Zacks Small-Cap Research

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# Clean Diesel Tech. (CDTI-NASDAQ)

**CDTI: Third quarter results were impacted by higher costs of certain metals used in catalysts as well as lower than expected revenue from the California CARB mandates.**

| | |
|---|---|
| **Current Recommendation** | **Outperform** |
| Prior Recommendation | Neutral |
| Date of Last Change | 02/23/2012 |
| Current Price (08/08/12) | $2.44 |
| **Six- Month Target Price** | **$5.50** |

## 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.

Our EPS estimates remain unchanged but we have dropped our price target from $8.50 to $5.50 a share

## SUMMARY DATA

| | |
|---|---|
| **52-Week High** | **$5.13** |
| **52-Week Low** | **$1.97** |
| **One-Year Return (%)** | **-48.6** |
| **Beta** | **2.1** |
| **Average Daily Volume (sh)** | **228,233** |
| **Shares Outstanding (mil)** | **7.2** |
| **Market Capitalization ($mil)** | **$18.8** |
| **Short Interest Ratio (days)** | **12.0** |
| **Institutional Ownership (%)** | **21.3** |
| **Insider Ownership (%)** | **6.5** |
| **Annual Cash Dividend** | **$0.00** |
| **Dividend Yield (%)** | **0.00** |
| **5-Yr. Historical Growth Rates** | |
| **Sales (%)** | **78.3** |
| **Earnings Per Share (%)** | **N/A** |
| **Dividend (%)** | **N/A** |
| **P/E using TTM EPS** | **N/M** |
| **P/E using 2012 Estimate** | **N/M** |
| **P/E using 2013 Estimate** | **7.2** |
| **P/Sales on L4Q Sales** | **0.3** |

| | |
|---|---|
| **Risk Level** | **High** |
| **Type of Stock** | **Small-Value** |
| **Industry** | **Pollution Cntrl** |

## ZACKS ESTIMATES

**Revenue**
(in millions of $)

| | Q1 (Mar) | Q2 (Jun) | Q3 (Sep) | Q4 (Dec) | Year (Dec) |
|---|---|---|---|---|---|
| **2010** | **$12.4 A** | **$12.9 A** | **$10.9 A** | **$11.8 A** | **$48.1 A** |
| **2011** | **$13.8 A** | **$11.5 A** | **$15.0 A** | **$21.3 A** | **$61.6 A** |
| **2012** | **$17.0 A** | **$16.7 A** | **$18.5 E** | **$23.0 E** | **$75.2 E** |
| **2013** | **$23.0 E** | **$24.0 E** | **$24.0 E** | **$26.0 E** | **$97.0 E** |

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

| | Q1 (Mar) | Q2 (Jun) | Q3 (Sep) | Q4 (Dec) | Year (Dec) |
|---|---|---|---|---|---|
| **2010** | **$0.00A** | **0** | **0** | **-$1.71A** | **-$6.71A** |
| **2011** | **-$0.58A** | **-$0.63A** | **-$0.21A** | **$0.06A** | **-$1.31A** |
| **2012** | **-$0.39A** | **-$0.29A** | **-$0.10E** | **$0.11E** | **-$0.70E** |
| **2013** | **$0.07E** | **$0.10E** | **$0.06E** | **$0.10E** | **$0.34E** |

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

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## RECENT NEWS

**Second quarter results**: The results were disappointing. Although some sales into the London Low Emission Zone carried over into the second quarter it appears that truckers in California are waiting until the last possible moment to comply with the emission requirements that come into force at year end. Unless CARB starts a major compliance enforcement initiative revenue from California may continue to be below expectations. On the positive side, OEM, off-highway and stationary sources are now nearly 40% of HD Diesel Division revenue and this is non-retrofit revenue that should continue to grow nationwide and outside of the vehicle mandates.

