FUEL TECH, INC.
Form 10-K
March 14, 2017
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SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

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Form 10-K
(Mark One)
ý ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended: December 31, 2016
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

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Fuel Tech, Inc.
(Exact name of registrant as specified in its charter)

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| Delaware | 20-5657551 |
|---|---|
| (State of Incorporation) | (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:

COMMON STOCK, $0.01 par value per share NASDAQ
Securities registered pursuant to Section 12(g) of the Act: NONE

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Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ¨ No ý
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 ý
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 ý No ¨
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ý No ¨
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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

| | |
|---|---|
| Large Accelerated Filer ¨ | Accelerated Filer ¨ |
| Non-accelerated Filer ¨ (Do not check if a smaller reporting company) | Smaller reporting company ý |

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

As of June 30, 2016, the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was approximately $31,097,000 based on the closing sale price as reported on the NASDAQ National Market System.

As of February 28, 2017, there were 23,459,265 shares of common stock outstanding.

Documents incorporated by reference:

Portions of the definitive Proxy Statement to be delivered to shareholders in connection with the Annual Meeting of Shareholders to be held on May 18, 2017 are incorporated by reference into Part III.

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TABLE OF DEFINED TERMS

| Term | Definition |
|---|---|
| AIG | Ammonia Injection Grid |
| ASCR™ | A trademark used to describe our Advanced Selective Catalytic Reduction process |
| CAIR | Clean Air Interstate Rule |
| CAVR | Clean Air Visibility Rule |
| CSAPR | Cross-State Air Pollution Rule |
| CFD | Computational Fluid Dynamics |
| EPA | The U.S. 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 |
| $NO_x$ | Oxides of nitrogen |
| $NO_x$OUT® | A trademark used to describe one of our SNCR processes for the reduction of NOx |
| $NO_x$OUT-SCR® | A trademark used to describe our direct injection of urea as a catalyst reagent |
| $NO_x$OUT CASCADE® | A trademark used to describe our process for the combination of SNCR and SCR technologies |
| 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 |
| ULTRA™ | |

A trademark used to describe our process for generating ammonia for use as a Selective Catalytic Reduction reagent

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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 identifying forward-looking statements. These statements are based on information currently available to us and are subject to various risks, uncertainties, and other factors, including, but not limited to, those discussed herein under the caption "Risk Factors" that could cause our actual growth, results of operations, financial condition, cash flows, performance and business prospects and opportunities to differ materially from those expressed in, or implied by, these statements. Except as expressly required by the federal securities laws, we undertake no obligation to update such factors or to publicly announce the results of any of the forward-looking statements contained herein to reflect future events, developments, or changed circumstances or for any other reason. Investors are cautioned that all forward-looking statements involve risks and uncertainties, including those detailed in our filings with the Securities and Exchange Commission. See "Risk Factors" in Item 1A.

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, combustion efficiency and advanced engineering services. These technologies enable our customers to operate efficiently in a cost-effective and environmentally sustainable manner. We operate as a fully integrated company to apply our extensive knowledge of carbonaceous fuel and combustion engineering to serve a variety of end markets. Our Air Pollution Control (APC) and FUEL CHEM® business processes rely heavily on our unique ability to inject chemical slurries into combustion units, in precise concentrations and locations, to achieve a desired outcome. Our Fuel Conversion business is a development stage opportunity focused on creating and manufacturing value-added engineered carbon feedstock products for carbon feedstock customer markets.

- Our APC technologies include advanced combustion modification techniques including low $NO_x$ burners and over fire air systems, along with post-combustion nitrogen oxide ($NO_x$) control approaches, including $NO_x$OUT® and HERT™ Selective Non-Catalytic Reduction (SNCR) and Rich Reagent Injection (RRI) systems. Our Advanced Selective Catalytic Reduction (ASCR) system utilizes the combination of combustion systems and SNCR to provide a cost effective alternative to high capital cost, standalone conventional SCR systems while providing similar $NO_x$ reduction levels. The ULTRA™ system generates ammonia on-site for SCR systems using safe urea reagent. Our SCR group provides process design optimization, performance testing and improvement, and catalyst selection services for SCR systems on coal-fired boilers. These technologies have established us as a leader in $NO_x$ reduction, with installations on over 1,000 units worldwide, where coal, fuel oil, natural gas, municipal waste, biomass, and other fuels are utilized.

- Our FUEL CHEM technologies revolve around the unique application of chemical injection programs which improve the efficiency, reliability, fuel flexibility 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 ($PM_{2.5}$), sulfur dioxide ($SO_2$), and carbon dioxide ($CO_2$). We use our patented 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.

