Zacks Small-Cap Research

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Clean Diesel Tech. (CDTI-NASDAQ)

CDTI: US EPA approves two Purifilter products including one for Off-Road heavy duty diesel engines.

Current Recommendation	**Outperform**
Prior Recommendation	Neutral
Date of Last Change	02/23/2012
Current Price (12/20/13)	$1.43
Six- Month Target Price	**$3.50**

OUTLOOK

Clean Diesel Technologies is a leading provider of pollution control solutions for gasoline and diesel engines. The company offers both OEM and after-market products on a worldwide basis. The company was formed by a merger in October 2010.

Over the next three years significant on highway diesel vehicle pollution regulations will be implemented which will have a major impact on the company's revenue and earnings. Off highway markets are also significant and are becoming important to Clean Diesel.

SUMMARY DATA

52-Week High	**$2.63**
52-Week Low	**$1.15**
One-Year Return (%)	**-37.8**
Beta	**2.2**
Average Daily Volume (sh)	**211,200**
Shares Outstanding (mil)	**9.3**
Market Capitalization ($mil)	**$13.3**
Short Interest Ratio (days)	**10.8**
Institutional Ownership (%)	**11.5**
Insider Ownership (%)	**8.2**
Annual Cash Dividend	**$0.00**
Dividend Yield (%)	**0.00**
5-Yr. Historical Growth Rates	
Sales (%)	**134.3**
Earnings Per Share (%)	**N/A**
Dividend (%)	**N/A**
P/E using TTM EPS	**N/M**
P/E using 2013 Estimate	**N/M**
P/E using 2014 Estimate	**N/M**
P/Sales on L4Q Sales	**0.3**

Risk Level	**Above Average**
Type of Stock	**Small-Value**
Industry	**Pollution Cntrl**

ZACKS ESTIMATES

Revenue
(in millions of $)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2012	**$17.0 A**	**$16.7 A**	**$14.4 A**	**$12.4 A**	**$60.5 A**
2013	**$13.3 A**	**$12.6 A**	**$14.2 A**	**$15.5 E**	**$55.6 E**
2014	**$15.0 E**	**$16.0 E**	**$17.0 E**	**$18.0 E**	**$66.0 E**
2015	**$16.0 E**	**$15.0 E**	**$14.0 E**	**$14.0 E**	**$59.0 E**

Earnings per Share
(EPS is operating earnings before non recurring items)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2012	**-$0.39A**	**-$0.29A**	**-$0.24A**	**-$0.30A**	**-$1.26A**
2013	**-$0.29A**	**-$0.19A**	**-$0.12A**	**-$0.01E**	**-$0.64E**
2014	**-$0.04E**	**$0.00E**	**$0.03E**	**$0.04E**	**$0.03E**
2015	**$0.04E**	**$0.03E**	**$0.01E**	**$0.02E**	**$0.10E**

Zacks Projected EPS Growth Rate - Next 3 Years %	**30**
N/A	**N/A**

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RECENT NEWS

CDTi has announced that the US EPA has approved two Purifilter products, one for highway use and the other for off road engines.

In November, 2012 the EAP had certified the passively regenerating Purifilter® EGR for retrofit use in 2001 to 2010 heavy duty highway truck engines. This has been extended to all highway diesel engines made between 1993 and 2010 including smaller engines.

This greatly expands the available for such systems and we would expect an immediate benefit to revenue from these systems.

The EPA has also verified the Purifilter® OR system for heavy duty diesel off-road engines, which the off-road derivative of the highway vehicle product.

The off-road market is larger than the heavy duty highway vehicle market. As incentives the EPA has announced the availability of $2 million in 2013 for construction equipment rebates (see below) plus $5 million in funding for clean diesel projects in ports. Both Purifilter® EGR and Purifilter® OR systems qualify for grants under DERA.

Diesel Emissions Reduction Act Grants (DERA 2012-2016)

In January 2010, President Obama signed legislation, H.R. 5809, reauthorizing DERA grants to eligible entities for projects that reduce emissions from existing diesel engines. The bill, passed by the Senate on December 16 and the House on December 21, authorizes up to $100 million annually for FY2012 through FY2016 and allows for new types of funding mechanisms. $29.9 million was appropriated by Congress for FY2012.

(Source: EPA web site)

R. Craig Breese has resigned his positions as CEO, President and member of the Board of Directors. Based on his employment agreement the Board of Directors has determined that his departure will be treated as termination without cause. In such cases it is usual that any stock options will not become vested or future options will not be granted. Nikhil A. Mehta CFO and Pedro J. Lopez-Baldrich, VP of Administration will act in the capacity as the Office of Chief Executive Officer.

Over the past two years the opportunities of vehicle pollution control in the London LEZ and the California CARB programs have illustrated the difficulties in sustaining a return on investment from mandated and unwanted abatement programs. In London the program was completed in a short period of time and future revenue is unlikely. CDTi did not make a profit from this program and there is no follow-on business. The CARB initiatives have been resisted by the truck and bus operators and cumulative gross profit over the last 7 quarters is a loss. Only a significant

cost cutting program had reversed the quarterly losses and some of the profit is probably due to the catalyst revenue from Honda.

In our opinion, the uncertainties of government mandated pollution control initiatives do not warrant a significant investment by small companies unless they can achieve market shares exceeding 25% to 30% of the revenue in such initiatives. Also, such initiatives as large as California's are few and probably not worth waiting for if they only generate $30 to $50 million in revenue.

The profitable future of Clean Diesel is in the catalyst business. However, it needs to expand its customer base to other programs within Honda and to other automobile companies. In general automobile companies are very slow to adopt new technology even when it saves them money.

CDTi reported its third quarter results on November 12, 2013, followed by a conference call. Revenue was above our expectations, and there was a significant increase in operating margins. G&A declined significantly from second quarter levels and R&D declined Y/Y as patent applications were lower but was up slightly from the second quarter.