| | 1Q11 | 2Q11 | 3Q11 | 4Q11 | 2011 | 1Q12 | 2Q12 |
|---|---|---|---|---|---|---|---|
| **HD Diesel revenue** | $9.5 | $9.6 | $11.1 | $17.3 | $47.4 | $12.6 | $11.0 |
| **Gross profit** | $2.9 | $2.9 | $3.8 | $0.3 | $9.9 | $0.0 | $0.1 |
| **Catalyst revenue** | $4.7 | $3.4 | $5.9 | $6.8 | $20.8 | $6.1 | $6.4 |
| **Gross profit** | $1.1 | $0.7 | $0.6 | $1.1 | $3.5 | $0.0 | $0.7 |
| **All revenue** | $13.8 | $11.5 | $15.0 | $21.3 | $61.6 | $17.0 | $16.7 |
| **Operating income** | $2.1 | $3.7 | $1.3 | $0.2 | $6.8 | $2.4 | $1.5 |
| **Net income** | $2.3 | $3.7 | $1.9 | $0.5 | $7.4 | $2.8 | $2.3 |
| Gross profit has been dropped and operating income used in 2012. | | | | | | | |

Both Heavy Duty Diesel and catalyst revenue increased year/year. HD Diesel Systems revenue was impacted by the end of London LEZ program, although there was about $1 million from the LEZ in the second quarter. California based revenue was $2.5 million; $1 million in New Jersey and $0.8 million in Texas.

On a geographic basis the US nearly doubled year/year, Canada increased slightly and Sweden was down slightly and the major gain occurred in the UK. With the LEZ initiative ending the business in the rest of 2012 will be biased towards California, New Jersey and Texas. We expect gross margins to improve from the second quarter level.

Catalyst revenue was driven by two major factors. Last year operations were impacted by the aftermath of the earthquakes in Japan and the subsequent tsunami. Japanese auto parts production has recovered and sales of the Japanese auto companies to US customers are well above year ago levels. Rare Earth metals, that are used in making auto emission catalysts, have increased in price. Although Clean Diesel is protected from these price (cost pass through) increases the profit is not increased, with subsequent margin compression.

The catalyst Division has been awarded the supply contract for US built next generation four and six cylinder Honda Accords. This is a positive development.

Now that the London LEZ business is over the S.G.& A. expenses associated with London will also end. This will have a positive impact on operating margins in the rest of the year and into next year.

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.

The company has announced two new catalyst systems that will be used in vehicles launched later in 2012. These catalyst have been approved by an OEM and by CARB. The first system is designed to meet the most stringent California regulations. The second catalyst system replaces the expensive Platinum and Rhodium with more widely available Palladium. Although the OEM contracts for catalysts usually contain pass-through provisions on the costs of the precious metals the replacement of high cost metals with lower cost materials can be a significant cost reduction to the vehicle's OEM.

On May 10, 2012 Clean Diesel announced the receipt of over $1 million for the retrofit of the diesel particulate removal systems in over 100 school buses in Texas. The retrofit, using the company's Purifilter Plus emission control system, can be done very quickly (over lunchtime) and is fully compliant with CARB and EPA requirements. The systems employ both active and passive regeneration and the order should begin in June and be completed in July 2012.

On April 30, 2012 the company announced it has received about $0.7 million in new orders for Clean Diesel's ECS-branded Purifilter Plus diesel particulate (soot) emission control systems that are approved by the New Jersey Dept. of Environmental Protection Mandatory Diesel Retrofit Program. Under this program dump, recycling and tow trucks are required to meet certain standards by established deadlines.

So far Clean Diesel Technology has received more than $3.4 million orders under the NJDEP program. This latest order should be completed by July 2012.

On March 8, 2012 R. Craig Breese was appointed President and CEO of Clean Diesel Technologies. Craig's past experience includes President of Honeywell's Consumer Products group that includes the auto products and services of: Prestone, FRAM, Autolite and HOLTS with revenue in excess of $1.2 billion. As well as experience in the automotive after-market he has worked with OEM auto equipment manufacturers and in the heavy duty diesel business.