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- The Fuel Conversion business represents the continuing evolution of a new research and business development initiative we first commenced in 2014 following our acquisition of intellectual property rights and know-how related to the CARBONITE® fuel conversion process and technology. The goal of our Fuel Conversion technology is to convert coals of various grades into value-added engineered carbon feedstock products that are designed to be high in energy content and manufactured to contain other customizable carbon feedstock characteristics desirable in a variety of carbon feedstock use applications. Our Fuel Conversion technology has a number of potential applications including certain coal replacement, electric arc furnace reductant, ferro-alloy feedstock, and mercury reduced carbon feedstock. Since 2014, we have been testing and developing certain engineered carbon feedstock products for specific market applications. We are in the process of evaluating the commercialization of these product offerings with prospective customers.

Many of our products and services rely heavily on our computational fluid dynamics and chemical kinetics modeling 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

Regulations and Markets: Domestic

The continued growth of our APC technology segment is dependent upon the adoption and enforcement of increasingly stringent environmental regulations in the U.S. and globally. In the U.S., federal and state laws regulating the emission of $NO_x$ are the primary driver in our APC technology segment. The principal regulatory drivers currently in effect are as follows:

Clean Air Act: The Clean Air Act (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 ($O_3$), Particulate Matter (PM), Nitrogen Dioxide ($NO_2$), Sulfur Dioxide ($SO_2$), Lead, and Carbon Monoxide (CO). The NAAQS provisions require that states comply with ozone and particulate emissions standards. $NO_x$ emissions are a precursor to ozone formation and also contribute to fine particulate emissions ($PM_{2.5}$), which has been the recent regulatory driver through the Cross-State Air Pollution Rule (CSAPR). $NO_x$ emissions were targeted as contributors to fine particulate emissions and ozone emissions. Since 1990, programs have been established by the EPA at the regional and federal level to help states in their mission to define and meet their State Implementation Plans (SIPs) for attainment. NAAQS PM standards were issued in 1997, with more stringent standards issued in 2006 and 2012. The NAAQS ozone standards issued in 1997 were made more stringent in 2008. On October 1, 2015, the EPA strengthened the NAAQS for ground-level ozone by reducing the minimum acceptable level from 75 to 70 parts per billion (ppb).

Cross-State Air Pollution Rule (CSAPR): On July 7, 2011, the Environmental Protection Agency passed the Cross-State Air Pollution Rule (CSAPR) under the “good neighbor” provision of the Clean Air Act to reduce emissions of $SO_2$ and $NO_x$ from power plants in the eastern half of the United States. This rule replaces the Clean Air Transport Rule (CATR) and focuses on reducing air emissions contributing to fine particle ($PM_{2.5}$) and ozone nonattainment that often travel across state lines; including $SO_2$ and $NO_x$ which contribute to $PM_{2.5}$ transport. CSAPR affected 27 states, with compliance for the first phase in 2012, with additional reductions required in the second phase by 2014. Under CSAPR, state emission caps were designated to mitigate the emission impact on downwind states by controlling emissions from upwind states. If sources within a state caused the state to exceed its assurance limit, severe penalties including a two-for-one reduction based on each source’s contribution percentage of the state overage would be applied. The timing of CSAPR's implementation has been affected by a number of court actions. In December 2011, CSAPR was stayed prior to implementation due to lawsuits filed by various states and combustion sources, and in August 2012 the U.S. Circuit Court of Appeals, D.C. Circuit, vacated CSAPR and remanded it to the EPA. The U.S. Supreme Court reversed that decision in April, 2014. Following the remand of the case to the D.C. Circuit, the EPA requested that the court lift the CSAPR stay and toll the CSAPR compliance deadlines by three years. In October, 2014, the D.C. Circuit granted the EPA's request and, accordingly, CSAPR Phase 1 implementation commenced in 2015, with Phase 2 beginning in 2017.

Most recently, in October 2016, the EPA finalized an update to CSAPR for the 2008 ozone NAAQS. The rule requires a number of sources to reduce NOx during the ozone season, which is from May through the end of September, starting in 2017. There are NOx credits available from prior years that may allow sources to trade banked allowances and delay emission reductions from current levels until the 2018 ozone season.