	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13
HD Diesel revenue	$9.5	$9.6	$11.1	$17.3	$12.6	$11.0	$8.7	$8.4	$7.3	$7.1	$8.0
Gross profit*	$2.9	$2.9	$3.8	$0.3	$0.4	$0.1	$0.3	$0.1	$0.3	$0.1	$0.7
Catalyst revenue	$4.7	$3.4	$5.9	$6.8	$6.1	$6.4	$6.7	$5.1	$6.5	$6.3	$7.2
Gross profit*	$1.1	$0.7	$0.6	$1.1	$0.3	$0.7	$0.3	$1.1	$0.1	$0.1	$0.6
Sales to HDD Division	$0.3	$1.5	$2.0	$2.8	$1.7	$0.7	$1.0	$1.1	$0.4	$0.9	$1.0
External sales	$4.3	$1.9	$3.9	$4.0	$4.4	$5.7	$5.7	$4.0	$6.1	$5.4	$6.2
All revenue	$13.8	$11.5	$15.0	$21.3	$17.0	$16.7	$14.4	$12.4	$13.3	$12.6	$14.2
Operating income	$2.1	$3.7	$1.3	$0.2	$2.4	$1.5	$1.2	$1.8	$2.0	$1.2	$0.1
Net income	$2.3	$3.7	$1.9	$0.5	$2.8	$2.3	$1.8	$2.2	$2.7	$1.4	$1.1
Gross profit has been replaced by operating income in 2012.											

The company reported an operating profit in the third quarter and the net loss was lower than year ago and below second quarter levels.

The California retrofit market has come to life. Pollution enforcement has picked up and vehicle operators are being fined. KS Industries, a Bakersfield CA construction company, was fined $230,000 for non compliance and inspections have significantly increased at the Otay Mesa US-Mexican crossing. As a result orders for retrofit equipment are increasing and revenue to CDTi is increasing. California retrofit revenue was about $3 million in the third quarter, and non-retrofit business increased slightly to 40% of HDD revenue.

We expect CARB retrofit revenue to increase significantly next year, and then decline as trucks become compliant or are sold out of state. However, the off-the-road business should grow and the new EGR systems should be a significant contributor.

Catalyst sales increased significantly Y/Y, up 39% after adjustment for the metal pricing changes made last year. Honda continues to be the driver of this business.

E Cube, the JV with Pirelli, has been dissolved. The poor business climate in Europe had made it impossible to meet the sales targets and a further review of CDTi's objectives suggested that E-Cube was not the best fit with the strategic plan. The loss from E-Cube was $0.4 million and this was about the same as what CDTi would have lost in Europe without the joint venture.

California was a disappointment for retrofit sales during the first six months of 2013. The industry estimate for those vehicles that need particulate pollution control is 59,500 engines. The deadline is December 31, 2013 and over six months only 3,508 units have been updated, of which CDTi had a 17% market share. There appears to be a ongoing, but modest, improvement in the retrofit business in California for trucks and school buses. A major problem is a lack of funding for CARB. However, the OEM business is improving. The non-retrofit HDD business has grown to 48% of the HDD revenue, up from 36% in the second quarter of 2012. California OEM business was up 12% to about 19% of the North American OEM business.

In the second quarter catalyst revenue was flat year to year, but this included the reimbursement on the rare earth metal prices last year. Excluding that Catalyst revenue increased by 13%. Part of the gain is due to the strong sales of the Honda Accord, which is up 18% so far this year. CDTi's mixed phase catalyst system has been selected by Honda for use on the 2013 Accord Hybrid and Accord plug-in Hybrid models. This expands the range of Honda vehicles that use catalyst systems provided by CDTi. North American versions of both four and six cylinder Accord and the Acura TSX are currently fitted with CDTi catalysts.

Honda uses a four to five year lifetime for model platforms. Although automobile manufacturers can change suppliers as they please any change in pollution control systems would require recertification of the platform. Consequently CDTi has a strong position on the Honda Accord for the next four years.

The public offering, with Roth Capital Partners, LLC as sole manager, consists of 1.6 million shares priced at $1.245 and warrants to purchase 0.8 million shares with an exercise price of $1.25. The warrants are immediately exercisable for a period of five years. The underwriters have a 30 day option to acquire 240,000 shares and 120,000 warrants. CDTi has also agreed to convert $0.235 million in principle and interest to common stock and to sell $100,000 of common stock to a director, Dr. Lon Bell, in a private placement.

The company has completed the strategic review of its businesses and has decided to "pursue aggressive development of its unique materials science platform". Clean Diesel is a leader in zero platinum group metal (ZPGM) catalyst systems but has no competitive edge in metal bending.

As mentioned in the fourth quarter and full year 2012 conference call, profits were influenced by price volatility in the Platinum Group (6 elements including platinum and palladium) and the rare earth group

(17 elements including the 15 Lanthanides) metals. However, the PGMs tend to be high priced, often over $1,000 a troy ounce, and a 1% price change is significant. The lanthanides are relatively cheap and a 1% change may be measured in pennies. Consequently there is a significant advantage to move to ZPGM based catalysts.

The skill in making catalyst systems is how to deposit the catalyst on a substrate, which may be silica or silicon carbide (of which there are many suppliers). Clean Diesel has patented its processes and the composition of the catalysts. As such they are a leader in the market.

In 1Q13 CDTI sold $2.7 million into the California retrofit market. CARB enforcement is increasing but is still at a relatively low level. This should increase during the year and we would expect HDD distributor sales to improve sequentially during 2013. One weak spot is the mining industry but an increase in school bus funding could offset this.

On March 15, 2013 Clean Diesel announced its fourth quarter and full year 2012 results. Although we had forecast a decline from year ago levels due to the end of the London Emission Zone initiative the rest of the diesel business was a disappointment. New Jersey was down and California flat at best. Since the Diesel market uses catalysts made internally this had an impact on the catalyst division. Lack of enforcement of the existing regulations by CARB is still having an impact, although citations are increasing. Some of the operators may opt to buy new vehicles (making that a OEM sale) and others may scrap the older vehicles.

CDTI has about 17% of the diesel pollution retrofit market in California, as compared to about 34% in the other contiguous states. One of its largest competitors (Cleaire Advanced Emissions Control) has gone out of business, leaving about 40% of the California market up for grabs. This includes a significant portion of the school bus fleets state wide. However, there is a major program to retrofit school buses with alternative fuel engines and a large number of school buses run on natural gas. We estimate that, over time, CDTI could move its market share up to 30% and possibly higher.

The catalyst division was impacted by two major factors. The decline in revenue from the diesel division reduced revenue from $1.8 million in 2012 fourth quarter to $1.1 million in 4Q13 (the eliminations line on the reported income statement is all internal catalyst sales). The rest of the catalyst revenue was unchanged. The second problem was that both rare earth and Platinum Metal Group (PMG) metal prices were very volatile and not all of cost were covered under the Honda contract. Honda is a significant customer for catalytic convertors on both the 6 and 4 cylinder Accords.