On February 13, 2012 Clean Diesel received approval for the California Air Resources Board [CARB] for the company's ECS Purifilter systems for use on heavy duty (Class 7 and 8) trucks with engines up to 16.0 liters and 625 horsepower. This is an extension of Clean Diesel's potential market within the truck and bus retrofit business. Without this approval the use of the company's filters would have been restricted.

There was no similar restriction within the London environmental zone

**New Jersey order for diesel retrofit.**

The New Jersey Department of Environmental Protection Mandatory Diesel Retrofit Program (NJDEP) has awarded Clean Diesel orders for over $1.7 million. The company's Purifilter Plus diesel particulate filter system was approved by the NJDEP for retrofitting trucks with equipment to reduce soot emissions from certain vehicles such as tow trucks and dump trucks. The purchase and installation is paid for by the NJDEP. All owners of such trucks had to submit a inventory/retrofit cost estimate to NJDEP be September 8, 2011 and the NJDEP will conduct a review of these costs and authorize the retrofit and reimbursement of expense. The NJDEP website is:

www.stopthesoot.org

The revenue from this order should be included in the fourth quarter of 2011.

**Bus pollution control order**:

Clean Diesel has received an order for its approved emission reduction products for retrofitting Purifilter Plus diesel particulate filter(DPF) emission reduction systems to school buses under the California Air Resources Board program for Northern California. The orders were received from Emissions Retrofit Group, a key distributor of Clean Diesels ECS-branded emission reduction products.

On October 10, 2011 the company, in conjunction with a private placement of stock, announced an unaudited preliminary revenue estimate of at least $14.7 million. This is slightly higher than our estimate of $14 million. The HDD revenue increase should exceed 50% due to strong off-road equipment sales, good retrofit business in N. America and continued revenue from the London LEZ initiative. Final results should be released on, or about, November 10, 2011.

Clean Diesel has entered into a stock purchase agreement with Lincoln Park Capital Fund, LLC, of Chicago IL.

The agreement allows Clean Diesel to sell to Lincoln Park Capitol, at Clean Diesel's option and with no obligation, up to $10.00 million of common stock over a 30 month period under the following conditions:

40, 247 shares as an up-front fee.
80,494 shares over the life of the loan if Lincoln Park Capital buys any stock.
The stock will be priced at the lowest price of the day or the average price over the last 12 trading days.

Clean Diesel can sell stock in the following dollar amounts:

Up to $0.5 million at any price.
$0.75 million if the stock price exceeds $5.00.
$1.0 million if the stock price exceeds $7.50.
$1.25 million if the stock price exceeds $10.00

The proceeds will, in our opinion, be most likely used for funding inventory as Clean Diesel gears up for the London LEZ and other controlled emission zones.

We have increased our estimates of the shares outstanding from 7 million to 8.8 million at the end of 2013 fiscal year. There has been no change in our estimates for sales and earnings beyond the slight increase in revenue for the third quarter.

On June 3, 2011 Clean Diesel filed an S-1 statement with the SEC for $13.8 million public offering. This was priced at $3.75 a share on June 29, 2011 and closed on July 5, 2011. The stock price closed at $4.05 on June 28 and increased to $4.86 after the pricing was announced. The company offered 2.645 million shares and selling shareholders offered 80,000 shares. The Underwriters exercised the over- allotment option for a total offering of 3,133,750 shares. The proceeds to Clean Diesel were about $10.1 million.

On June 29, 2011 Clean Diesel was included in the Russell Microcap Index.

Clean Diesel announced on May 25, 2011 the receipt of $2 million in orders for its emission reduction equipment for use in California. The average price for these systems was $10,000.

On May 18, 2011 Clean Diesel reported an agreement with its Japanese joint venture in Asia, Tanaka Kikinzoku Kogyo Kabushiki Kaisha (TKK), to provide catalyst engineering and support services for catalyst manufacturing capability in China for $1.45 million comprised of an up-front payment (unspecified) and the balance over 14 months subject to certain milestones. In 2008 Clean Diesel (as Catalytic Solutions) had sold specific diesel catalyst technology to TKK for a total of $7.5 million and in 2009 sold light vehicle technology for $4 million. All of the rights were

for use of the technology in Asia. These transactions reduced CDTI's ownership to 5% of the joint venture.

