the Incentive Plan as of December 31, 2022. Based on the existing issued or reserved awards in Incentive Plan, there are 1,899,250 shares available to be used for future awards to participants in the Incentive Plan as of December 31, 2022.

Defined Contribution Plan

We have a retirement savings plan available for all our U.S. employees who have met minimum length-of-service requirements. Our contributions are determined based upon amounts contributed by the employees with additional contributions made at the discretion of the Board of Directors. Costs related to this plan were \$200 and \$206 in 2022 and 2021, respectively.

Basic and Diluted Earnings per Common Share

Basic earnings per share excludes the antidilutive effects of stock options, restricted stock units (RSUs), warrants, and the nil coupon non-redeemable convertible unsecured loan notes (see Note 6). Diluted earnings per share includes the dilutive effect of the nil coupon non-redeemable convertible unsecured loan notes, RSUs, warrants, and unexercised in-the-money stock options, except in periods of net loss where the effect of these instruments is antidilutive. Out-of-the-money stock options and warrants are excluded from diluted earnings per share because they are unlikely to be exercised and would be anti-dilutive if they were exercised. At December 31, 2022 and 2021, we had weighted-average outstanding equity awards of 763,800 and 214,500, respectively, and 2,850,000 warrants in both periods, which were antidilutive for the purpose of calculation of the diluted earnings per share. As of December 31, 2022, 42,600 incremental equity awards were antidilutive because of the net loss in the year then ended. These equity awards could potentially dilute basic EPS in future years.

The table below sets forth the weighted-average shares used at December 31 in calculating earnings (loss) per share:

	2022	2021
Basic weighted-average shares	30,289,000	29,585,000
Conversion of unsecured loan notes	—	—
Unexercised options and unvested restricted stock units	—	109,000
Diluted weighted-average shares	30,289,000	29,694,000

Risk Concentrations

Financial instruments that potentially subject the Company to a significant concentration of credit risk consist primarily of cash and cash equivalents and accounts receivable. The Company maintains deposits in federally insured financial institutions in excess of federally insured limits. However, management believes the Company is not exposed to significant credit risk due to the financial position of its primary depository institution where a significant portion of its deposits are held.

For the year ended December 31, 2022, we had three customers which individually represented greater than 10% of revenues. Two customers primarily contributed revenues to the FUEL CHEM technology segment and one contributed revenue to the APC technology segment. In total these three customers represented 48% of consolidated revenues. We had no customer that accounted for greater than 10% of our current assets as of December 31, 2022.

For the year ended December 31, 2021, we had four customers which individually represented greater than 10% of revenues. Three customers primarily contributed revenues to the FUEL CHEM technology segment and one contributed revenue to the APC technology segment. In total these four customers represented 60% of consolidated revenues. We had no customer that accounted for greater than 10% of our current assets as of December 31, 2021.

We control credit risk through requiring milestone payments on long-term contracts, performing ongoing credit evaluations of its customers, and in some cases obtaining security for payment through bank guarantees and letters of credit.

Treasury Stock

We use the cost method to account for common stock repurchases. During the years ended December 31, 2022 and 2021, we withheld 12,497 and 15,162 shares of our common stock, valued at approximately \$17 and \$52, respectively, to settle personal tax withholding obligations that arose as a result of restricted stock units that vested. Refer to Note 5, "Treasury Stock," for further discussion.

Recently Issued Accounting Pronouncements

In June 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-13, Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, and in November 2019, the FASB issued ASU 2019-10, Financial Instruments - Credit Losses (Topic 326), Derivatives and Hedging (Topic 815), and Leases (Topic 842). This guidance amends the current accounting guidance and requires the measurement of all expected losses based on historical experience, current conditions and reasonable and supportable forecasts. For trade receivables, loans, and other financial instruments, we will be required to use a forward-looking expected loss model rather than the incurred loss model for recognizing credit losses which reflects losses that are probable. The standard will become effective for interim and annual periods beginning on January 1, 2023 for Fuel Tech. Application of the amendments is through a cumulative-effect adjustment to retained earnings as of the effective date. The Company is finalizing the impact of adoption, but we do not believe the adoption of this standard will have a material impact on our financial statements. Beginning on January 1, 2023, Fuel Tech will use the caption Allowance for Credit Losses and our expected credit loss model to calculate the allowance.

2. REVENUE RECOGNITION

Disaggregated Revenue by Product Technology

The following table presents our revenues disaggregated by product technology:

	Twelve Months Ended December 31,	
	2022	2021
Air Pollution Control		
Technology solutions	\$ 7,935	\$ 4,189
Spare parts	911	1,138
Ancillary revenue	1,751	1,569
Total Air Pollution Control technology	10,597	6,896
FUEL.CHEM		
FUEL.CHEM technology solutions	16,344	17,365
Total Revenues	\$ 26,941	\$ 24,261

Disaggregated Revenue by Geography

The following table presents our revenues disaggregated by geography, based on the location of the end-user:

	Twelve Months Ended December 31,	
	2022	2021
United States	\$ 20,311	\$ 19,515
Foreign Revenues		
Americas	213	356
Europe	2,888	1,894
Asia	3,529	2,496
Total Foreign Revenues	6,630	4,746
Total Revenues	\$ 26,941	\$ 24,261

Timing of Revenue Recognition

The following table presents the timing of our revenue recognition:

	Twelve Months Ended December 31,	
	2022	2021
Products transferred at a point in time	\$ 18,849	\$ 20,072
Products and services transferred over time	8,092	4,189
Total Revenues	\$ 26,941	\$ 24,261

Contract Balances

The timing of revenue recognition, billings and cash collections results in billed accounts receivable, unbilled receivables (contract assets), and customer advances and deposits (contract liabilities) on the Consolidated Balance Sheets. In our APC technology segment, amounts are billed as work progresses in accordance with agreed-upon contractual terms. Generally, billing occurs subsequent to revenue recognition, resulting in contract assets. For the FUEL.CHEM technology segment, deliveries made in the current period but billed in subsequent periods are also considered contract assets. These assets are reported on the Consolidated Balance Sheet on a contract-by-contract basis at the end of each reporting period. At December 31, 2022, 2021, and 2020 contract assets for APC technology projects were approximately \$3,082, \$1,277, and \$2,079, respectively, and at December 31, 2020, contract assets for the FUEL.CHEM technology segment were approximately \$269, and are included in accounts receivable on the consolidated balance sheets. There were no contract assets for the FUEL.CHEM technology segment as of December 31, 2022 and 2021.