The Honda contract has been renegotiated to address the metal pricing problem. This will impact both revenue and costs since the active metal prices are a component of the selling prices as well as part of the cost structure. This should have an immediate positive impact although there may be a lag as inventory pricing moves through the system.

The company also discussed several strategic initiatives. The Pirelli initiative mentioned below may be followed by other agreements that would provide Clean Diesel with a stronger position in the OEM market. The company's low PMG catalyst systems may have applications for fuel cell cost reductions and Clean Diesel has a significant patent portfolio that has not, so far, been licensed to third parties.

Pirelli and Clean Diesel have announced they will, jointly, develop and sell pollution control systems for Europe and in the CIS countries. The CIS countries consist of what was used to be the USSR and is now Russia, Ukraine, Kazakhstan, Belarus, Azerbaijan, Uzbekistan, Turkmenistan, Georgia, Armenia, Tajikistan, Kyrgyzstan and Moldova. Outside of Russia there are few indigenous auto and truck manufacturers but there are joint ventures between Asian and European makers. On the auto side in the CIS KIA and Lada each have 35% of the market, Chevrolet has 13% and Skoda has 10%. The two companies complement each other. Pirelli makes catalyst substrates but CDTI does not but uses them in the pollution control equipment. CDTI is strong in Scandinavia and has a presence in the UK, areas where Pirelli is weak.

Pirelli is the fifth largest tire company in the world and is the sole supplier of racing tyres to F1. The company has a number of wholly owned subsidiaries, including some in the environmental and pollution control market. These include Eco Technology and Pirelli Environmental Products and Services. Pirelli makes a recrystallized silicon carbide material that it uses in a series of products including the Feelpure Particulate Filter. This filter is used to reduce emissions from diesel engines.

The JV, Eco Emission Enterprise Srl, will be based in Milan, Italy and will sell auto and diesel systems using the Pirelli filter and Clean Diesel systems. Pirelli has a presence in this market so this should be of immediate benefit to Clean Diesel.

On Jan. 25, 2013 the company announced that has received full verification from CARB for its Purifilter (R) EGR emission reduction system for particulate control, replacing the Executive order that had allowed Clean Diesel to sell the system pending this full verification. This removes the uncertainty that the full approval may have been delayed well into 2013. The system is also verified by EPA for use in all states.

Clean Diesel Inc. has changed its name to **CDTi** although its legal name remains Clean Diesel Inc.

Both Honda and Clean Diesel have announced that Clean Diesel will supply a new palladium only catalyst system (invented by CDTi), first for the 2013 model Accord currently being built in North America, and then to other Honda models. The new system will reduce precious metal content by 22% and Rhodium content by 50%. This cuts the cost of the system by 37% while complying with some of the most stringent emission regulations in the world. This business will have a significant impact on Clean Diesel's revenue and profit. Over the past two years the company has been impacted by the problems in Japan that had an effect on parts availability. This catalyst will be used in other Honda cars, presumably Accords being built in other countries, on a sequential basis. In August 2012 Honda sales increased by 59.5% to 131,321 vehicles, the Accord increasing by 89%. The seasonally adjusted sales rate was 14.52 million vehicles as compared to 12.8 million vehicles in 2011.

On August 30, 2012 Clean Diesel issued a comment on a recent release by the Manufacturers of Emission Controls Association, MECA, that the diesel particulate filter (DPF) retrofit rate in California continued to be below that required to meet the proscribed requirements. This continues the trend of the first half of the year. In the first six months of 2012 the verified sales number was 3,030 out of an expected rate of 12,000 for 2012 and 66,000 filters for the period 2011 to 2015.

Without strong enforcement action, that is fines not citations, we doubt that many truck operators will comply with the regulations and the January 1, 2013 deadlines. Fleet operators, which make up a large proportion of Clean Diesel's customer base, are moving towards compliance but small independent operators are under financial pressure in a weakening economy.

There is no certainty that the trucker will rush to buy DPF units in the fourth quarter so we are reducing our estimates for 2012 and 2013. Positive factors are the off-road and stationary diesel markets and the new contract with Honda for catalyst systems.

Clean Diesel Technologies and American Infrastructure Leasing (AIL) have partnered to supply equipment leases on Clean Diesel's ECS-branded diesel particulate filters (DPF) to vehicle and fleet owners in North America. American Infrastructure Leasing has a strong franchise in providing capital to the vehicle and fleet owners. Using capital from AIL truckers can acquire DPF equipment on attractive terms.

On May 31, 2012 Clean Diesel announced that the company had received an expanded verification from the EPA for its ECS-branded Purifilter Plus emission reduction system. This is the only DPF hybrid system that employs both passive and active regeneration that the EPA has verified for use in engine retrofit programs. That the system is EPA approved expands the market to include all states that accept EPA verification without having more stringent individual approval programs (relatively few states have programs similar to CARB). The verification includes retrofitting to both exhaust gas recirculation (EGR) and non-EGR diesel engines built from 1994 to 2010 for on-road use. This includes all types of diesel trucks and increases the total available market for the company's systems.

KEY POINTS

- Pollution impacts life expectations.
- Pollution control is driven by regulation on a national, regional and city basis.
- Gasoline engine emission control is a mature market in the U.S., Europe and Japan.
- For CDTI the auto market is an OEM market but the diesel market is an after-market business.
- Other countries like China and India are starting pollution abatement initiatives.

- The higher the standards the more advanced is the technology (at a higher cost) and this is a barrier to entry for small companies .

- Changing emission standards over the next five years will drive revenue and earnings significantly higher.

OVERVIEW

There are many ways to convert a fuel to power that can be used to produce motion. These include engines that run on gasoline, diesel and bio-diesel, kerosene, steam, electricity, propane (and butane) and compressed natural gas. There are many engine types including internal combustion engines such as two stroke, four stroke, diesel, Wankel rotary, jet engines as well as external combustion engines such as the Stirling cycle engine and steam generators where the fuel is burnt to produce heat in a secondary fluid which then drives a turbine to produce electricity.

The problem with all engines based on burning a fuel is that a product of combustion is pollution. This is usually a combination of un-burnt fuel (usually hydrocarbons, HC), carbon monoxide (poisonous, CO) and various oxides of nitrogen (that produce brown smog, NOx). Certain fuels also produce particles of soot (carbon) produced by incomplete combustion of the fuel. Burning coal (or wood) to produce steam that drives a turbine that produces electricity also produces ash that has to be removed from the exhaust gas.