On October 15, 2010, the wholly-owned subsidiary, CDTI Merger Sub, Inc., merged with and into Catalytic Solutions, Inc.. with one-for-six reverse split. The merger was accounted for as a reverse acquisition.

## 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.

The major world-wide programs are outlined below:

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 remain in effect through 2011

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[3] Euro IV standards are implemented in National Capital Region (NCR) and 11 noncompliant cities

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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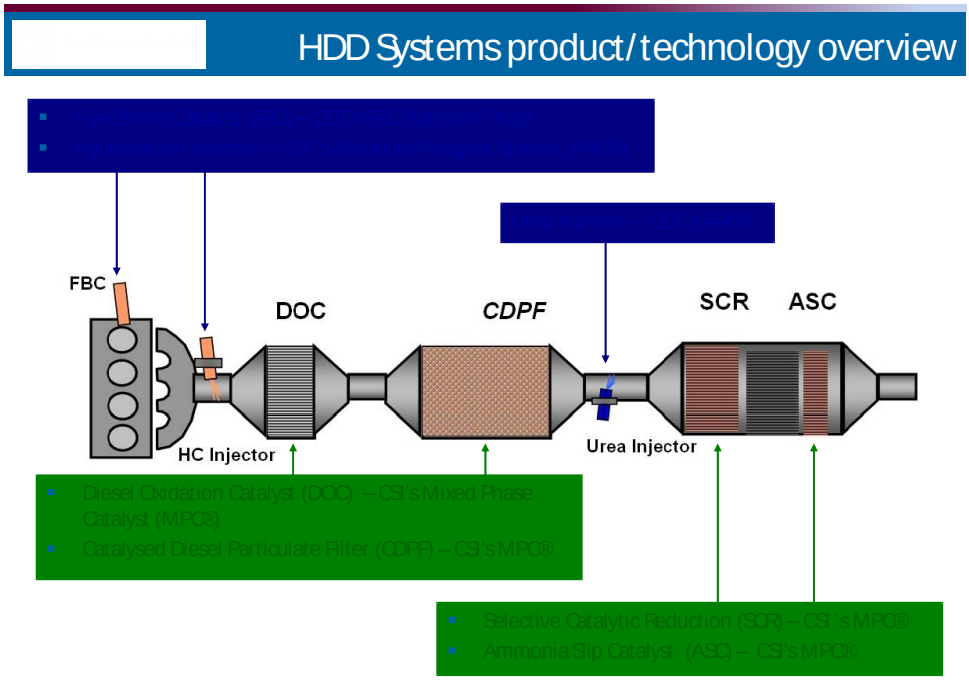


## INDUSTRY OUTLOOK

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. Other states with significant mandates are New Jersey and Texas.