However, the Company will periodically bill in advance of costs incurred before revenue is recognized, resulting in contract liabilities. These liabilities are reported on the consolidated balance sheet on a contract-by-contract basis at the end of each reporting period. Contract liabilities were \$372, \$390, and \$850 at December 31, 2022, 2021, and 2020, respectively, and are included in other accrued liabilities on the consolidated balance sheets.

Changes in the contract asset and liability balances during the year ended December 31, 2022, were not materially impacted by any other items other than amounts billed and revenue recognized as described previously. Revenue recognized that was included in the contract liability balance at the beginning of the period was \$384 and \$776 for the years ended December 31, 2022 and 2021, respectively, which represented primarily revenue from progress toward completion of our APC technology contracts.

As of December 31, 2022 and 2021 we had no construction contracts in progress that were identified as a loss contract.

Remaining Performance Obligations

Remaining performance obligations, represents the transaction price of APC technology booked orders for which work has not been performed. As of December 31, 2022, the aggregate amount of the transaction price allocated to remaining performance obligations was \$8,245. The Company expects to recognize revenue on approximately \$7,926 of the remaining performance obligations over the next 12 months with the remaining recognized thereafter.

Practical Expedients and Exemptions

We generally expense sales commissions on a ratable basis when incurred because the amortization period would have been one year or less. These costs are recorded within selling, general and administrative expenses within the Consolidated Statements of Operations. A practical expedient was elected to not recognize shipping and handling costs as a separate performance obligation under ASC 606.

Accounts Receivable

The components of accounts receivable are as follows:

	As of	
	December 31, 2022	December 31, 2021
Trade receivables	\$ 4,605	\$ 2,122
Unbilled receivables	3,082	1,277
Other short-term receivables	152	83
Allowance for doubtful accounts	(110)	(223)
Total accounts receivable	<u>\$ 7,729</u>	<u>\$ 3,259</u>

3. INCOME TAXES

Within the calculation of the Company's annual effective tax rate, the Company has used assumptions and estimates that may change as a result of future guidance, interpretation, and rule-making from the Internal Revenue Service, the SEC, and the FASB and/or various other taxing jurisdictions. For example, the Company anticipates that the state jurisdictions will continue to determine and announce their conformity to the U.S. Tax Act which could have an impact on the annual effective tax rate.

On March 27, 2020 the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) was enacted which enacted the following relief among others;

- Amended federal tax laws to permit 100% bonus depreciation for eligible qualified improvement property placed in service by the taxpayer after December 31, 2017 and before January 1, 2023.
- Eliminated the 80% of taxable income limitations by allowing corporate entities to fully utilize Net Operating Losses (NOL) carryforwards to offset taxable income in 2018, 2019 or 2020. The 80% limitation is reinstated for tax years after 2020.
- Increased the net interest expense deduction limit to 50% of adjusted taxable income from 30% for tax years beginning January 1, 2019 and 2020.
- Allowed taxpayers with alternative minimum tax credits to claim a refund in 2020 for the entire amount of the credit instead of recovering the credit through refunds over a period of years, as originally enacted by the Tax Cuts and Jobs Act in 2017.
- Allowed taxpayers the carryback of Net Operating Losses (NOL) as a result of tax years beginning after December 31, 2017, but before January 1, 2021 for the five prior years of the generated loss.

On August 16, 2022, President Biden signed into law the Inflation Reduction Act (IRA) of 2022, which, among other things, imposes a new 15% corporate Alternative Minimum Tax (AMT) based on audited financial statement income ("AFSI") applicable to corporations with a three-year average AFSI over \$1 billion. The AMT is effective for the 2023 tax year and, if applicable, corporations must pay the greater of the regular corporate income tax or the AMT. Although NOL carryforwards created through the regular corporate income tax system cannot be used to reduce the AMT, financial statement net operating losses can be used to reduce AFSI and the amount of AMT owed. The IRA of 2022 as enacted requires the U.S. Treasury to provide regulations and other guidance necessary to administer the AMT, including further defining allowable adjustments to determine AFSI, which directly impacts the amount of AMT to be paid. Based on interim guidance issued by the U.S. Treasury in late December 2022, the Company believes that it is more likely than not it will not be subject to the AMT beginning 2023. The Company continues to evaluate the impacts of the Inflation Reduction Act of 2022 but does not expect this legislation to have a material impact on the Company's financial statements.

For tax years beginning before January 1, 2022, taxpayers can make an election with respect to research and experimental (R&E) expenditures incurred in connection with a trade or business to either currently deduct or defer and amortize such expenditures over a period of not less than 60 months. However, the Tax Cuts and Jobs Act of 2017 (TCJA) requires taxpayers to capitalize R&E expenditures effective for taxable years beginning after December 31, 2021. R&E expenditures attributable to US-based research must be amortized over a period of 5 years and R&E expenditures attributable to research conducted outside of the US must be amortized over a period of 15 years. Further, the statute provides that the definition of R&E expenditures includes amounts paid or incurred in connection with the development of any software. The Company has recorded a deferred tax asset of \$528 related to research and experimental expenditures for the year ending December 31, 2022.

The components of loss before taxes for the years ended December 31 are as follows:

	2022	2021
Origin of income before taxes		
United States	\$ (1,262)	\$ 798
Foreign	(126)	(730)
Income (loss) before income taxes	<u>\$ (1,388)</u>	<u>\$ 68</u>

Significant components of income tax benefit (expense) for the years ended December 31 are as follows:

	2022	2021
Current:		
Federal	\$ —	\$ —
State	(6)	(9)
Foreign	(10)	—
Total current	(16)	(9)
Deferred:		
Federal	(19)	—
State	(19)	(5)
Total deferred	(38)	(5)
Income tax expense	<u>\$ (54)</u>	<u>\$ (14)</u>

A reconciliation between the provision for income taxes calculated at the U.S. federal statutory income tax rate and the consolidated income tax expense in the consolidated statements of operations for the years ended December 31 is as follows:

	2022	2021
Provision at the U.S. federal statutory rate	21.0%	21.0%
State taxes, net of federal benefit	3.1%	(15.5)%
Foreign tax rate differential	0.4%	(30.2)%
Valuation allowance	(48.8)%	(1504.6)%
Chile outside basis differential	0.4%	34.4%
PPP Loan Forgiveness	—%	(484.6)%
Accrual to return	3.1%	(329.3)%
Research and development credit	5.9%	(144.9)%
State rate change	9.5%	(124.0)%
China deferred adjustment	—%	1006.0%
China enterprise tax	—%	—%
Share based compensation	3.3%	1590.3%
Other true up	—%	—%
Intangible assets impairment and other non-deductibles	—%	—%
Other	(1.8)%	2.0%
Income tax (expense) benefit effective rate	<u>(3.9)%</u>	<u>20.6%</u>

