Impacts of Pending California Air Resources Board Regulations on Off-Road Diesel Equipment To:

- Construction Company Equity
- Public Agencies
- Small & Minority Owned Business
- Employment in California
- Infrastructure Improvement & Expansion

ENGINEERING & UTILITY
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A Common Sense Analysis with Solutions that Improve Air Quality

A Common Sense Economic Analysis

Introduction
In an era of acknowledged global warming and the need for businesses to be responsive and responsible, regulation is an expected and necessary consequence. In most industries there is a predictable amount of rhetoric that is tossed in the air by industry to either obfuscate the issues or create political pressure. This document means to do neither. It is intended to educate those impacted by the pending regulation proposed by the California Air Resources Board of the impacts of this proposed regulations on construction company equity, public agencies, small and minority owned business, employment in California, and infrastructure improvement and expansion efforts. It is common sense and bottom line. The spin and hand wringing have been eliminated.

Situation Analysis
California is a global leader in most every way. Clean air is no different and policies here are being carefully scrutinized as templates for the rest of the nation, particularly the 21 other states with federal air quality non-attainment areas. It takes courage and sacrifices to achieve national leadership and obtain positive results.

The construction industry is prepared to improve emissions from its equipment, but with regard to the current California Air Resources Board (CARB) proposed regulations, the economic consequences are excessive and will have a disproportional impact on those required to comply with it.

Summary of Pending CARB Regulation on Off-Road Diesel Equipment
On May 25, 2007, CARB members will be voting on a regulation requiring owners of off-road, in-use diesel equipment (greater than 25 horsepower) to reduce Particulate Matter (PM) and Nitrous Oxide (NOx) emissions. This is part of the Board's strategy to reach its overall goal of reducing PM from all diesel-fueled engines in California by 85 percent by year 2020.

The Board announced their intention to establish these reductions in 2000. The original plan called for an 18-year timeline to meet the goal of reducing PM emissions only. Now, after seven years of delay in developing these rules, that timeline is reduced to 10 years. The CARB staff added NOx emissions reductions to the proposed rule in the last few months, which significantly alters the technology needed for companies to be in compliance.

According to CARB, construction-related diesel emissions represent 24 percent of the total PM emissions from mobile sources and less than one percent of total PM emissions from all sources. NOx emissions from construction engines represent about 19 percent of all emissions from off-road sources and 9 percent of all NOx emissions statewide.

The regulation requires owners of this equipment replace, repower, retrofit or retire their engines at a rate of 8 to 10 percent per year for NOx reduction through 2020. For PM reductions, owners are required to retrofit 20 percent of their remaining fleet horsepower with CARB verified diesel emission control systems (VDECS). These rules call for the complete replacement of three fourths of the construction fleet. The only engines that meet both NOx and PM requirements under CARB's proposed rules, federal EPA required Tier 4 engines will not be available across all equipment categories until 2015.

Impact on Construction Company Equity

CARB staff asserts that their rule will have a negligible effect on owner equity. The truth is that this rule will destroy construction company equity in an ever-spiraling environment of increased debt and reduced capacity.

Most construction firms have their equity tied up in their equipment. This is true for owner/operators of one unit and for large heavy construction contractors. Unlike other vehicles, construction equipment, if properly maintained, can last for decades. Most operators buy used equipment, with prices ranging from $5,000-$75,000 and to as high as $1.5 million depending on equipment type, age and condition, plus shipping and repairs.

The reason for this is simple—comparable new equipment runs from $25,000 to $3,500,000 and is expensive to finance. Unlike other expenditures of this magnitude, contractors have a very short financing window—five to seven years is the norm. Since this is a volatile industry, few can forecast profits that far into the future.

Imagine then, the impact of the reduction of equity value to these firms of, under the CARB regulation, requiring contractors either:

- sell existing equipment out of state in a flooded used equipment market
- retrofit other equipment for short term and then sell out of state later

Either of these destroys the contractors' years of equity value invested. The assumption that somehow they have either the capital available or can "earn it as they go" simply does not correlate to industry business principles or financial practice.

