CLEARSIGN COMBUSTION CORP
Form 10-K
February 14, 2017

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

x **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

o **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 001-35521

CLEARSIGN COMBUSTION CORPORATION

(Exact name of registrant as specified in its charter)

WASHINGTON	**26-2056298**

(State or other jurisdiction of incorporation or organization) (I.R.S. Employer Identification No.)

12870 Interurban Avenue South

Seattle, Washington 98168

(Address of principal executive offices)

(Zip Code)

(206) 673-4848

(Registrant's telephone number, including area code)

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

Title of each class	**Name of each exchange on which registered**
Common Stock, par value $.0001	The NASDAQ Stock Market LLC

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

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

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 x 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 (§ 229.405 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 x No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K 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.

Large accelerated filer ¨	Accelerated filer ¨
Non-accelerated filer ¨	Smaller reporting company x
(Do not check if a smaller reporting company)	

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

State the aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold, or the average bid and asked price of such common equity, as of the last business day of the registrant's most recently completed second fiscal quarter.

As of June 30, 2016, the aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the last sale price of the common equity was $62,000,000.

Indicate the number of shares outstanding of each of the registrant's classes of common stock, as of the latest practicable date.

As of February 14, 2017, the registrant has 15,598,853 shares of common stock, par value $.0001, issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement for the 2017 Annual Meeting of Shareholders are incorporated herein by reference in Part III of this Annual Report on Form 10-K to the extent stated herein. Such proxy statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31,

2016.

Combustion Corporation

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS AND OTHER INFORMATION CONTAINED IN THIS REPORT

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 and the provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements give our current expectations or forecasts of future events. You can identify these statements by the fact that they do not relate strictly to historical or current facts. You can find many (but not all) of these statements by looking for words such as "approximates," "believes," "hopes," "expects," "anticipates," "estimates," "projects," "intends," "plans," "would," "should," " or other similar expressions in this report. In particular, these include statements relating to future actions; prospective products, applications, customers and technologies; future performance or results of any products; anticipated expenses; and future financial results. These forward-looking statements are subject to certain risks and uncertainties that could cause actual results to differ materially from our historical experience and our present expectations or projections. Factors that could cause actual results to differ materially from those discussed in the forward-looking statements include, but are not limited to:

- our limited cash and our history of losses;
- our ability to successfully develop and implement our technology and achieve profitability;
- our limited operating history;
- emerging competition and rapidly advancing technology in our industry that may outpace our technology;
- customer demand for the products and services we develop;
- the impact of competitive or alternative products, technologies and pricing;
- our ability to manufacture any products we design;
- general economic conditions and events and the impact they may have on us and our potential customers;
- our ability to obtain adequate financing in the future;
- our ability to continue as a going concern;
- our success at managing the risks involved in the foregoing items; and
- other factors discussed in this report.

Forward-looking statements may appear throughout this report, including without limitation, the following sections: Item 1"Business," Item 1A "Risk Factors," and Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations." The forward-looking statements are based upon management's beliefs and assumptions and are made as of the date of this report. We undertake no obligation to publicly update or revise any forward-looking statements included in this report. You should not place undue reliance on these forward-looking statements.

Unless otherwise stated or the context otherwise requires, the terms "ClearSign," "we," "us," "our" and the "Company" refer to ClearSign Combustion Corporation.

PART I

ITEM 1: BUSINESS

Introduction

We design and are developing technologies for the purpose of improving key performance characteristics of combustion systems, including emission and operational performance, energy efficiency and overall cost-effectiveness. Our patented Duplex™ and Electrodynamic Combustion Control™ (ECC™) platform technologies enhance the performance of combustion systems in a broad range of markets, including the energy (upstream oil production and down-stream refining), commercial/industrial boiler, chemical, petrochemical, and power industries. Our Duplex technology uses a porous ceramic tile above a standard burner to significantly reduce flame length and achieve very low emissions without the need for external flue gas recirculation, selective catalytic reduction, or excess air systems. Our ECC technology introduces a computer-controlled high voltage electric field into a combustion volume in order to better control gas-phase chemical reactions and improve system performance and cost-effectiveness. To date, our operations have been funded primarily through sales of our securities. We have earned nominal revenue since inception in 2008.