The deferred tax assets and liabilities at December 31 are as follows:

	2022	2021
Deferred tax assets:		
Stock compensation expense	\$ 272	\$ 173
Goodwill	182	591
Royalty accruals	10	10
Bad debt allowance	53	51
Net operating loss carryforwards	12,158	11,950
Credit carry-forwards	1,058	992
Inventory reserve	233	217
Depreciation	585	556
Research and Development Costs	528	—
Other	471	376
Total deferred tax assets	<u>15,550</u>	<u>14,916</u>
Deferred tax liabilities:		
Intangible assets	(100)	(105)
Total deferred tax liabilities	<u>(100)</u>	<u>(105)</u>
Net deferred tax asset before valuation allowance	15,450	14,811
Valuation allowances for deferred tax assets	(15,627)	(14,950)
Net deferred tax liability	<u>\$ (177)</u>	<u>\$ (139)</u>

The change in the valuation allowance for deferred tax assets for the years ended December 31 is as follows:

Year	Balance at January 1	Charged to costs and expenses	(Deductions)/Other	Balance at December 31
2021	\$ 15,971	(1,021)	—	\$ 14,950
2022	\$ 14,950	677	—	\$ 15,627

For the years ended December 31, 2022 and 2021, there were no exercises of stock options.

As required by ASC 740, we recognize the financial statement benefit of a tax position only after determining that the relevant tax authority would more likely than not sustain the position following an audit. For tax positions meeting the more-likely-than-not threshold, the amount recognized in the financial statements is the largest benefit that has a greater than 50% likelihood of being realized upon ultimate settlement with the relevant tax authority.

We recognize interest and penalties related to unrecognized tax benefits in income tax expense for all periods presented. There were no interest and penalties recognized in income tax expense during the years ended December 31, 2022 and 2021. There were no unrecognized tax benefits as of December 31, 2022 and 2021.

We are subject to taxation in the U.S., various states, and in non-U.S. jurisdictions. Our U.S. income tax returns are primarily subject to examination from 2020 through 2022; however, U.S. tax authorities also have the ability to review prior tax years to the extent loss carryforwards and tax credit carryforwards are utilized. The open years for the non-U.S. tax returns range from 2015 through 2022 based on local statutes.

Management periodically estimates our probable tax obligations using historical experience in tax jurisdictions and informed judgments. There are inherent uncertainties related to the interpretation of tax regulations in the jurisdictions in which we transact business. The judgments and estimates made at a point in time may change based on the outcome of tax audits, as well as changes to or further interpretations of regulations. If such changes take place, there is a risk that the tax rate may increase or decrease in any period. Tax accruals for tax liabilities related to potential changes in judgments and estimates for both federal and state tax issues are included in current liabilities on the consolidated balance sheet.

The investment in foreign subsidiaries other than Fuel Tech S.p.A (Chile) and Beijing Fuel Tech is considered to be indefinite in duration and therefore we have not provided a provision for deferred U.S. income taxes on the unremitted earnings from those subsidiaries. A provision has not been established because it is not practicable to determine the amount of unrecognized deferred tax liability for such unremitted foreign earnings and because it is our present intention to reinvest the undistributed earnings indefinitely.

As required by ASC 740, a valuation allowance must be established when it is more likely than not that all or a portion of a deferred tax asset will not be realized. We have approximately \$28,227 of U.S. net operating loss carryforwards available to offset future U.S. taxable income as of December 31, 2022. The net operating loss carry-forwards related to tax losses generated in years ending December 31, 2018 and before in the U.S. totaling \$10,733 begin to expire in 2034. Further, we have tax loss carry-forwards of approximately \$6,760 available to offset future foreign income in Italy as of December 31, 2022. We have recorded a full valuation allowance against the deferred tax asset because we cannot anticipate when or if this entity will have taxable income sufficient to utilize the net operating losses in the future. There is no expiration of the net operating loss carry-forwards related to tax losses generated in prior years in Italy. Finally, we have tax loss carry-forwards of approximately \$13,684 available to offset future foreign income in China as of December 31, 2022.

As of December 31, 2019, the investment in Fuel Tech S.p.A (Chile) was no longer considered to be indefinite and a provision for deferred U.S. income taxes was recorded. As of December 31, 2021, the provision for deferred U.S. income taxes related to the Fuel Tech S.p.A (Chile) investment was \$136. As of December 31, 2022, Fuel Tech S.p.A (Chile) was still included in continuing operations. As a result an additional (\$15) was recorded, adjusting the total consideration to \$151. The deferred income taxes associated with this investment are offset by a valuation allowance of (\$151).

4. COMMON STOCK

At December 31, 2022 and 2021, respectively, we had 31,272,303 and 31,227,300 shares of common stock issued and 30,296,297 and 30,263,791 outstanding, with an additional 6,715 shares reserved for issuance upon conversion of the nil coupon non-redeemable convertible unsecured loan notes (see Note 6). As of December 31, 2022, we had 5,600,676 shares reserved for issuance upon the exercise or vesting of equity awards, of which 384,500 are stock options that are currently exercisable (see Note 8).

5. TREASURY STOCK

Common stock held in treasury totaled 976,006 and 963,509 with a cost of \$2,251 and \$2,234 at December 31, 2022 and 2021, respectively. These shares were withheld from employees to settle personal tax withholding obligations that arose as a result of restricted stock units that vested during the periods presented.

6. NIL COUPON NON-REDEEMABLE CONVERTIBLE UNSECURED LOAN NOTES

At December 31, 2022 and 2021, we had a principal amount of \$76 of nil coupon non-redeemable convertible unsecured perpetual loan notes (Loan Notes) outstanding. The Loan Notes are convertible at any time into common stock at rates of \$6.50 and \$11.43 per share, depending on the note. As of December 31, 2022, the nil coupon loan notes were convertible into 6,715 shares of common stock. Based on our closing stock price of \$1.27 at December 31, 2022, the aggregate fair value of the common stock that the holders would receive if all the loan notes were converted would be approximately \$9, which is less than the principal amount of the loans outstanding as of that date. The Loan Notes bear no interest and have no maturity date. They are repayable in the event of our dissolution and the holders do not have the option to cash-settle the notes. Accordingly, they have been classified within stockholders' equity in the accompanying balance sheets. The notes do not hold distribution or voting rights unless and until converted into common stock.

For the years ended December 31, 2022 and 2021, there were no Loan Notes repurchased by the Company.