The impacts of this are significant:

- Many construction companies are multi-generation with the Baby Boomers reaching near retirement. Particularly in small and minority firms, their equipment equity is all they have. These firms depend upon this equipment-centric net worth for their personal financial security. With the majority of their net worth tied up in equipment that will be devalued due to the regulation, contractors will lose the majority of what they have worked for many years.
- Contractor bonding, required to be able to bid for work, is based on net assets. The equipment devalued by this regulation will have a directly proportional affect on bonding capacity.
- CARB tells the industry to pass along the costs of its regulations ($3.4 billion in direct cost and $16.1 billion in equipment replacement) to their customers—public and private. CARB erroneously assumes that increases in revenue drop straight to the bottom line, whereas industry knows that actual costs such as labor, materials and overhead have to come out of revenue streams before the resulting profits can be used to acquire new equipment or retrofit existing machines.
- In the construction, where virtually every job is based on competitive bidding, passing on costs assumes a level playing field, which is not the case for small and minority-owned firms. These firms already compete in an environment where a very few giant companies dominate the landscape.

Impact on Public Agencies

Public agencies throughout California, including cities, counties, municipalities, water districts and state agencies are all subject to the pending CARB regulation. Most public agencies own fleets of off-road diesel equipment, used for maintenance work and those projects not subject to the public contracting requirements. These machines are typically older machines with older engines, many with Tier 0 engines. The CARB regulation requires these engines to replaced, repowered or retired. This expense will use up a large amount of the agency's funds, thus diminishing the budgets that these agencies would otherwise use for capital improvement projects.

Additionally, costs incurred by contractors in meeting these requirements will be passed on to their clients, raising the price of bids to public agencies and increasing the costs of all public and private infrastructure projects in California.

Finally, many out of state construction firms will simply decide to either not bid in California. Local firms will close their doors forever. This will reduce the number of competitive bids submitted; further increasing bid prices for all public and private clients. Reduced bonding capacity will also net the same effect.

Impact on Small and Minority Businesses

All of the observations in this document will be exponentially more serious impacts to minority and small firms, as they are the least capitalized and most subject to economic downturns. Here's why:

- Construction is largely a family-owned business, made up of mostly small firms.
- 55 percent of California construction firms have fewer than five employees
- 74 percent of the companies employ less than ten individuals.[1]
- Less than one percent of the state's construction firms have more than 250 employees. Figure 1 illustrates firm distribution.
- 97 percent of all California construction firms generate less than $10 million in annual sales.[2]

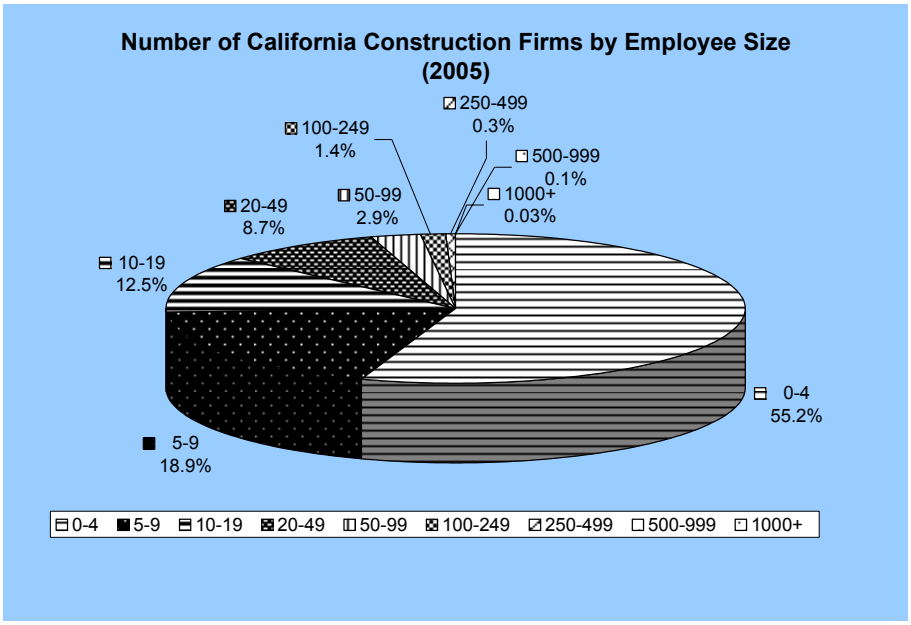
The Construction Financial Managers Association pegs construction net profit margins at two to five percent. This leaves little room for error and even less profit for replacing three fourths of the existing 165,000 pieces of construction equipment that CARB says are in the California fleet.

In the latest Economic Census conducted by the U. S. Census Bureau (2002), there were roughly 67,000 construction establishments with employees and 167,000 firms without employees—owner/operators of a few very small, very old machines, bought on the used equipment market and carefully maintained to continue their economic life.

[1] Employment Development Department, Labor Market Information Division, 2007
http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/?PageID+67&SubID=138

[2] Ibid.