Using on a price/sales ratio of 0.6 (well below the current median value) and N4Q revenue of $85 million results in a stock value of $5.50 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) | | 8/9/12 | Cap | (%) | L4Q | N4Q | LQ | L4Q | L4Q | L4Q | | Ownership |
| | | | (in million) | | | | | | | | | % |
| **Clean Diesel Technologies Inc.** | **CDTI** | **$2.44** | **$19** | **NM** | **NM** | **NM** | **1.26** | **0.27** | **0.24** | **0.37** | **0.46** | 6.9 |
| | | | | | | | | | | | | |
| **ADA-ES , Inc.** | **ADES** | $24.35 | $244 | NM | NM | 6.80 | 5.26 | 5.26 | 3.47 | N/M | 0.96 | 40.4 |
| **Cummings Inc.** | **CMI** | $101.28 | $19,120 | 33.70 | 10.06 | 9.53 | 3.12 | 1.03 | 1.00 | 7.34 | 0.83 | 90.0 |
| **Donaldson Company Inc.** | **DCI** | $34.38 | $5,120 | 26.53 | 20.39 | 18.29 | 5.17 | 2.10 | 2.11 | 12.55 | 1.57 | 78.8 |
| **Enova Systems Inc.** | **ENA** | $0.05 | $2 | NM | N/A | N/A | 1.29 | 0.53 | 1.12 | NM | N/A | 28.2 |
| **Fuel Sysyems Solutions Inc.** | **FSYS** | $16.88 | $338 | 1.06 | NM | 19.40 | 1.00 | 0.78 | 0.74 | 10.33 | 1.80 | 61.1 |
| **Johnson Matthey Plc.** | **JMPLF** | $34.95 | $3,710 | 21.49 | N/A | 0.12 | 1.70 | 0.21 | N/A | N/A | 1.46 | N/A |
| **LiqTech International Inc.** | **LIQT** | $1.47 | $33 | 12.92 | 22.62 | N/A | 2.30 | 1.35 | 1.39 | 10.94 | N/A | 2.6 |
| **MFRI Inc.** | **MFRI** | $6.80 | $47 | 4.64 | N/A | N/A | 0.67 | 0.20 | 0.38 | N/A | N/A | 43.1 |
| **Speedemissions Inc.** | **SPMI** | $0.01 | 0.21 | | Data not available | | | 0.06 | | | | |
| **Westport Innovations Inc.** | **WPRT** | $37.10 | $2,040 | NM | NM | NM | 4.92 | 5.33 | 5.11 | NM | NM | 53.5 |
| * Data: Zacks Investment Research and Yahoo! Financial. | | | | | | | | | | | | |
| **Mean** | | | | 16.72 | 17.69 | 10.83 | 2.67 | 1.56 | 1.73 | 8.31 | 1.18 | |
| **Median** | | | | 17.21 | 20.39 | 9.53 | 2.00 | 0.78 | 1.12 | 10.33 | 1.21 | |