7. WARRANTS

On February 11, 2021, Fuel Tech entered into a securities purchase agreement to issue and sell, in a private placement, 5,000,000 shares of common stock and 2,500,000 warrants exercisable for a total of 2,500,000 shares of common stock with an exercise price of \$5.10 per Warrant Share, at a purchase price of \$5.1625 per Share and associated warrant. The gross proceeds to the Company from the Private Placement were \$25,812, before deducting placement agent fees and offering expenses of \$1,783. Subject to certain ownership limitations, the Warrants are immediately exercisable upon issuance and expire on the five and one-half year anniversary of the effective date of the registration statement registering the Warrant Shares for resale. In addition, the Company issued to the placement agent Warrants to purchase up to 350,000 shares of common stock. The Placement Agent Warrants are exercisable at an exercise price of \$6.45 per share of common stock and expire on the five and one-half year anniversary of the effective date of the registration statement registering the Shares and the Warrant Shares for resale.

Fuel Tech uses the Black-Scholes option pricing model to estimate the grant date fair value of the warrants. The principal variable assumptions utilized in valuing warrants and the methodology for estimating such model inputs are: (1) risk-free interest rate of 0.59%, an estimate based on the yield of zero-coupon treasury securities with a maturity equal to the expected life of the warrant; (2) expected volatility of 94.66% – an estimate based on the historical volatility of Fuel Tech's common stock for a period equal to the expected life of the warrant; and (3) expected life of the warrant of five and one-half years based on the term of the warrant.

The calculated fair value allocated to the warrants is \$7,337. This amount has been recorded as Additional paid in capital - warrants and is shown net in the Additional paid in capital line of the consolidated balance sheets.

The issuance of warrants to purchase shares of the Company's common stock are summarized as follows:

	Shares
Outstanding as of December 31, 2021	2,850,000
Granted	—
Exercised	—
Outstanding as of December 31, 2022	2,850,000

The following table summarizes information about warrants outstanding and exercisable at December 31, 2022:

Range of Exercise Price		Number Outstanding/ Exercisable	Weighted-Average Remaining Life in Years		Weighted-Average Exercise Price
\$ 5.10		2,500,000	3.62	\$	5.10
\$ 6.45		350,000	3.62	\$	6.45
		2,850,000			

8. STOCK-BASED COMPENSATION

Under our stock-based employee compensation plan, referred to as the Fuel Tech, Inc. 2014 Long-Term Incentive Plan (Incentive Plan), awards may be granted to participants in the form of Non-Qualified Stock Options, Incentive Stock Options, Stock Appreciation Rights, Restricted Stock, RSUs, Performance Awards, Bonuses or other forms of share-based or non-share-based awards or combinations thereof. Participants in the Incentive Plan may be our directors, officers, employees, consultants or advisors (except consultants or advisors in capital-raising transactions) as the directors determine are key to the success of our business. There are a maximum of 5,600,676 shares that may be issued or reserved for awards to participants under the Incentive Plan. At December 31, 2022, we had 1,899,250 equity awards available for issuance under the Incentive Plan.

We did not record any excess tax benefits within income tax expense for the years ended December 31, 2022 and 2021. Given the Company has a full valuation allowance on its deferred tax assets, there were no excess tax benefits to record. In addition, we account for forfeitures of awards based on an estimate of the number of awards expected to be forfeited and adjusting the estimate when it is no longer probable that the employee will fulfill the service condition.

Stock-based compensation is included in selling, general and administrative costs in our consolidated statements of operations. The components of stock-based compensation from continuing operations for the years ended December 31, 2022 and 2021 were as follows:

	For the Year Ended December 31,	
	2022	2021
Stock options and restricted stock units, net of forfeitures	\$ 224	\$ 82
After-tax effect of stock based compensation	\$ 224	\$ 82

Stock Options

The stock options granted to employees under the Incentive Plan have a 10-year life and they vest as follows: 50% after the second anniversary of the award date, 25% after the third anniversary, and the final 25% after the fourth anniversary of the award date. Fuel Tech calculates stock compensation expense for employee option awards based on the grant date fair value of the award, less expected annual forfeitures, and recognizes expense on a straight-line basis over the four-year service period of the award. Stock options granted to members of our Board of Directors vest immediately. Stock compensation for these awards is based on the grant date fair value of the award and is recognized in expense immediately.

Fuel Tech uses the Black-Scholes option pricing model to estimate the grant date fair value of employee stock options. The principal variable assumptions utilized in valuing options and the methodology for estimating such model inputs include: (1) risk-free interest rate – an estimate based on the yield of zero-coupon treasury securities with a maturity equal to the expected life of the option; (2) expected volatility – an estimate based on the historical volatility of Fuel Tech's common stock for a period equal to the expected life of the option; and (3) expected life of the option – an estimate based on historical experience including the effect of employee terminations.

There were no stock options granted during the years ended December 31, 2022 and 2021.

The following table presents a summary of our stock option activity and related information for the years ended December 31:

	2022		2021	
	Number of Options	Weighted-Average Exercise Price	Number of Options	Weighted-Average Exercise Price
Outstanding at beginning of year	434,500	\$ 3.05	484,500	\$ 3.57
Granted	—	—	—	—
Exercised	—	—	—	—
Expired or forfeited	(50,000)	3.55	(50,000)	8.16
Outstanding at end of year	384,500	\$ 2.98	434,500	\$ 3.05
Exercisable at end of year	384,500	\$ 2.98	434,500	\$ 3.05
Weighted-Average Remaining Contractual Life (years)		2.43		3.08
Aggregate Intrinsic Value		\$ 27		\$ 38

The aggregate intrinsic value in the preceding table represents the total pretax intrinsic value, based on our closing stock price of \$1.27 as of December 31, 2022, which would have been received by the option holders had those options holders exercised their stock options as of that date.

The following table summarizes information about stock options outstanding at December 31, 2022:

Options Outstanding and Exercisable				
Range of Exercise Prices	Number of Options	Weighted-Average Remaining Contractual Life (years)	Weighted-Average Exercise Price	
\$0.96 - \$1.27	88,000	4.9	\$	0.97
\$1.28 - \$2.01	27,000	3.4		1.58
\$2.02 - \$3.15	105,000	2.4		2.44
\$3.16 - \$4.54	70,000	0.4		3.85
\$4.55 - \$5.22	94,500	1.4		5.22
	384,500	2.4	\$	2.98

As of and for the 12 months ended December 31, 2022, there was no non-vested stock option activity and no total unrecognized compensation cost related to non-vested stock options granted under the Incentive Plan. Fuel Tech received no proceeds from the exercise of stock options in the years ended December 31, 2022 and 2021. It is our policy to issue new shares upon option exercises, loan conversions, and vesting of restricted stock units. We have not used cash and do not anticipate any future use of cash to settle equity instruments granted under share-based payment arrangements. Shares received for exercise of stock options come from newly issued shares.