While we have recently begun commercializing our Duplex technologies and our technologies have not been tested or verified by any independent third party, based on the results of our laboratory and field testing as well as our initial commercialized installations in three different applications, we believe that our proprietary technology platforms may improve emissions control performance and operational performance for many types of industrial and commercial combustion systems. As a result, we also believe that our technologies may reduce costs associated with the construction (including refurbishment and upgrade), operation and maintenance of these combustion systems as compared to combustion systems that use no or alternative technology to enhance combustion and control emissions.

Based on the results of our testing, we believe our technologies compare favorably with current industry-standard air pollution control technologies, such as selective catalytic reduction devices, low- and ultra-low NOx burners (which address nitrogen oxides or NOx), excess air systems and other similar technologies. Such systems are used in our current target market segments of petroleum refining and petrochemical process heaters, large-scale once through steam generators (OTSGs), enclosed ground flares, and packaged boilers.

Corporate History

We were incorporated in Washington on January 23, 2008. The address of our corporate headquarters is 12870 Interurban Avenue South, Seattle, Washington 98168 and our telephone number is (206) 673-4848. Our website can be accessed at www.clearsign.com. The information contained on or that may be obtained from our website is not a part of this report. All of our operations are located in the United States.

Our Industry

The combustion and emissions control markets are significant, both in the wide array of industries in which the systems are used and in the amount of money spent in installing and upgrading systems. The Energy Information Administration of the U.S. Department of Energy determined in its 2014 Annual Energy Outlook that the world's industrial sector consumed 165 quadrillion British thermal units (BTUs) of hydrocarbon fuels. These are used to provide heat for all manner of industrial processes, including boilers, furnaces, kilns and turbines. In order to maximize energy efficiency while keeping pace with regulatory guidelines for air pollution emissions, operators of these systems are continually installing, maintaining and upgrading a variety of costly process control, air pollution control and monitoring systems. Although we believe that there are many potential markets for our technologies, to date we have limited the introduction of our technologies to market segments that include petroleum refining process heaters, enclosed ground flares, and OTSGs.

Our Technologies

We are pursuing development of our technologies to enable future sales. These activities entail (i) field development projects in the case of our Duplex technology where we have successfully demonstrated our proprietary technology operating in our field testing with thermal output of up to 52 million BTU/hr, (ii) laboratory research in the case of our ECC technology where we have demonstrated certain attributes of our proprietary technology operating in our research facility with thermal output of up to 2 million BTU/hr, and (iii) business development and marketing activities with established entities that use process heaters, enclosed ground flares, steam generators, boilers, solid fuel burners, and other combustion systems as well as original equipment manufacturers (OEMs). We intend to continue to enter into collaborative arrangements, such as those described below and with OEMs, which would enable us to work closely with established companies in targeted industries to apply solutions developed in our laboratory and field settings.

Field Testing of our Duplex Technology in Once-Through Steam Generators

After performing testing on our Duplex technology in our laboratory furnace with thermal output up to 5 million BTU/hr, we commenced field development work in the fourth quarter of 2014 with an oil field operator in Southern California to demonstrate and test the Duplex technology in an OTSG with a thermal output ranging from 40 to 62.5 million BTU/hr used to facilitate a thermally enhanced oil recovery process in California's San Joaquin Valley. To date, we have tested an OTSG at a rate of 52 million BTU/hr and met the requirements of San Joaquin Valley Air Pollution Control District's Rule 4320, Advance Emission Reduction Options for Boilers, Steam Generators and Process Heaters Greater Than 5.0 MMBtu/hr, which prohibits NOx emissions exceeding 5 ppm (corrected at 3% O_2). These results were achieved without major modifications to the burner or the need for flue gas recirculation (FGR). During testing, the OTSG unit continued to supply steam at the capacity and quality required for oil field operations. Our agreement with this operator includes time-sensitive pricing, delivery and installation terms, if elected, that will apply to future purchases of this Duplex application. In September 2015, this operator placed an order to retrofit a second OTSG unit with our Duplex technology. The retrofit was completed and the sale recorded in the quarter ended December 31, 2016. This customer is considering additional unit sales after conducting additional field testing related to its unique stranded gas fuel supply.

In May 2015, we received an order from an independent Southern California oil producer to retrofit a 25 million BTU/hr OTSG with our Duplex technology. The installation involves an antiquated OTSG and burner with unique installation issues that we do not believe apply to our target markets. Substantial progress was made in 2016 related to this installation and it is expected to be completed in the first quarter of 2017.

In 2016, we completed a design study for a large Canadian operator of OTSGs. We believe that this operator is considering our Duplex technology because it is anticipating, and therefore preparing for, the passage during the next

few years of increased emissions regulations in the locale in which it operates.