## 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 Act | 2Q12 Act | 3Q12 Est | 4Q12 | 2012 E Est | 1Q13 | 2Q13 | 3Q13 | 4Q13 | 2013 E Est. |
| **Revenue** | $48.12 | **$13.78** | **$11.53** | **$14.97** | **$21.30** | **$61.59** | **$17.00** | **$16.72** | **$18.50** | **$23.00** | **$75.22** | **$23.00** | **$24.00** | **$24.00** | **$26.00** | **$97.00** |
| % Change | (4.75) | 10.76 | (10.78) | 36.89 | 80.40 | 28.00 | 23.32 | 45.02 | 23.55 | 7.98 | 22.14 | 35.30 | 43.51 | 29.73 | 13.04 | 28.95 |
| Cost Goods | 36.08 | 9.78 | 8.10 | 10.70 | 15.40 | 43.98 | 13.06 | 12.55 | 13.50 | 16.10 | 55.21 | 16.10 | 16.80 | 16.80 | 18.20 | 67.90 |
| G & A | 11.92 | 4.55 | 4.86 | 3.90 | 3.70 | 17.01 | 4.45 | 3.76 | 3.50 | 3.50 | 15.20 | 3.70 | 3.70 | 4.00 | 4.00 | 15.40 |
| 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 |
| R&D | 4.37 | 1.51 | 2.24 | 1.62 | 2.00 | 7.37 | 1.92 | 1.95 | 2.20 | 2.20 | 8.27 | 2.30 | 2.30 | 2.40 | 2.60 | 9.60 |
| 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 | 0.00 | 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) | (0.70) | 1.20 | (3.46) | 0.90 | 1.20 | 0.80 | 1.20 | 4.10 |
| Interest Expenses | 3.64 | 0.21 | 0.32 | 0.33 | 0.00 | 0.87 | 0.32 | 0.35 | 0.30 | 0.30 | 1.27 | 0.30 | 0.30 | 0.30 | 0.30 | 1.20 |
| 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 |
| Non Op Income | (1.82) | 0.00 | 0.55 | 0.24 | (0.50) | 0.30 | (0.32) | 0.13 | 0.10 | 0.10 | 0.01 | 0.10 | 0.10 | 0.10 | 0.10 | 0.40 |
| Other | 0.39 | 0.17 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | (0.35) | 0.00 | 0.00 | (0.35) | 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) | (0.90) | 1.00 | (5.06) | 0.70 | 1.00 | 0.60 | 1.00 | 3.30 |
| Taxes | 0.01 | 0.22 | 0.25 | 0.54 | (0.70) | (1.15) | (0.32) | 0.12 | (0.14) | 0.16 | (0.81) | 0.11 | 0.16 | 0.10 | 0.16 | 0.53 |
| Tax Rate | (0.13) | (10.58) | (7.26) | (40.52) | 233.33 | 16.00 | 10.52 | (5.58) | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 |
| 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 |
| 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 | 0.00 | 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) | (0.76) | 0.84 | (4.87) | 0.59 | 0.84 | 0.50 | 0.84 | 2.77 |
| 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) | (0.76) | 0.84 | (5.00) | 0.59 | 0.84 | 0.50 | 0.84 | 2.77 |
| Shares Used, millions | 1.24 | 3.98 | 4.01 | 7.04 | 7.22 | 5.57 | 7.22 | 7.70 | 7.70 | 8.00 | 7.12 | 8.20 | 8.40 | 8.60 | 8.80 | 8.18 |
| Earnings Per Share | | | | | | | | | | | | | | | | |
| **EPS** | ($7.55) | **($0.58)** | **($0.93)** | **($0.27)** | **$0.07** | **($1.33)** | **($0.39)** | **($0.29)** | **($0.10)** | **$0.11** | **($0.70)** | **$0.07** | **$0.10** | **$0.06** | **$0.10** | **$0.34** |