Restricted Stock Units

RSUs granted to employees vest over time based on continued service (typically vesting over a period between two and four years), and RSUs granted to directors vest after a one year vesting period based on continued service. Such time-vested RSUs are valued at the date of grant using the intrinsic value method based on the closing price of the common stock on the grant date. Compensation cost, adjusted for estimated forfeitures, is amortized on a straight-line basis over the requisite service period.

During the years ended December 31, 2022 and 2021, there were 45,003 and 50,002 restricted stock units that vested with a grant date fair value of \$68 and \$75, respectively. As of December 31, 2022, there was \$738 of total unrecognized compensation cost related to all non-vested share-based compensation arrangements granted under the Incentive Plan. That cost is expected to be recognized over the remaining requisite service period of 2.4 years.

A summary of restricted stock unit activity for the years ended December 31, 2022 and 2021 is as follows:

	Shares	Weighted Average Grant Date Fair Value
Unvested restricted stock units at December 31, 2020	100,005	\$ 1.50
Forfeited	(5,000)	0.97
Vested	(50,002)	1.50
Unvested restricted stock units at December 31, 2021	45,003	1.51
Granted	807,048	1.32
Forfeited	(40,000)	1.32
Vested	(45,003)	1.51
Unvested restricted stock units at December 31, 2022	767,048	\$ 1.32

Deferred Directors Fees

In addition to the Incentive Plan, Fuel Tech has a Deferred Compensation Plan for Directors (Deferred Plan). Under the terms of the Deferred Plan, Directors can elect to defer Directors' fees for shares of Fuel Tech common stock that are issuable at a future date as defined in the agreement. In accordance with ASC 718, Fuel Tech accounts for these awards as equity awards as opposed to liability awards. In 2022 and 2021, there was no stock-based compensation expense under the Deferred Plan.

9. COMMITMENTS AND CONTINGENCIES

Fuel Tech is subject to various claims and contingencies related to, among other things, workers compensation, general liability (including product liability), and lawsuits. The Company records liabilities where a contingent loss is probable and can be reasonably estimated. If the reasonable estimate of a probable loss is a range, the Company records the most probable estimate of the loss or the minimum amount when no amount within the range is a better estimate than any other amount. The Company discloses a contingent liability even if the liability is not probable or the amount is not estimable, or both, if there is a reasonable possibility that a material loss may have been incurred.

From time to time we are involved in litigation with respect to matters arising from the ordinary conduct of our business. In the opinion of management, based upon presently available information, either adequate provision for anticipated costs have been accrued or the ultimate anticipated costs will not materially affect our consolidated financial position, results of operations, or cash flows. We do not believe we have any pending loss contingencies that are probable or reasonably possible of having a material impact on our consolidated financial position, results of operations or cash flows.

During the third quarter of 2020, the Company was notified of an equipment component failure at a foreign customer location. The failure was remedied under the warranty provision of the contracts that was in place with the customer and supplier and was completed in the third quarter of 2021. As of December 31, 2022 and 2021 no charges were recorded in the other accrued liabilities line of the Consolidated Balance Sheets.

Performance Guarantees

The majority of Fuel Tech's long-term equipment construction contracts contain language guaranteeing that the performance of the system that is being sold to the customer will meet specific criteria. On occasion, performance surety bonds and bank performance guarantees/letters of credit are issued to the customer in support of the construction contracts as follows:

- in support of the warranty period defined in the contract; or
- in support of the system performance criteria that are defined in the contract.

As of December 31, 2022, we had outstanding bank performance guarantees and letters of credit in the amount of \$689 in support of equipment construction contracts that have not completed their final acceptance test or that are still operating under a warranty period. The performance guarantees and letters of credit expire in dates ranging from June 2023 through December 2024. The expiration dates may be extended if the project completion dates are extended. Our management believes it is probable that these projects will be successfully completed and that there will not be a material adverse impact on our operations from these bank performance guarantees and letters of credit. As a result, no liability has been recorded for these performance guarantees.

Product Warranties

Fuel Tech issues a standard product warranty with the sale of our products to customers. Our recognition of warranty liability is based primarily on analyses of warranty claims experience in the preceding years as the nature of our historical product sales for which we offer a warranty are substantially unchanged. This approach provides an aggregate warranty accrual that is historically aligned with actual warranty claims experienced. There was no change in the warranty liability included in the Other accrued liabilities line of the Consolidated Balance Sheet in 2022 and 2021. The warranty liability balance was \$159 at December 31, 2022 and 2021.

10. LEASES

The terms of the Company's three primary office space lease arrangements are as follows:

- The Gallarate, Italy building lease, for approximately 1,335 square feet, runs through April 30, 2025. This facility serves as the operating headquarters for our European operations.
- The Aurora, IL warehouse lease, for approximately 11,000 square feet, runs through December 31, 2023. This facility serves as an outside warehouse facility.
- The Overland Park, KS lease, for approximately 600 square feet, runs through October 15, 2024. This facility serves primarily as a sales office.

The Company also has three additional operating leases related to certain office equipment and company leased vehicles and one short-term lease. Our leases have remaining lease terms of 1.0 years to 2.4 years. Our leases do not contain any material residual value guarantees or material restricted covenants and we currently have no material sublease arrangements. We have no financing leases as defined under ASC 842.

Total operating lease expense for the years ended December 31, 2022 is as follows:

	2022	2021
Operating lease cost	\$ 176	\$ 198
Short-term lease cost	29	21
Total lease cost	<u>\$ 205</u>	<u>\$ 219</u>

The weighted average remaining lease term was 1.77 years as of December 31, 2022. The weighted average discount rate was 4.48% as of December 31, 2022.

Remaining maturities of our existing lease liabilities as of December 31, 2022 were as follows:

Year Ending December 31,	Operating Leases
2023	\$ 149
2024	61
2025	13
Thereafter	—
Total lease payments	<u>\$ 223</u>
Less imputed interest	(32)
Total	<u>\$ 191</u>

The following is the balance sheet classification of our existing lease liabilities:

	2022	2021
Operating lease liabilities - current	\$ 125	\$ 113
Operating lease liabilities - non-current	66	122
Total operating lease liabilities	<u>\$ 191</u>	<u>\$ 235</u>

Supplemental cash flow information related to leases was as follows:

	For the Twelve Months ended December 31, 2022	For the twelve months ended December 31, 2021
Cash paid for amounts included in the measurement of lease liabilities	\$ 157	\$ 178
Leased assets obtained in exchange for operating lease liabilities	139	158

11. DEBT FINANCING

On June 30, 2022, the Company entered into an Investment Collateral Security agreement to use for the sole purpose of issuing standby letters of credit that replaces the former Cash Collateral agreement with BMO Harris. The Investment Collateral Security agreement requires us to pledge our investments as collateral for 150% of the aggregate face amount of outstanding standby letters of credit. The Company pays 250 basis points on the face values of outstanding letters of credit. There are no financial covenants set forth in the Investment Collateral Security agreement. At December 31, 2022, the Company had outstanding standby letters of credit totaling approximately \$689 under the Investment Collateral Security agreement. At December 31, 2022, the investments held as collateral totaled \$1,034. Fuel Tech is committed to reimbursing the issuing bank for any payments made by the bank under these instruments.