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Industrial Boiler MACT: In December 2011, the EPA re-proposed its new emissions rule for industrial, commercial and institutional boilers and process heaters, known as the Industrial Boiler Maximum Achievable Control Technology (MACT) standard. The EPA implemented the final rule on January 31, 2013, with compliance starting in January 2016 for most units. Emissions regulated include acid gas emissions including hydrochloric acid (HCl), carbon monoxide (CO), mercury, PM, and dioxins. Due to on-going litigation, final deadlines still have not been determined for all the boiler types and categories, although many sources have installed controls to meet the requirements.

Clean Air Visibility Rule (CAVR: The Clean Air Visibility Rule (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 by 2021. The overall obligation of CAVR is to return the US scenic areas to “active” visibility by 2064.

Consent Decrees: Consent decree activity through the US 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 $NO_x$ control systems outside the United States, specifically in Europe, Latin America, India (under a license agreement) and in the Pacific Rim, including the People’s Republic of China (China). Under European Union Directives, existing coal fired power plants will need to meet tighter emission regulations, and come into compliance by 2019 or 2020 (country specific). The Latin American countries will also present some opportunities for SNCR systems with plants that have inter-company directives for curbing emissions, in the absence of national regulations. However, these opportunities will not be time sensitive, and will greatly depend on allocation of capital budgets from the parent companies.

China continues to represent an attractive opportunity for us as the government sets pollution control, energy conservation and efficiency improvements as top priorities, as part of tightened standards addressed by the super clean emission regulation officially released in December, 2015. We have viable technologies to help achieve these objectives. China’s dominant reliance on coal as an energy resource is not expected to change in the foreseeable future. China alone is forecasted to account for 76% of the projected increase in world coal use through 2035. Clean air will continue to be a pressing issue and has become a political issue, especially given China’s growing awareness of air pollution and increasingly expanded role in international events and organizations.

China’s Ministry of Environmental Protection issued super clean emission regulations to be fully implemented by 2020, in support of reducing harmful pollutants and further defining the technologies recommended to achieve the reductions. Super clean emission requires NOx emission under 50 mg/Nm3, SO2 emission under 35 mg/Nm3 and particulate emission under 10 mg/Nm3. The regulations apply to all public utility units of 300MW or larger and private power generation units of 100MW or larger, and will be progressively implemented in the eastern region by 2017, the central region by 2018, and the western region by 2020. These limits are also expected to be enforced on industrial emitters once the utility boilers are in compliance. Newly constructed units and existing units must meet the same stringent emission standard. The existing units which cannot be retrofitted will be closed, particularly for units under 300MW as part of Thirteenth Five Year Plan-improving overall energy efficiency and clean emission from 2015-2020. In addition, Chinese government promotes the use of waste incineration plants to replace landfills with focus on major cities. New construction of MSW’s units which are equipped with SNCR or SCR has been growing.

The European Industrial Emissions Directive (IED) sets the target for NOx emissions to be at or below 200 mg/Nm3 from 1st January 2016. 15 member states have applied for temporary derogation primarily due to aging coal-fired fleets and compliance time frames vary between 2016 and 2020. The implementation is country specific and each member country sets its own limits based on this guideline. Turkey, while not a member state, is also looking to meet this guideline as part of their bid to join the European Union. Other European countries that rely heavily on coal generation, and are impacted by the IED include Spain, Poland and Czech Republic. A number of Polish and Czech utilities have first generation NOx abatement systems which cannot comply with BREF limits, and will need to be upgraded. Turkey will also see modernization of its fleet of coal-based power generation with upgrade projects covering all aspects of the power plant. However, the pace of implementation will be dependent on the degree of political stability in the country.

The Latin American governments in general have not enacted NOx specific emission regulations (with the exception of Chile). However, certain companies have set internal targets for pollution control and these will present a few opportunities for Fuel Tech in the next 2 - 3 years. Current Chilean NOx emission limits for existing units are being met with retrofitting of Low NOx burners and OFA systems, while the new units are being fitted with SCRs. Further tightening of NOx limits may require the addition of SCRs to existing plants for compliance.

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In India, stricter emission targets were announced by the government in December 2015 and phased implementation is expected. The government has prioritized PM, SOx, and NOx abatement in order of precedence for retrofit of existing power plants but emission control equipment is being designed in on new power plant projects. The power producers are looking to the government to set up policies to help pay for the cost of plant retrofits. This will impact the pace of upgrade projects.

Products

Our $NO_x$ reduction and particulate control technologies are installed worldwide on over 1000 combustion units, including utility, industrial and municipal solid waste applications. Our products include customized $NO_x$ control systems and our patented ULTRA™ technology, which converts urea-to-ammonia on site and provides safe reagent for use in Selective Catalytic Reduction (SCR) systems.