Pollution poses health hazards. The EPA estimates that diesel pollution is the cause of 12,000 premature deaths; 280,000 child respiratory cases and 200,000 child asthma cases (although there may be some double counting here) and a loss of 1,000,000 workdays. California air pollution costs are estimated to be as high as $130 billion. According to the WHO particulate matter (PM) reduces life expectancy by 8.6 months for every person in the European Union (EU) and that the EU could save up to $225 billion a year by reducing air-pollution related deaths.

Despite all of the estimated benefits of controlling air pollution the business is driven by government regulation. This is because pollution control is an expense that is not offset by significant improvements in productivity and is an expense that is a capital and operating cost to the operator.

The US imposed automobile exhaust control starting with the 1975 model year (production starting in mid 1974). General Motors decided to use a catalytic converter developed by the Engelhard Corporation for use on forklifts in warehouses and this forced all the other auto companies to use the same technology. The early catalysts used relatively large amounts of platinum and so they were expensive. Over the years the driver has been to reduce the cost by using other platinum group metals as well as non-precious metals. The first catalyst were 2-way catalyst that converted HC and CO into carbon dioxide and water. Later developments resulted in 3-way catalysts and engine modifications that reduced the emission of NOx.

This was followed by diesel engine emission controls. A diesel engine is a compression ignition engine. There is no spark plug. Compressing the air/fuel mixture in the first upstroke causes it to heat up and explode so diesel engines are more robust than gasoline engines. The cylinder temperatures are much higher in diesel engines and this causes more NOx to be formed. Diesel exhaust also contains more oxygen than gasoline engine exhaust. Too much oxygen is a problem for 3-way catalysts so they cannot be used on a diesel engine. However, 2-way catalysts work well and are used to control HC and CO. The energy during combustion also converts some HC to carbon and this soot (PM) has to be removed.

Regulations have been imposed on stationary power sources such as engines used in mining (drag lines for example), construction equipment, railway engines and off-road vehicles and ships.

Other countries impose pollution control. Although often criticized, China has an active vehicle pollution control program (based on European standards) that started in 2010 and may be upgraded in 2012.

Pollution control is driven by legislation

Market/Application	2010	2011	2012	2013	2014
U.S. on-highway	EPA10		TRB[1]	TRB[1]	TRB[1], CA LEV III
U.S. off-highway	Tier 3/4	Tier 3/4	Tier 4	Tier 4	Tier 4
Europe off-highway		Stage IIIA/IIIB	Stage IIIA/IIIB	Stage IIIB	Stage IV
Europe on-highway	Euro V	Euro V		Euro V/VI	Euro VI
Brazil on-highway	Proconve China has an active P5[2] (Euro III)	Proconve P5[2] (Euro III)	Proconve P7 (Euro V)	Proconve L6	Proconve L6
China on-highway		Euro IV	Euro IV/V (proposed)	Euro IV/V	Euro V
India on-highway (major cities)	Euro III/IV[3]				

Source: Clean Diesel Technologies, Inc.

[1] California Air Resources Board Truck and Bus Regulation
[2] Proconve P6 standards were not implemented; P5 standards remained in effect through 2011
[3] Euro IV standards are implemented in National Capital Region (NCR) and 11 noncompliant cities

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Source: www.dieselnet.com/stndards

ARB Estimate[1] of Class 7 & 8 HD Trucks in California with Mandatory Retrofit Requirement from 2012 thru 2014[2]

Model Years	Class 8 (>33,000lbs)	Class 7 (26,000-33,000lbs)	Total
2003 – 2006	53,404	9,625	63,029
1998 – 2002	36,488	11,527	48,015
1997 and older	37,470	22,317	59,787
Total Number of Trucks			170,831

Note:
- Only includes California-based trucks
- Trucks outside California meeting certain criteria must also comply with retrofit requirements
- Does not include school buses which also must comply with retrofit requirements
- Assumes trucks remain in use

CDT management estimates that CDT CARB verified products can address the emission requirements of over 70% of the vehicles estimated above.

[1]Analysis based upon draft vehicle population estimate provided by Mobile Source Analysis Branch of ARB. Numbers are based upon an extrapolation of 2005 DMV registration data and reflect an approximate estimate only.
[2]CARB Truck and Bus Regulation requires compliance of 90% of vehicles with diesel particulate filters by 2014**.**

There are currently 142 Low Emission Zones in operation in 10 European countries and 120 are in the planning process. These are similar to the California initiatives in that they are special low emission areas that impose more restrictive controls that exist outside of these zones. One of the first of these zones was in central London, UK. that started in 2008. This has been expanded to include the Greater London Area, bounded by the M25 roadway. It targets the worst polluters, diesel commercial vehicles. Vehicles that do not meet the standards will be fined $281 every time they enter the LEZ. Starting in 2012 the standards will be tightened and a further 20,000 vehicles will require upgrading at an estimated cost of $60 million to $70 million

Company Background

The company is organized into two divisions. The Heavy Duty Diesel Systems division is a leader and manufacturer of verified exhaust emissions control systems for the retrofit and OEM markets though a distribution and dealer network that includes PAACAR and International, two of the largest heavy truck manufacturers in the US. The Engine Control Systems (“ECS”) and Clean Diesel Technologies-branded products, such as Purifilter ® , Purifier and ARIS ® and exhaust gas recirculation with selective catalytic reduction are used to reduce exhaust emissions created by on-road, off-road and stationary diesel and alternative fuel engines including propane and natural gas. The company also promotes the Platinum Plus ® range of fuel-borne catalyst solutions into global markets.

Auto catalyst technology is being driven by lower prices and, therefore, lower costs. Platinum group metals are very expensive, volatile in price and most of the mining is outside of the largest markets with many mines in areas of political instability. The key to success is to replace the precious metals with base metals of a significantly lower price. Since the 2-way auto catalyst technology can be used in diesel applications the cost benefits can differentiate Clean Diesel from its competitors in both markets. The company is in the process of having its catalyst technology verified to be used in systems for diesel vehicles. This will allow the Catalyst division to be a supplier to the Diesel division thus improving profit margins. The ability to use its own catalyst will enable Clean Diesel to design its own systems, customizing the pollution control equipment and this will have a significant positive impact on profits.