| **Pro Forma EPS** | ($6.77) | **($0.58)** | **($0.63)** | **($0.21)** | **$0.06** | **($1.31)** | **($0.39)** | **($0.29)** | **($0.10)** | **$0.11** | **($0.70)** | **$0.07** | **$0.10** | **$0.06** | **$0.10** | **$0.34** |

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| Clean Diesel Technologies | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Consolidated Balance Sheet (in millions) | | | | | | | | |
| Fiscal Year Dec. 31. | | | | | | | | |
| | | 2010 | 1Q11 | 2Q11 | 3Q11 | 4Q11 | 1Q12 | 2Q12 |
| **ASSETS** | | | | | | | | |
| Cash & Equiv. | | 5.01 | 1.25 | 3.15 | 4.56 | 3.47 | 4.39 | 3.43 |
| A/R | | 5.48 | 7.46 | 6.50 | 8.66 | 11.70 | 8.60 | 8.36 |
| Inventories | | 5.25 | 6.10 | 8.53 | 12.03 | 10.29 | 10.57 | 8.41 |
| Other | | 1.82 | 1.16 | 2.08 | 2.59 | 1.66 | 2.23 | 1.96 |
| Total current assets | | 17.55 | 15.97 | 20.27 | 27.84 | 27.12 | 25.79 | 22.16 |
| Gross Plant | | 2.88 | 3.05 | 2.88 | 2.74 | 2.65 | 2.56 | 2.41 |
| Deprn | | 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 |
| Intangibles | | 11.97 | 11.85 | 11.46 | 11.14 | 10.95 | 10.97 | 10.56 |
| Other | | 0.25 | 0.21 | 0.15 | 0.20 | 0.39 | 0.42 | 0.42 |
| **All Assets** | | 32.65 | 31.08 | 34.76 | 41.92 | 41.12 | 39.74 | 35.53 |
| | | | | | | | | |
| **LIABILITIES AND NET WORTH** | | | | | | | | |
| Debt Due 1 Yr | | 4.01 | 2.54 | 4.37 | 4.21 | 4.53 | 4.27 | 5.36 |
| Notes Payable | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.58 |
| A/P | | 4.59 | 6.56 | 7.38 | 7.50 | 5.95 | 6.67 | 4.73 |
| Taxes | | 0.46 | 0.24 | 0.44 | 0.88 | 0.27 | 0.02 | 0.03 |
| Other | | 5.70 | 4.97 | 5.58 | 4.77 | 5.02 | 5.61 | 4.96 |
| Total current liabilities | | 14.75 | 14.31 | 17.77 | 17.37 | 15.77 | 16.58 | 19.65 |
| Conv. Debt | | 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 |
| Other LT | | 0.05 | 0.04 | 0.00 | 0.02 | 0.00 | 0.01 | 0.00 |
| Def. Taxes & ITC | | 1.10 | 1.13 | 1.13 | 1.07 | 0.96 | 0.97 | 0.94 |
| Other | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| All Liabilities | | 17.31 | 16.92 | 23.36 | 22.95 | 21.25 | 22.11 | 20.59 |
| Pref.Stock | | 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 |
| Surplus | | 0.00 | 173.85 | 0.00 | 185.23 | 185.47 | 185.56 | 185.70 |
| Retained Earnings | | 0.00 | -160.04 | 0.00 | -165.41 | -164.96 | -167.78 | -170.05 |
| Other | | 0.00 | 0.31 | 0.00 | -0.92 | -0.72 | -0.21 | -0.79 |
| Treasury Stock | | 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 |
| **Total liabilities & stockholders' equity** | | 32.65 | 31.08 | 23.36 | 41.92 | 41.12 | 39.74 | 35.53 |