On April 17, 2020, the Company received \$1,556 in loan proceeds from the Paycheck Protection Program (PPP), established pursuant to the Coronavirus Aid, Relief, and Economic Security Act and administered by the U.S. Small Business Administration (SBA). The unsecured loan is evidenced by a promissory note of the Company dated April 15, 2020 in the principal amount of \$1,556, issued to BMO Harris Bank N.A., the lender.

On January 8, 2021, the Company received full forgiveness from the SBA for the entire balance of loan proceeds used to fund its qualified payroll expenses. The Company accounted for the PPP Loan as debt in accordance with ASC 470, Debt and accrued interest in accordance with the interest method under ASC 835-30. When the loan was forgiven, the Company reduced the non-current liability by the amount forgiven and recorded other income in the Consolidated Statements of Operations. The SBA has the right to audit the loan forgiveness for 6 years after the date the loan was forgiven.

12. BUSINESS SEGMENT AND GEOGRAPHIC FINANCIAL DATA

Business Segment Financial Data

We segregate our financial results into two reportable segments representing two broad technology segments as follows:

- The Air Pollution Control technology segment includes technologies to reduce NOx emissions in flue gas generated by the firing of natural gas or coal from boilers, incinerators, furnaces and other stationary combustion sources. These include Over Fire Air systems, NOxOUT® and HERT™ Selective Non-Catalytic Reduction systems, and Selective Catalytic Reduction (SCR) systems. Our SCR systems can also include Ammonia Injection Grid, and GSG™ Graduated Straightening Grid systems to provide high NOx reductions at significantly lower capital and operating costs than conventional SCR systems. ULTRA® technology creates ammonia at a plant site using safe urea for use with any SCR application. ESP technologies make use of electrostatic precipitator products and services to reduce particulate matter. FGC systems are chemical injection systems offered in markets outside the U.S. and Canada to enhance electrostatic precipitator and fabric filter performance in controlling particulate emissions.
- The FUEL CHEM® technology segment, which uses chemical processes in combination with advanced CFD and CKM boiler modeling, for the control of slagging, fouling, corrosion, opacity and other sulfur trioxide-related issues in coal-fired furnaces and boilers through the addition of chemicals into the furnace using TIFI® Targeted In-Furnace Injection™ technology.

The "Other" classification includes those profit and loss items not allocated to either reportable segment. There are no inter-segment sales that require elimination.

We evaluate performance and allocate resources based on gross margin by reportable segment. The accounting policies of the reportable segments are the same as those described in the summary of significant accounting policies. We do not review assets by reportable segment, but rather, in aggregate for the Company as a whole.

Information about reporting segment net sales and gross margin from continuing operations are provided below:

	Air Pollution Control Segment	FUEL CHEM Segment	Other	Total
For the year ended December 31, 2022				
Revenues from external customers	\$ 10,597	\$ 16,344	\$ —	\$ 26,941
Cost of sales	(6,924)	(8,374)	—	(15,298)
Gross margin	3,673	7,970	—	11,643
Selling, general and administrative	—	—	(12,275)	(12,275)
Research and development	—	—	(895)	(895)
Operating income (loss) from continuing operations	\$ 3,673	\$ 7,970	\$ (13,170)	\$ (1,527)

	Air Pollution Control Segment	FUEL CHEM Segment	Other	Total
For the year ended December 31, 2021				
Revenues from external customers	\$ 6,896	\$ 17,365	\$ —	\$ 24,261
Cost of sales	(3,529)	(8,834)	—	(12,363)
Gross margin	3,367	8,531	—	11,898
Selling, general and administrative	—	—	(12,055)	(12,055)
Research and development	—	—	(1,332)	(1,332)
Operating income (loss) from continuing operations	\$ 3,367	\$ 8,531	\$ (13,387)	\$ (1,489)

Geographic Segment Financial Data

Information concerning our operations by geographic area is provided below. Revenues are attributed to countries based on the location of the end-user. Assets are those directly associated with operations of the geographic area.

	2022	2021
For the years ended December 31,		
Revenues:		
United States	\$ 20,311	\$ 19,515
Foreign	6,630	4,746
	<u>\$ 26,941</u>	<u>\$ 24,261</u>
As of December 31,		
Assets:		
United States	\$ 47,007	\$ 46,271
Foreign	3,117	3,703
	<u>\$ 50,124</u>	<u>\$ 49,974</u>

13. RESTRUCTURING ACTIVITIES

On January 18, 2019, the Company announced a planned suspension of its APC business operation in China (Beijing Fuel Tech). This action was part of Fuel Tech's ongoing operational improvement initiatives designed to prioritize resource allocation, reduce costs, and drive profitability for the Company on a global basis. The transition associated with the suspension of the APC business includes staff rationalization, supplier and partner engagement, and the monetization of certain assets. The remaining transition activities include the execution of the remaining activities to satisfy the requirements for the remaining APC projects in China (with a backlog totaling approximately \$5) in addition to collection efforts for the remaining accounts receivable.

The following table presents our revenues and net loss in China for the years ended December 31, 2022 and 2021:

	2022	2021
Total revenues	\$ 3	\$ 22
Net loss	(209)	(114)

The following table presents net assets in China for the years ended December 31, 2022 and 2021:

	2022	2021
Total assets	\$ 929	\$ 1,235
Total liabilities	79	92
Total net assets	<u>\$ 850</u>	<u>\$ 1,143</u>

Total assets primarily consist of cash and accounts receivable. Total liabilities consist of accounts payable and certain accrued liabilities.

The Company recorded no restructuring charges for the years ended December 31, 2022 and 2021.