The Catalyst division includes the company's proprietary MPC ® technology. This technology enables Clean Diesel to produce catalyst formulations for gasoline, diesel and natural gas induced emissions that offer superior performance, proven durability and cost effectiveness for multiple markets and a wide range of applications. The company has developed a family of unique high performance catalysts — with base-metals or low platinum group metal and zero-platinum group metal content — to provide increased catalytic performance and value for technology-driven automotive industry customers and for the Heavy Duty Diesel Systems division.

The Diesel division offers a wide range of technology, some of which are not currently approved for use in the US. The range of products and technology is shown below. Applications include on-road (the largest market); off-road (second largest market); stationary units, propane and natural gas fueled engines (both on and off road application) and clean fuels such as bio-diesel. Not only do the exhaust emissions have to be controlled but other combustion related problems, such as crankcase ventilation gases have to be enclosed and treated. Clean Diesel has a system, its ECS ventilation system that eliminates 100% of crankcase emissions which has a major impact on cabin air quality. These systems are EPA approved.

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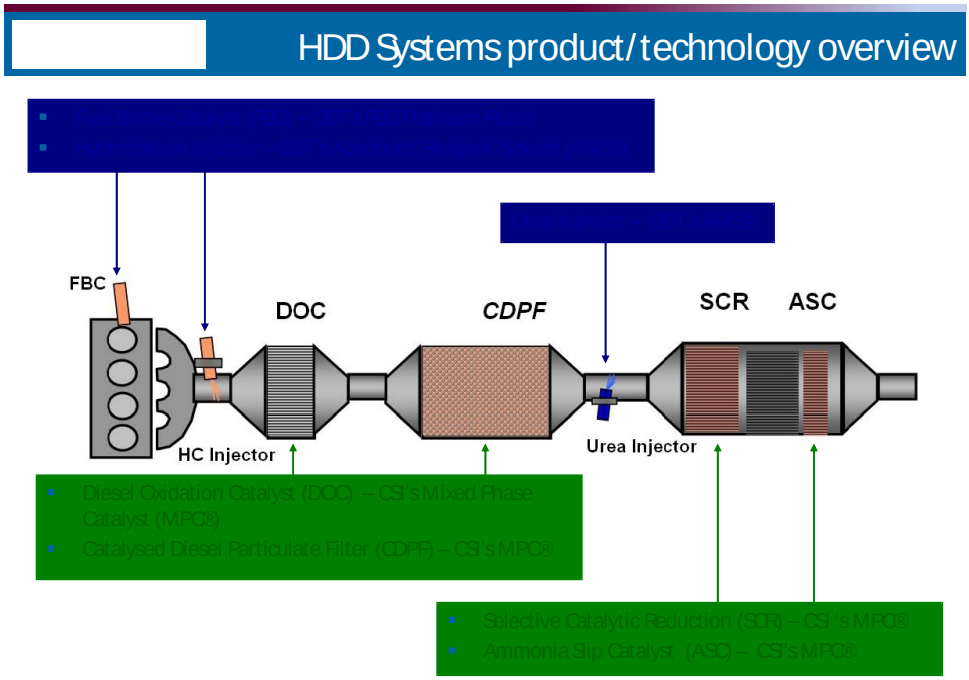

INDUSTRY OUTLOOK

INDUSTRY OUTLOOK - POSITIVE

Both legislative initiatives and economic growth have positive impacts on the demand for, and use of, both on road and off road vehicles and machinery over the next three to four years.

For Clean Diesel the automobile (light vehicle) catalyst market is an OEM market. The systems take one to two years to develop and receive certification and are frequently designed for a particular model of automobile. Once designed in and approved the automobile company usually keeps that configuration and supplier for the life of that model. Auto production in N. America, W. Europe and Japan of gasoline engines is a flat to declining business as diesel engines penetrate the market. In several EU countries diesel engines have achieved more than a 50% penetration of new car sales. Although market penetration of diesel cars is low in the US the high price of gasoline is a strong incentive for adoption of diesel technology now that the EPA has approved the current pollution control technology used in Europe and low sulfur/low phosphorous diesel fuel is now available in the US. Sulfur poisons precious metal catalysts. The removal of phosphorous is also beneficial as it prevents an ash problem in the exhaust. Volkswagen, Mercedes, Audi and BMW offer diesel alternatives to their gasoline engines. The VW Jetta is selling well, for the first five months of 2011 sales are up nearly 70% year over year, and 50% are diesels, and dealer inventory of this model is very low.

The heavy truck market is an after-market business. Class 7 & 8 trucks, those over 26,000 lbs, have a long life. The engines can run over 50,000 miles before needing a major overhaul. As a result there are many trucks older than 10 years. As an example 35% of the HD trucks in California are over 14 years old. This is a significant and growing market for retrofit pollution control equipment. The cost to the

operator for a total system for a class 8 truck driven in California can exceed $10,000 per vehicle. The total available market for diesel retrofits in California alone could exceed $1.15 billion over the period 2012 through 2014. However, many old trucks are likely to be scrapped, some may be re-engined and some replaced by new equipment. The EPA has estimated that 20 million vehicles with diesel engines do not meet the new emission standards. Although the standards for California are the most stringent in the US, and require the most expensive retrofit equipment, other states have matched them. Using an equipment price well below the mid-point of the cost range the market for heavy duty vehicle diesel retrofits in N. America could exceed $150 billion over the next ten years. And Europe has even more stringent requirements that will require a higher level of technology. And higher levels of technology mean higher costs.

Johnson Matthey, the world's largest producer of platinum group metals has estimated that the world-wide market for exhaust catalyst systems could exceed $2.5 billion in 2016.

The 10 largest manufacturers of trucks over 16 tons GVW produced 2.16 million trucks in 2009, with Daimler AG and the Volvo Group having over 40% of the market. Daimler estimates that the medium and heavy duty vehicle market will grow from 2.1 million units in 2010 to 2.6 million units in 2013. The eight million trucks sold over this period will face tighter emission standards in 2017 and beyond, as will many other HDD trucks produced before 2010. In most cases these statistics do not include buses. By the end of 2013 the US, Europe, China, India and Brazil will face new, more stringent, standards for NOX and particulate emissions to take effect in 2014. There are 13 countries plus California, Beijing, Indian cities and S. Korea (gasoline engines) that will require new emission equipment by the end of 2015.

As well as on-road vehicles there are other sources of emissions including locomotives, ships, off-road vehicles and mining and construction vehicles, both movable and stationary.