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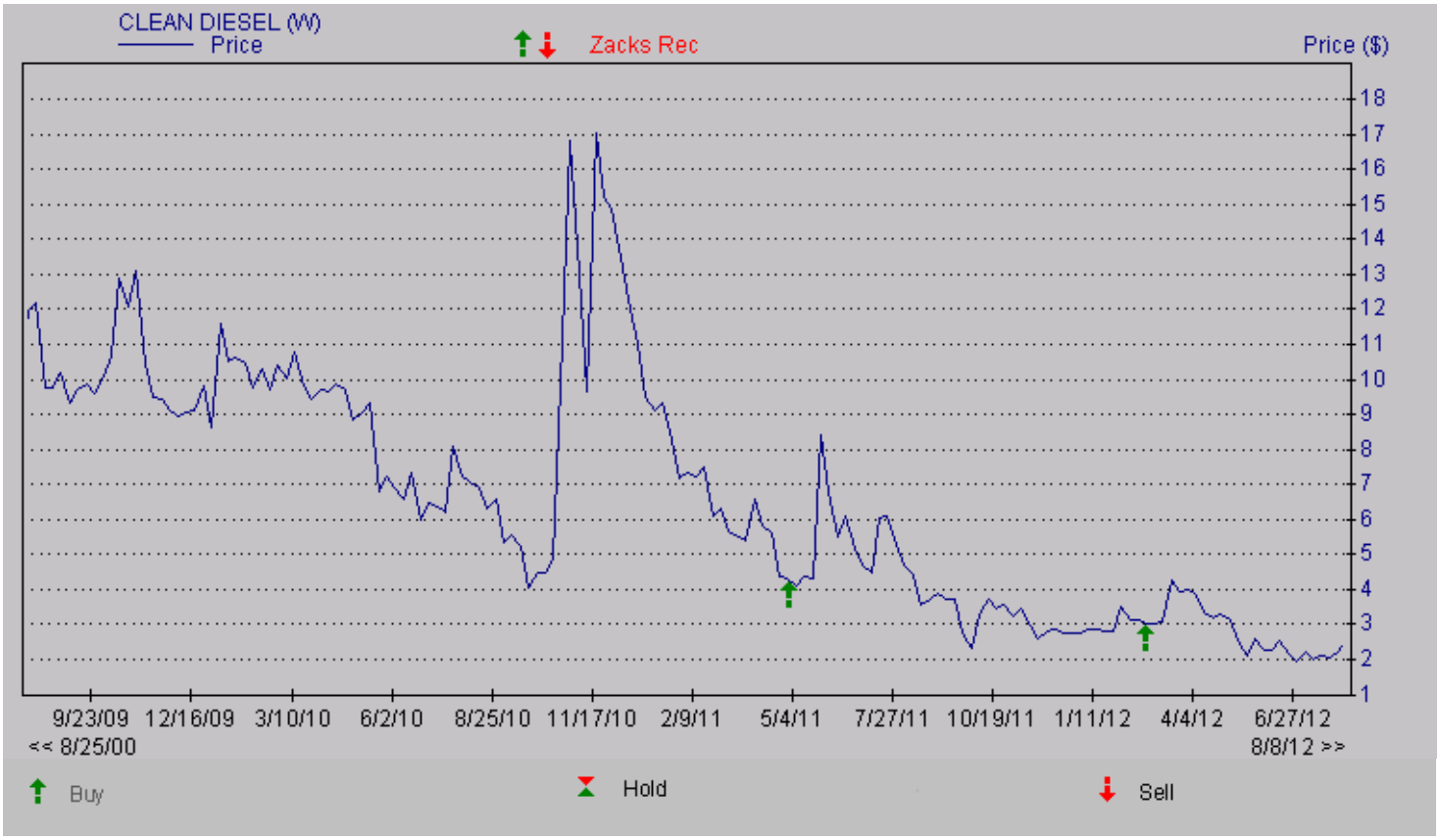
| **Clean Diesel Technologies** | | | | | |
|---|---|---|---|---|---|
| Condensed Consolidated Statements of Cash Flows | | | | | |
| Fiscal Year Dec. 31. | | | | | **6 Months** |
| | **2008** | **2009** | **2010** | **2011** | **2012** |
| Cash flow from operations: | | | | | |
| Net (Loss) Income | (20.80) | 0.50 | (8.38) | (7.31) | (5.09) |
| Depreciation & amortization | 1.00 | 1.00 | 1.29 | 1.75 | 0.71 |
| Amortization of goodwill | 6.50 | 6.50 | 1.53 | | |
| | | | | | |
| Stock issued for services | | | | | |
| Stock based compensation | 15.00 | 15.00 | 0.28 | 1.50 | 0.23 |
| Impairment of machinery | | | | | |
| In-process R&D | | | | | |
| Other | 5.00 | 5.00 | 1.02 | (10.56) | 3.35 |
| **Net cash provided by (used in) operating activites** | **6.70** | **28.00** | **(4.26)** | **(14.62)** | **(0.79)** |
| | | | | | |
| Cash flow from investments: | | | | | |
| Purchase of PP&E | 2.00 | 2.00 | 0.42 | 0.62 | 0.12 |
| Proceeds from disposal of PP&E | | | 2.00 | | |
| Other | | | 2.66 | (0.09) | |
| **Net cash provided by (used in) investing activities** | **2.00** | **2.00** | **5.08** | **0.53** | **0.12** |
| | | | | | |
| Cash flow from financing activities: | | | | | |
| Proceeds from issuance of common stock | | | | 13.18 | |
| Proceeds (payment) on lines of credit, net | | | | 1.99 | 0.83 |
| Proceeds from debt - related parties | | | | | |
| Proceeds fromo debt | | | | | |
| Payment on debt - related parties | | | | | |
| Payment on debt | | | (0.14) | (1.24) | |
| Other | | | 1.99 | (1.38) | (0.20) |
| **Net cash provided by (used in) financing activities** | **0.00** | **0.00** | **1.85** | **12.55** | **0.63** |
| | | | | | |
| Increase (decrease) in cash and equivalents | 8.70 | 30.00 | 2.67 | (1.54) | (0.04) |
| Cash & equivalents at beginning of period | | | 2.34 | 5.01 | 3.47 |
| Cash & equivalents at end of period | | 2.34 | 5.01 | 3.47 | 3.43 |

## 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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