- SNCR Systems: Our $NO_x$OUT® and HERT™ SNCR processes use non-hazardous urea as the reagent rather than ammonia. Both the $NO_x$OUT® and HERT™ processes on their own are capable of reducing $NO_x$ by up to 25% - 50% for utilities and by potentially significantly greater amounts for industrial units in many types of plants with capital costs ranging from \$5 - \$20/kW for utility boilers and with total annualized operating costs ranging from \$1,000 - \$2,000/ton of $NO_x$ removed.
- Combined Systems: Our Advanced Selective Catalytic Reduction (ASCR™) systems include LNB, OFA, and SNCR components, along with a downsized SCR catalyst, Ammonia Injection Grid (AIG), and Graduated Straightening Grid (GSG™) system. Together, these systems provide up to 90% $NO_x$ reduction at significantly lower capital and operating costs than conventional SCR systems while providing greater operational flexibility to plant operators. The capital costs for ASCR 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 SCR systems. The $NO_x$OUT CASCADE® and $NO_x$OUT-SCR® processes are basic types of ASCR systems which use just SNCR and SCR catalyst components. The $NO_x$OUT CASCADE® systems can achieve 60% - 70% $NO_x$ reduction, with capital costs being a portion of the ASCR values defined above. Our $NO_x$OUT-SCR® process utilizes urea as the SCR catalyst reagent to achieve $NO_x$ reductions of up to 85% from smaller stationary combustion sources with capital and operating costs competitive with equivalently sized, standard SCR systems.
- 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 $NO_x$ 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. Overseas, new coal-fired power plants incorporating SCR systems are expected to be constructed at a rapid rate in China, and our ULTRA™ process is believed to be a market leader for the safe conversion of urea to ammonia just prior to injection into the flue gas duct, which is particularly important near densely populated cities, major waterways, harbors or islands, or where the transport of anhydrous or aqueous ammonia is a safety concern.
- SCR Processes and Services: Our SCR group provides process design optimization, performance testing and improvement, and catalyst selection services for SCR systems on coal-fired boilers. In addition, other related services, including start-ups, maintenance support and general consulting services for SCR systems, Ammonia Injection Grid 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 both physical experimental models, which involve construction of scale models through which fluids are tested, and computational fluid dynamics 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 patent pending Graduated Straightening Grid (GSG™). Our models help clients optimize performance in flow critical equipment, such as selective catalytic reactors in SCR systems, where the effectiveness and longevity of catalysts are of utmost concern. The Company’s modeling capabilities are also applied to other power plant systems where proper flow distribution and mixing are important for performance, such as flue gas desulphurization scrubbers, electrostatic precipitators, air heaters, exhaust stacks and carbon injection systems for mercury removal.
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ESP Processes and Services: ESP technologies for particulate control include Electrostatic Precipitator (ESP) products and services including ESP Inspection Services, Performance Modeling, and Performance and Efficiency Upgrades, along with complete turnkey capability for ESP retrofits. Flue gas conditioning (FGC) systems include treatment using sulfur trioxide ($SO_3$) and ammonia ($NH_3$) based conditioning to improve the performance of ESPs by modifying the properties of the fly ash particle. 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.

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- Burner Systems: Low $NO_x$ Burners and Ultra Low $NO_x$ Burners (LNB and ULNB) are available for coal-, oil-, and gas-fired industrial and utility units. Each system application is specifically designed to maximize $NO_x$ reduction. Computational fluid dynamics combustion modeling is used to validate the design prior to fabrication of equipment. $NO_x$ reductions can range from 40%-60% depending on the fuel type. Over-Fire Air (OFA) systems stage combustion for enhanced $NO_x$ reduction. Additional $NO_x$ reductions, beyond Low $NO_x$ Burners, of 35% - 50% are possible on different boiler configurations on a range of fuel types. Combined overall reductions range from 50% - 70%, with overall capital costs ranging from $10 - $20/kW and total costs ranging from $300 - $1,500/ton of $NO_x$ removed, depending on the scope.

The key market dynamic for the APC product line is the continued use of coal as the principal fuel source for global electricity production. Coal currently accounts for approximately 33% of all U.S. electricity generation and roughly 74% of Chinese electricity generation. Major coal consumers include China, the United States and India.

Sales of APC products were $34.1 million, $43.5 million, and $42.0 million for the years ended December 31, 2016, 2015 and 2014, respectively.

$NO_x$ Reduction Competition

Competition with our $NO_x$ reduction suite of products may be expected from companies supplying urea SNCR systems, combustion modification products, SCR systems an