14. ACCRUED LIABILITIES

The components of other accrued liabilities are as follows:

	As of	
	December 31, 2022	December 31, 2021
Contract liabilities (Note 2)	\$ 372	\$ 390
Warranty reserve (Note 9)	159	159
Other accrued liabilities	295	312
Total other accrued liabilities	<u>\$ 826</u>	<u>\$ 861</u>

ITEM 9 - CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None

ITEM 9A - CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

Under the supervision and with the participation of our Chief Executive Officer and Principal Financial Officer, our management evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act), as of the end of the period covered by this Annual Report on Form 10-K (the "Evaluation Date"). Based upon that evaluation, our Chief Executive Officer and Principal Financial Officer concluded that, as of the Evaluation Date, our disclosure controls and procedures are effective to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is (i) recorded, processed, summarized and reported, within the time periods specified in the Commission's rules and forms and (ii) accumulated and communicated to our management, including our Chief Executive Officer and Principal Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

Change in Internal Controls

There has been no change in the Company's internal control over financial reporting during the year covered by this report that has materially affected, or is reasonably likely to materially affect, its internal control over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f) under the Exchange Act. As required by Rule 13a-15(c) under the Exchange Act, our management has carried out an evaluation, with the participation of the Chief Executive Officer and Principal Financial Officer, of the effectiveness of its internal control over financial reporting as of the end of the last fiscal year. The framework on which such evaluation was based is contained in the report entitled "Internal Control—Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission (the "COSO Report") in 2013.

Our system of internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Based on its assessment, management has concluded that we maintained effective internal control over financial reporting as of December 31, 2022, based on criteria in "Internal Control - Integrated Framework" issued by the COSO in 2013.

ITEM 9B - OTHER INFORMATION

None

PART III

ITEM 10 – DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information required by this Item will be set forth under the captions “Election of Directors,” “Directors and Executive Officers of Fuel Tech,” “Compensation Committee,” “Audit Committee,” and “Financial Experts” in our definitive Proxy Statement related to the 2023 Annual Meeting of Stockholders (the “Proxy Statement”) and is incorporated by reference.

We have adopted a Code of Ethics and Business Conduct (the “Code”) that applies to all employees, officers and directors, including the Chief Executive Officer and Principal Financial Officer. A copy of the Code is available free of charge to any person on written or telephone request to our Legal Department at the address or telephone number described in Item 1 under the heading “Available Information.” The Code is also available on our website at www.ftek.com.

Other information concerning our directors and executive officers and relating to corporate governance will be set forth under the captions “Election of Directors,” “Audit Committee,” “Compensation and Nominating Committee,” “Financial Experts,” “Corporate Governance” and “General” in our Proxy Statement related to the 2023 Annual Meeting of Stockholders and is incorporated by reference.

ITEM 11 - EXECUTIVE COMPENSATION

Information required by this Item will be set forth under the caption “Executive Compensation” in our definitive Proxy Statement and is incorporated by reference.

ITEM 12 - SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The following table provides information for all equity compensation plans as of the fiscal year ended December 31, 2022, under which our securities were authorized for issuance:

<u>Plan Category</u>	Number of Securities to be issued upon exercise of outstanding options and vesting of restricted stock units	Weighted-average exercise price of outstanding options	Number of securities remaining available for future issuance under equity compensation plan excluding securities listed in column (a)
	(a)	(b)	(c)
Equity compensation plans approved by security holders	1,151,548	\$ 2.98	1,899,250

In addition to the plans listed above, we have a Deferred Compensation Plan for directors under which 100,000 shares of common stock have been reserved for issuance as deferred compensation with respect to director's fees.

Further information required by this Item will be set forth under the caption “Principal Stockholders and Stock Ownership of Management” in the definitive Proxy Statement and is incorporated by reference.

ITEM 13 - CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information required by this Item will be set forth under the captions “Compensation Committee Interlocks and Insider Participation” and “Certain Relationships and Related Transactions” in our definitive Proxy Statement and is incorporated by reference.

ITEM 14 - PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information required by this Item will be set forth under the caption “Approval of Appointment of Auditors” in our definitive Proxy Statement and is incorporated by reference.

PART IV

ITEM 15 - EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) (1) Financial Statements

The financial statements identified below and required by Part II, Item 8 of this Form 10-K are set forth above.

Management's Report on Internal Control Over Financial Reporting
 Report of Independent Registered Public Accounting Firm (PCAOB ID: 49)
 Consolidated Balance Sheets as of December 31, 2022 and 2021
 Consolidated Statements of Operations for Years Ended December 31, 2022 and 2021
 Consolidated Statements of Comprehensive Loss for Years Ended December 31, 2022 and 2021
 Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2022 and 2021
 Consolidated Statements of Cash Flows for the Years Ended December 31, 2022 and 2021
 Notes to Consolidated Financial Statements

(2) Financial Statement Schedules

All other schedules have been omitted because of the absence of the conditions under which they are required or because the required information, where material, is shown in the financial statements or the notes thereto.

(3) Exhibits

Exhibit	Description	Filed Herewith	Form	Incorporated by Reference	
				Period ending	Filing date
3.1	Certificate of Incorporation of Fuel Tech, Inc.		8-K		10/5/2006
3.2	Certificate of Conversion of Fuel Tech, Inc.		8-K		10/5/2006
3.3	Amended and Restated By-Laws of Fuel Tech, Inc. dated as of May 28, 2015		8-K		6/1/2015
4.1	Instrument Constituting US \$19,200,000 Nil Coupon Non-Redeemable Convertible Unsecured Loan Notes of Fuel-Tech N.V., dated December 21, 1989		10-Q	9/30/2009	11/4/2009
4.2	First Supplemental Instrument Constituting US \$3,000 Nil Coupon Non-Redeemable Convertible Unsecured Loan Notes of Fuel-Tech N.V., dated July 10, 1990		10-Q	9/30/2009	11/4/2009
4.3	Instrument Constituting US \$6,000 Nil Coupon Non-Redeemable Convertible Unsecured Loan Notes of Fuel-Tech N.V., dated March 12, 1993		10-Q	9/30/2009	11/4/2009
4.4*	Fuel Tech, Inc. Incentive Plan as amended through June 3, 2004		S-8		10/2/2006
4.5*	Fuel Tech, Inc. 2014 Long-Term Incentive Plan		S-8		3/31/2014
4.6*	Fuel Tech, Inc. Form of Non-Executive Director Stock Option Agreement		10-K	12/31/2006	3/6/2007
4.7	Fuel Tech, Inc. Form of 2014 Long-Term Incentive Plan Non-Employee Director's Stock Option Agreement		10-Q	6/30/2014	8/11/2014
4.8*	Fuel Tech, Inc. Form of Common Stock Warrant		8-K		2/18/2021
4.9*	Fuel Tech, Inc. Form of Placement Agent Warrant		8-K		2/18/2021
4.10*	Fuel Tech, Inc. Form of Restricted Stock Unit Agreement (2014 Long-Term Incentive Plan)		10-Q	6/30/2014	8/11/2014
4.11*	Fuel Tech, Inc. Form of 2014 Long-Term Incentive Plan Stock Option Agreement		10-Q	3/31/2015	5/11/2015