Based upon our results to date, we observed a thermal efficiency improvement in OTSGs of approximately 1% when compared to a baseline case with a conventional low NOx burner without FGR. OTSG systems typically operate with FGR to lower NOx emissions. FGR, however, penalizes thermal efficiency, increasing fuel and electricity costs. We estimate that Duplex, compared to systems operating with FGR, will provide an overall energy savings of as much as 3-4% which could represent a significant reduction in annual operating expense depending on variables such as the thermal output of the OTSG and the market price for natural gas and electricity. Further, compliance with current emissions standards would eliminate the cost of any fines associated with the retrofitted operations. We continue to conduct testing to address additional performance criteria in order to further validate the environmental and operational benefits of our Duplex technology.

Field Testing of our Duplex Technology in Wellhead Enclosed Flares

In February 2016, we received an order through an intermediary, acting on behalf of a large Southern California oil producer, for installation in wellhead enclosed ground flares for the purpose of evaluating Duplex as a solution to the oil producer's NOx emissions challenges. The initial retrofit was completed and payment received in the quarter ended September 30, 2016 whereby we recognized $260,000 of revenue. This was an important milestone because it was our first meaningful product sale and our second completed installation following the non-revenue field development installation in an OTSG. Furthermore, we entered into an agreement to supply this oil producer with 5 additional wellhead enclosed ground flare retrofits for $900,000. These are expected to be completed over the next six months depending on the availability of the customer’s equipment. During the year ended December 31, 2016, we received payments of 40% of the contract amount as an initial payment, which is standard for the industry for this stage of completion.

Field Testing of our Duplex Technology in Refinery Process Heaters

We previously executed two agreements regarding field tests related to process heaters with thermal outputs ranging from 12 to 15 million BTU/hr with two separate petroleum refineries in the San Joaquin Valley. Retrofits for Tricor Refining, LLC and an unnamed California refinery were each completed and accepted by the customers in the quarter ended December 31, 2016. These are important milestones as these two installations have become demonstration sites for other refiners, including super major refiners, which we believe will aid us in expanding our access to this industry. Additionally, the process heater at Tricor had been out of service since 1984. Our Duplex technology retrofit allowed Tricor to bring this obsolete asset back into production and to provide what we believe is another helpful demonstration to refiners.

In August 2015, we executed an agreement with Tesoro Refining & Marketing Company LLC, a subsidiary of Tesoro Corporation, to evaluate our Duplex technology in a multiple-burner process heater located in Tesoro's Los Angeles area refinery. The Duplex technology performance will be evaluated based on several performance criteria, including NOx emission criteria determined by California's South Coast Air Quality Management District. The first phase of the project, involving initial design, was completed under a fixed price agreement in 2015. Tesoro is furthering its design process based on the refinery results observed to date and is formulating a strategy to test Duplex under its environment and supervision.

Testing of our Duplex Plug & Play™ for Refinery Process Heaters

We have recently completed laboratory testing and intend to begin field testing a new burner product for refinery and industrial process heater applications. The Duplex Plug & Play design provides a more simplified, pre-engineered and standardized direct burner replacement for traditional refinery process heaters. We believe that this product will reduce the customized engineering associated with typical retrofits and lend itself to mass production. The product derives its name from the fact that it is designed to allow a heater or furnace to continue operating during installation rather than be shut down. If field testing confirms this design attribute, the ability to install the Duplex Plug & Play while the system is operational will allow customers to avoid down time and shorten the sales cycle often prolonged by annual or semi-annual scheduled maintenance.

In September 2015, we executed an agreement with a refiner in Texas to install our Duplex technology in a process heater located in one of their refineries. The Duplex installation is being installed to eliminate potential flame impingement upon process tubes and reduce maintenance costs and downtime. This will provide the initial field testing site for our Duplex Plug & Play. The refiner's application awaits an appropriate shut-down schedule in the coming months to install and test the product. Field testing at this Texas refinery will provide the last phase of product assessment and allow for operational feedback from this beta site customer. The customer has expressed interest in purchasing additional units if the testing is completed to their satisfaction. We believe that successful launch of this

product could cultivate interest in licensing and potential manufacturing arrangements with OEMs with established manufacturing and distribution capabilities.

We intend to continue field validation of our Duplex technology in order to produce sufficient data to demonstrate product attributes and dependability.

Laboratory Research of our ECC