INDUSTRY POSITION

The emission retrofit market is highly fragmented. Although Clean Diesel Technology is probably one of the top three world wide providers of vehicle emission technology and products there are many small companies and divisions of larger companies that compete in some sectors.

VALUATION

During the London UK LEZ implementation that started in 2008 the company believes it captured 15% of the available business. We consider that a market share of 15% (mainly diesel PM and NOx control) may be realistic for the for the California CARB retrofit market. That implies a revenue stream of $85 million over the next four years from these areas alone. However, the revenue may be back ended. Other states with significant mandates are New Jersey and Texas.

Using on a price/sales ratio of 0.3 (well below the current median value of the peer group but close to the current level) and N4Q revenue of $83 million results in a stock value of $3.50 a share using the share count of 7.2 million.

COMPARISON TABLE*	Ticker	Price	Mkt	ROE	P/E	P/E	P/B	P/S	EV/Rev.	EV/EBITDA	PEG	Inst.
(Source: Yahoo Finance)		12/22/13	Cap	(%)	L4Q	N4Q	LQ	L4Q	L4Q	L4Q		Ownership
			(in million)									%
Clean Diesel Technologies Inc.	**CDTI**	**$1.43**	**$13.3**	**NM**	**NM**	**NM**	**1.64**	**0.25**	**0.34**	**0.37**	**-1.93**	**11.5**
ADA-ES , Inc.	**ADES**	$54.40	$550	7.26	N/M	19.15	N/A	2.06	1.99	58.11	NM	41.4
Cummings Inc.	**CMI**	$137.35	$25,640	21.33	18.25	14.89	3.60	1.50	1.46	12.01	1.81	85.4
Donaldson Company Inc.	**DCI**	$43.13	$6,310	24.06	25.51	21.57	5.32	2.53	2.50	14.30	2.14	79.3
Fuel Sysyems Solutions Inc.	**FSYS**	$12.37	$249	N/M	N/A	53.87	0.78	0.62	0.43	7.30	2.77	45.3
Johnson Matthey Plc.	**JMAY/JMPLF**	$52.75	$10,700	22.13	21.8	N/A	4.66	0.54	0.61	13.3	N/A	N/A
LiqTech International Inc.	**LIQT**	$2.17	$59	N/M	N/A	N/A	4.11	4.71	4.60	N/M	N/A	0.5
MFRI Inc.	**MFRI**	$13.54	$96	N/M	N/A	N/A	1.24	0.38	0.50	8.12	N/A	40.6
Speedemissions Inc.	**SPMI**	$0.03	$1.3		Data not available			0.24				
Westport Innovations Inc.	**WPRT**	$18.38	$1,150	NM	NM	NM	3.68	7.33	7.48	NM	NM	53.5
* Data: Zacks Investment Research and Yahoo! Financial.												
Mean				18.70	21.84	27.37	3.13	2.02	2.21	16.22	1.20	
Median				21.73	21.77	20.36	3.64	1.06	1.46	12.01	1.98	

RISKS

The company has a number of significant financial risks.

- It will need additional funding to cover near term losses. The company does not have positive cash flow from operations and will need to reduce costs and grow revenue to achieve profitability.
- The auditor's report for year-end December 2010 includes a "going concern" caution.
- The company has been dependent on a few major customers and the loss of one of these customers would have a significant impact on profitability.

INSIDER TRADING AND OWNERSHIP

Directors and Officers own 6.5% of the outstanding stock. Special Situation Funds own 15.3%; Cycad Group 5.6%; John Kanis 5.4%; and Rockport Capital owns 5.2%

Insiders and %5 owners sold 237,227 shares over the last six months.
There were no direct insider buys.