Table of Contents

10.1	Form of Indemnity Agreement between Fuel Tech, Inc. and its Directors and Officers.	8-K	99.1	2/7/2007
10.2*	2021 Corporate Incentive Plan of Fuel Tech, Inc.	8-K	10.2	3/3/2021
10.3*	2022 Corporate Incentive Plan of Fuel Tech, Inc.	8-K	99.1	4/11/2022
10.4*	2023 Corporate Incentive Plan of Fuel Tech, Inc.	8-K	99.1	3/3/2023
10.5*	2022 Corporate Objectives Plan of Fuel Tech, Inc.	8-K	99.2	4/11/2022
10.6*	2023 Corporate Objectives Plan of Fuel Tech, Inc.	8-K	99.2	3/3/2023
10.7*	2021 Fuel Tech, Inc. FUEL CHEM Officer Sales Commission Plan	8-K	99.2	12/21/2020
10.8*	2022 Fuel Tech, Inc. FUEL CHEM Officer Sales Commission Plan	8-K	99.2	12/14/2021
10.9*	2023 Fuel Tech, Inc. FUEL CHEM Officer Sales Commission Plan	8-K	99.2	12/12/2022
10.10*	2021 Fuel Tech, Inc. APC Officer and NSM Sales Commission Plan	8-K	99.1	12/21/2020
10.11*	2022 Fuel Tech, Inc. APC Officer and NSM Sales Commission Plan	8-K	99.1	12/14/2021
10.12*	2023 Fuel Tech, Inc. APC Officer and NSM Sales Commission Plan	8-K	99.1	12/12/2022
10.13*	Employment Agreement dated August 31, 2009, between William E. Cummings, Jr. and Fuel Tech, Inc.	10-K	12/31/2009	10.10
10.14*	Employment Agreement, dated September 20, 2010 between Vincent J. Arnone and Fuel Tech, Inc.	10-K	12/31/2011	10.21
10.15*	Engagement Letter, dated February 11, 2021, by and between Fuel Tech, Inc. and H.C. Wainwright & Co.	8-K	1.1	2/18/2021
10.16*	Employment Agreement, dated July 8, 1996, between Ellen T. Albrecht and Fuel Tech, Inc.	10-K	10.13	3/8/2022
10.17*	Form of Securities Purchase Agreement	8-K	10.1	2/18/2021
10.18*	Form of Registration Rights Agreement	8-K	10.2	2/18/2021
23.1	Consent of Independent Registered Public Accounting Firm.	X		
31.1	Certifications of Chief Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X		
31.2	Certifications of principal financial officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X		
32	Certification of Chief Executive Officer and principal financial officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.	X		

101.1 INS	Inline XBRL Instance Document.
101.2 SCH	Inline XBRL Taxonomy Extension Schema Document.
101.3 CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.4 DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.5 LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.6 PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104	Cover Page Interactive Data File (embedded within the Inline XBRL and contained in Exhibit 101)

* Indicates a management contract or compensatory plan or arrangement.

** Portions of this document have been omitted pursuant to a request for confidential treatment and the omitted information has been filed separately with the Securities and Exchange Commission.

ITEM 16 - FORM 10-K SUMMARY

None.

SIGNATURES AND CERTIFICATIONS

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

FUEL TECH, INC.

Date: March 7, 2023

By: /s/ Vincent J. Arnone
Vincent J. Arnone
President and Chief Executive Officer
(Principal Executive Officer)

Date: March 7, 2023

By: /s/ Ellen T. Albrecht
Ellen T. Albrecht
Vice President, Chief Financial Officer and Treasurer
(Principal Financial Officer)

Pursuant to the requirements of the Securities and Exchange Act of 1934, this report has been duly signed below by the following persons on behalf of Fuel Tech, Inc. and in the capacities and on the date indicated.

Date: March 7, 2023

<u>Signature</u>	<u>Title</u>
<u>/s/ Vincent J. Arnone</u> Vincent J. Arnone	President and Chief Executive Officer (Principal Executive Officer)
<u>/s/ Ellen T. Albrecht</u> Ellen T. Albrecht	Vice President, Chief Financial Officer and Treasurer (Principal Financial Officer)
<u>/s/ Douglas G. Bailey</u> Douglas G. Bailey	Director
<u>/s/ Dennis L. Zeitler</u> Dennis L. Zeitler	Director
<u>/s/ Sharon L. Jones</u> Sharon L. Jones	Director

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statements (No. 333-201422 and 333-36390) on Form S-8 and Registration Statement (No. 333-253619) on Form S-3 of Fuel Tech, Inc. of our report dated March 7, 2023, relating to the consolidated financial statements of Fuel Tech, Inc., appearing in this Annual Report on Form 10-K of Fuel Tech, Inc. for the year ended December 31, 2022.

/s/ RSM US LLP

Chicago, Illinois
March 7, 2023

I, Vincent J. Arnone, certify that:

1. I have reviewed this Annual Report on Form 10-K of Fuel Tech, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15 (e) and 15d-15 (e) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):
 - a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 7, 2023

By: /s/ Vincent J. Arnone
Vincent J. Arnone
Chief Executive Officer

I, Ellen T. Albrecht certify that:

1. I have reviewed this Annual Report on Form 10-K of Fuel Tech, Inc.;

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

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

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

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

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

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

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

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

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

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

Date: March 7, 2023

By: /s/ Ellen T. Albrecht
Ellen T. Albrecht
Chief Financial Officer and Treasurer
(Principal Financial Officer)

The undersigned in their capacities as Chief Executive Officer and Chief Financial Officer of the Registrant do hereby certify that:

(i) this report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(ii) information contained in the report fairly presents, in all material respects, the financial condition and results of operations of the Registrant as of, and for, the periods presented in the report.

Date: March 7, 2023

By: /s/ Vincent J. Arnone
Vincent J. Arnone
Chief Executive Officer

Date: March 7, 2023

By: /s/ Ellen T. Albrecht
Ellen T. Albrecht
Chief Financial Officer and Treasurer
(Principal Financial Officer)

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (the "Act") this certification accompanies the Report and shall not, except to the extent required by the Act, be deemed filed by the Registrant for purposes of Section 18 of the Securities Exchange Act of 1934, as amended.

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Fuel Tech, Inc. and will be retained by Fuel Tech, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.