PROJECTED INCOME STATEMENT & BALANCE SHEET

Clean Diesel Technologies																				
Consolidated Statements of Operations																				
(Dollars in millions except per share data)																				
Fiscal Year Dec. 31.	2010A	1Q11	2Q11	3Q11	4Q11	2011A	1Q12	2Q12	3Q12	4Q12	2012A	1Q13	2Q13	3Q13	4Q13	2013 E Est.	1Q14 Est.	2Q14 Est.	3Q14 Est.	4Q14 Est.	2014 E Est.
Revenue	$48.12	**$13.78**	**$11.53**	**$14.97**	**$21.30**	**$61.59**	**$17.00**	**$16.72**	**$14.40**	**$12.41**	**$60.54**	**$13.31**	**$12.56**	**$14.21**	**$15.50**	**$55.57**	**$15.00**	**$16.00**	**$17.00**	**$18.00**	**$66.00**
% Change	(4.75)	10.76	(10.78)	36.89	80.40	28.00	23.32	45.02	(3.83)	(41.72)	(1.71)	(21.72)	(24.93)	(1.35)	24.86	(8.21)	12.72	27.44	19.68	16.13	18.78
Cost Goods	36.08	9.78	8.10	10.70	15.40	43.98	13.06	12.55	10.53	9.68	45.82	10.20	9.30	9.93	10.85	40.27	10.65	11.36	12.07	12.96	47.04
G & A	11.92	4.55	4.86	3.90	3.70	17.01	4.45	3.76	3.38	3.36	14.95	3.84	3.42	2.95	3.00	13.22	3.00	2.90	2.90	2.90	11.70
In process R&D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R&D	4.37	1.51	2.24	1.62	2.00	7.37	1.92	1.95	1.65	1.21	6.72	1.27	0.95	1.20	1.20	4.61	1.20	1.20	1.20	1.20	4.80
Depr. & Amort.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
Op Income GAAP	(4.26)	(2.06)	(3.67)	(1.25)	0.20	(6.77)	(2.43)	(1.53)	(1.15)	(1.84)	(6.95)	(1.99)	(1.17)	0.13	0.45	(2.59)	0.15	0.54	0.83	0.94	2.46
Interest Expenses	3.64	0.21	0.32	0.33	0.00	0.87	0.32	0.35	0.44	0.37	1.48	0.34	0.34	0.38	0.40	1.45	0.40	0.40	0.40	0.40	1.60
Interest Income	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non Op Income	(1.82)	0.00	0.55	0.24	(0.50)	0.30	(0.32)	0.13	0.00	(0.56)	(0.76)	(0.59)	(0.15)	(0.70)	0.00	(1.44)	0.00	0.00	0.00	0.00	0.00
Other	0.39	0.17	0.00	0.00	0.00	0.17	0.00	(0.35)	(0.50)	(0.04)	(0.89)	0.31	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00
Calc.Pretax	(9.33)	(2.10)	(3.43)	(1.34)	(0.30)	(7.17)	(3.06)	(2.10)	(2.09)	(2.81)	(10.06)	(2.62)	(1.65)	(0.96)	0.05	(5.18)	(0.25)	0.14	0.43	0.54	0.86
Taxes	0.01	0.22	0.25	0.54	(0.70)	(1.15)	(0.32)	0.12	(0.12)	(0.04)	(0.37)	0.11	(0.28)	0.12	0.15	0.11	0.15	0.15	0.15	0.15	0.60
Tax Rate	(0.13)	(10.58)	(7.26)	(40.52)	233.33	16.00	10.52	(5.58)	5.87	1.39	3.65	(4.36)	16.97	(12.63)	300.00	(2.03)	(60.00)	107.14	34.88	27.78	69.77
Other Income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pro-forma adj.	0.00	0.00	1.20	0.40	(0.10)	0.10	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Income	(9.34)	(2.32)	(3.68)	(1.88)	0.40	(7.48)	(2.74)	(2.22)	(1.97)	(2.77)	(9.69)	(2.73)	(1.37)	(1.08)	(0.10)	(5.28)	(0.40)	(0.01)	0.28	0.39	0.26
Costs and expenses are on a pro-forma basis																					
Net For Common	(8.38)	(2.32)	(3.72)	(1.88)	0.50	(7.42)	(2.82)	(2.26)	(1.77)	(2.24)	(9.09)	(2.73)	(1.37)	(1.08)	(0.10)	(5.28)	(0.40)	(0.01)	0.28	0.39	0.26
Shares Used, millions	1.24	3.98	4.01	7.04	7.22	5.57	7.22	7.70	7.23	7.24	7.23	7.26	7.31	9.25	9.30	8.28	9.30	9.30	9.30	9.30	9.30
Earnings Per Share																					
EPS	($7.55)	**($0.58)**	**($0.93)**	**($0.27)**	**$0.07**	**($1.33)**	**($0.39)**	**($0.29)**	**($0.24)**	**($0.31)**	**($1.26)**	**($0.38)**	**($0.19)**	**($0.12)**	**($0.01)**	**($0.64)**	**($0.04)**	**($0.00)**	**$0.03**	**$0.04**	**$0.03**
Pro Forma EPS	($6.77)	**($0.58)**	**($0.63)**	**($0.21)**	**$0.06**	**($1.31)**	**($0.39)**	**($0.29)**	**($0.24)**	**($0.31)**	**($1.26)**	**($0.29)**	**($0.19)**	**($0.12)**	**($0.01)**	**($0.64)**	**($0.04)**	**($0.00)**	**$0.03**	**$0.04**	**$0.03**
Gross margins	25.01%	29.07%	29.75%	28.52%	27.70%	28.59%	23.16%	24.98%	26.90%	22.02%	24.32%	23.39%	25.89%	30.13%	30.00%	27.52%	29.00%	29.00%	29.00%	28.00%	28.73%

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Clean Diesel Technologies												
Consolidated Balance Sheet (in millions)												
Fiscal Year Dec. 31.												
	2010	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13
ASSETS												
Cash & Equiv.	5.01	1.25	3.15	4.56	3.47	4.39	3.43	7.65	6.88	4.58	3.16	4.56
A/R	5.48	7.46	6.50	8.66	11.70	8.60	8.36	7.09	5.47	6.35	5.40	7.38
Inventories	5.25	6.10	8.53	12.03	10.29	10.57	8.41	8.16	8.70	8.87	7.39	6.50
Other	1.82	1.16	2.08	2.59	1.66	2.23	1.96	1.63	1.76	1.46	1.53	1.57
Total current assets	17.55	15.97	20.27	27.84	27.12	25.79	22.16	24.53	22.80	21.27	17.48	20.01
Gross Plant	2.88	3.05	2.88	2.74	2.65	2.56	2.41	2.27	2.00	1.90	1.73	1.63
Deprn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Intangibles	11.97	11.85	11.46	11.14	10.95	10.97	10.56	10.71	10.46	10.15	9.76	9.75
Other	0.25	0.21	0.15	0.20	0.39	0.42	0.42	0.41	0.18	0.29	0.41	0.30
All Assets	32.65	31.08	34.76	41.92	41.12	39.74	35.53	37.93	35.44	33.60	29.38	31.69
LIABILITIES AND NET WORTH												
Debt Due 1 Yr	4.01	2.54	4.37	4.21	4.53	4.27	5.36	5.09	5.48	5.14	4.69	4.45
Notes Payable	0.00	0.00	0.00	0.00	0.00	0.00	4.58	4.61	0.10	3.10	3.10	3.00
A/P	4.59	6.56	7.38	7.50	5.95	6.67	4.73	5.29	5.61	6.81	4.87	5.25
Taxes	0.46	0.24	0.44	0.88	0.27	0.02	0.03	0.03	0.02	0.05	0.06	0.54
Other	5.70	4.97	5.58	4.77	5.02	5.61	4.96	4.79	4.51	4.34	4.11	4.91
Total current liabilities	14.75	14.31	17.77	17.37	15.77	16.58	19.65	19.80	15.72	19.44	16.83	18.15
Conv. Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
L.T.Debt	1.41	1.44	4.46	4.49	4.52	4.55	0.00	2.93	7.48	4.50	4.52	4.53
Other LT	0.05	0.04	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Def. Taxes & ITC	1.10	1.13	1.13	1.07	0.96	0.97	0.94	0.98	0.80	0.79	0.85	0.87
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
All Liabilities	17.31	16.92	23.36	22.95	21.25	22.11	20.59	23.72	24.00	24.72	22.20	23.56
Pref.Stock	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Stock	0.00	0.04	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.09
Surplus	0.00	173.85	0.00	185.23	185.47	185.56	185.70	185.91	186.11	186.27	186.44	187.85
Retained Earnings	0.00	-160.04	0.00	-165.41	-164.96	-167.78	-170.05	-171.82	-174.62	-176.76	-178.13	-179.22
Other	0.00	0.31	0.00	-0.92	-0.72	-0.21	-0.79	0.04	-0.11	-0.71	-1.20	-0.59
Treasury Stock	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Worth	15.34	14.16	0.00	18.97	19.87	17.63	14.94	14.21	11.45	8.88	7.18	8.13
Total liabilities & stockholders' equity	32.65	31.08	23.36	41.92	41.12	39.74	35.53	37.93	35.44	33.60	29.38	31.69

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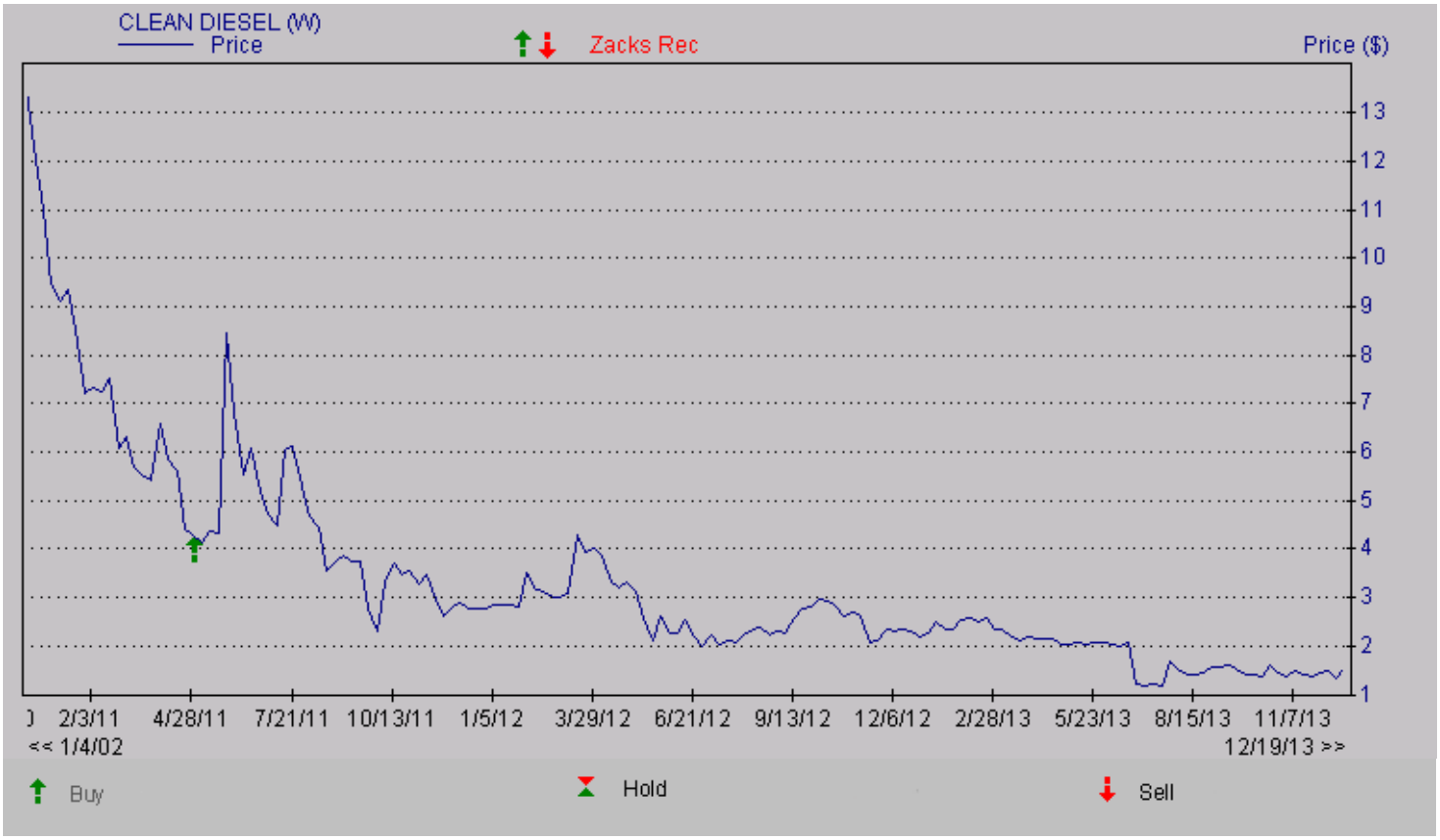
Clean Diesel Technologies						
Condensed Consolidated Statements of Cash Flows						
Fiscal Year Dec. 31.						**9 months**
	2008	**2009**	**2010**	**2011**	**2012**	**2013**
Cash flow from operations:						
Net (Loss) Income	(20.80)	0.50	(8.38)	(7.31)	(9.66)	(4.60)
Depreciation & amortization	1.00	1.00	1.29	1.75	1.43	0.98
Amortization of goodwill & other assets	6.50	6.50	1.53		0.24	
Stock issued for services						
Stock based compensation	15.00	15.00	0.28	1.50	0.53	0.19
Impairment of machinery						0.54
In-process R&D						
Other	5.00	5.00	1.02	(10.56)	7.30	0.50
Net cash provided by (used in) operating activites	**6.70**	**28.00**	**(4.26)**	**(14.62)**	**(0.16)**	**(2.40)**
Cash flow from investments:						
Purchase of PP&E	2.00	2.00	0.42	0.62	0.24	(0.14)
Proceeds from disposal of PP&E			2.00		0.02	
Other			2.66	(0.09)		(0.33)
Net cash provided by (used in) investing activities	**2.00**	**2.00**	**5.08**	**0.53**	**0.25**	**(0.47)**
Cash flow from financing activities:						
Proceeds from issuance of common stock				13.18		1.84
Proceeds (payment) on lines of credit, net				1.99	0.56	(1.03)
Proceeds from debt - related parties					3.00	
Proceeds fromo debt						
Payment on debt - related parties					(0.08)	
Payment on debt			(0.14)	(1.24)	0.95	
Other			1.99	(1.38)	(0.61)	(1.20)
Net cash provided by (used in) financing activities	**0.00**	**0.00**	**1.85**	**12.55**	**3.82**	**(0.39)**
Increase (decrease) in cash and equivalents	8.70	30.00	2.67	(1.54)	3.41	(2.31)
Cash & equivalents at beginning of period			2.34	5.01	3.47	6.87
Cash & equivalents at end of period		2.34	5.01	3.47	6.87	4.56

HISTORICAL ZACKS RECOMMENDATIONS



Note: Prices shown prior to Oct 10, 2010 are for the predecessor company and not for Clean Diesel (CDTI)

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The current distribution of Zacks Ratings is as follows on the 1033 companies covered: Buy/Outperform- 15.8%, Hold/Neutral- 77.5%, Sell/Underperform – 5.7%. Data is as of midnight on the business day immediately prior to this publication.