Figure 1



Source: "Characterizing California's Construction Industry: Economic Activity, Firm Parameters and Off-Road Vehicle Fleets", M-Cubed Economics, March 26, 2007

These small firms are the most at risk from economic dislocation. Construction is a cyclical market and we are in a period of decline. During the past two years, investment in new private construction has plummeted from $69.7 billion in 2005 to $61.2 billion in 2006—a 12 percent drop.[3]

Public works construction has increased in California during this period, but the amount spent by private market dwarfs the public sector. For example, $6 billion was spent on the state's roads and bridges in 2006. This is less than one-tenth of the private market expenditures.

The voter approved bond funds will be a significant assist to this troubled market, but won't make up the shortfall in residential construction activity, particularly for small and minority contractors who are unable to participate in large scale public works projects.

In addition to market conditions, contractors, like family farmers, are subject to individual project problems, ranging from weather to labor issues or unforeseen subsurface conditions that can and often does change the profit picture from positive to negative in mere weeks. The two combine to make construction profitability a volatile prospect.

Because of this volatility, contractors (particularly small firms) have to use short-term credit lines to finance operations. Construction lenders use company's balance sheet; cash flow; existing debt load; and year-to-year profitability to determine credit access. To the extent that the proposed CARB regulation reduces the value of existing equipment, which CARB agrees will happen, it will decrease the balance sheet portion of this asset class.

[3] Summary of Construction Trends and Forecasts, all categories 2002-2007, State of California, January 2007, Construction Industry Research Board.

Impact on Employment in California
CARB staff assumes that only 1,000 jobs will be lost due to their regulation. Our analysis indicates that the true impact will be a job loss of between 30,000 – 40,000 high-paying jobs. Since most small and medium size firms buy used equipment, they will be forced to "retire" a significant portion of their existing fleet to meet the ever-declining emission reductions.

The primary target of CARB's rules is uncertified Tier 0 engines (pre-1998) on both portable and off-road diesel equipment. CARB estimates that 51 percent of the 165,000 off-road diesel units in the state are Tier 0 equipped—a staggering 84,150 machines that have to leave the state or be scrapped, under the retirement option.

Their small and medium sized owners will replace a mere fraction of these machines due to the cost of new equipment. This retirement option carries a one-to one job loss factor for equipment operators, who are the highest paid employees in most construction companies.

The resulting employment losses will be equally staggering for other personnel—mechanics, internal staff and employees of suppliers who support this equipment— will lose their jobs.

Impacts on Infrastructure Improvement & Expansion
CARB is correct in their assessment that the costs of replacing, retrofitting or repowering equipment will be passed on to the clients of the construction companies, or to the taxpayer. CARB staff's statement that the cost of their rule will be negligible is far from the case.

Infrastructure project prices will increase dramatically due to fewer bidders, due to firms:

- Choosing to close business rather than deal with the impacts of the regulation
- Moving out of state
- Reduced bonding capacity due to reduced equity
- Not attracting out of state firms to bid on California projects
- Passing on the costs of the regulation

Other Critical Impacts to All
CARB claims that there will be adequate supplies of retrofit equipment and replacement machines and engines to meet the requirements of their regulation. However, all equipment manufacturers have indicated that the demand created by CARB's regulation will significantly exceed the availability of the required equipment.

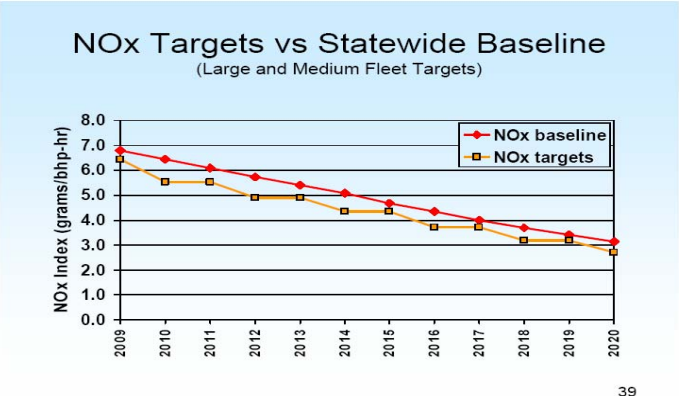
California construction capacity to meet the regulation is limited by the availability of equipment. The regulations accelerated retirement of older equipment anticipates replacement with new machines equipped with Tier 4 engine technology. There are major factors will impact equipment availability:

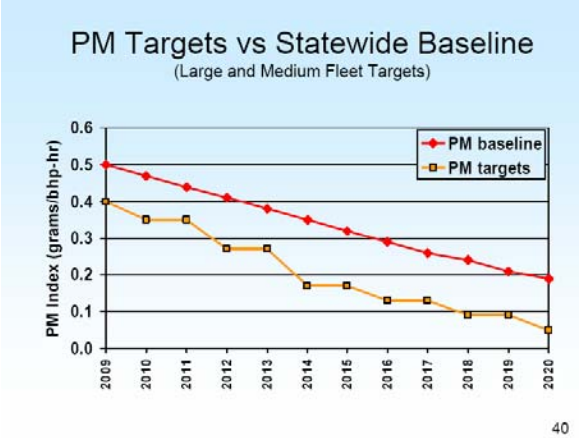
- Tier 4 engine technology is yet to be developed. No manufacture has a functioning Tier 4 engine in their development laboratories today. Federal EPA guidelines allow the manufacturers until 2015 to complete the development of this technology.
- Tier 4 technology at this stage depends on the availability of fuel additives (urea or ammonia are the most frequently mentioned) as well as selective catalyst reduction and particulate filter technologies. Federal EPA says it will not approve Tier 4 systems that can run without these additives. There is no fuel infrastructure to deliver these products.

- Equipment manufacturers are global companies. U. S. manufacturers are currently shipping 34 percent of their machines to South American, Asian and European markets. California construction companies have to compete for equipment in this environment.
- Manufacturing capacity is limited. Current equipment backorders stretch out for two years on many categories of equipment. Roughly 7,000 new pieces of equipment have been sold in California each year for the last dozen years. It will take more than two decades to replace the existing fleet based on this historical average.

CARB staff admits that normal industry equipment replacement cycles will achieve the same emission results as their pending regulation, but just take longer. We agree.

CARB, the environmental community and the industry all agree that new generation construction equipment, added to our fleets during the normal course of equipment replacement will achieve virtually the same emission reductions, particularly in terms of NOx. This is clearly illustrated in a presentation slide from the CARB workshops held in Sacramento, Fresno and Riverside in late February and early March of this year (see below).





This is true because new engine technology (Tier 3 and especially Tier 4) with greatly improved NOx emissions will start making its way into the fleet in the next few years. But it is not here today. Tier 3 engines are required by federal EPA standards starting in 2007 for all engine classes. Due to EPA waivers for manufacturers there are still some older engines shipped in new equipment,

Tier 4 machines won't be available until 2015. These machines will operate so efficiently that the air coming out of our exhaust pipes will be, at least in the Los Angeles Basin, cleaner than the air coming in.

The case is not so clear for PM emissions because Tier 3 engines sacrifice particulate matter emissions to achieve their improved NOx reductions. This is an engineering problem that every engine manufacturer in the world is working on now…but it is not the fault of the construction companies who have to buy what is available to do their work.

Fortunately, there is a solution for this conundrum that doesn't require elimination of three-fourths of the existing fleet. There are devices, tested on the smaller construction equipment in Europe and Asia for the past twenty years, which can achieve the 85 percent reduction in PM emissions mandated by the state's 2000 Diesel Risk Reduction Plan.

These devices, known as diesel emission control systems, must be verified by CARB for use on on-road or off-road equipment. To date, CARB has verified four such systems that cover a variety of equipment, but not all. More of this promising technology is to be available in the future. The proposed CARB rule already exempts small fleets (<1,500 hp) from the equipment turnover requirements and requires the installation of these devices starting in 2015, if their fleets don't meet emission target requirements.

Final Thoughts on Making Compliance Possible

Given the available technology and what will be in the fleet in the future, the obvious conclusion is that CARB's regulatory approach will fail to achieve its goals in the early years while crippling the construction industry and causing massive layoffs.

- The only technologically feasible means of meeting the emission targets is to promote installation of VDECS for the entire fleet, at a rate of 10 percent of fleet horsepower per year and allow the natural turnover of equipment to new technology to accomplish the NOx goals in the later years of the rule. While this will still represent an enormous expense (somewhere between $3 and 3.5 billion according to CARB) it is achievable, especially if the state would provide investment tax credits for this air quality improvement technology.
- CARB's initial proposal called for an 18-year timeline to meet the particulate matter emission reduction goals. Due to delays in developing these rules, that timeline dropped to 10 years. In addition, the regulation of NOx emissions has been added to the rule – which significantly alters the kind of technology needed for companies to be in compliance, and the availability of equipment that reduces both PM and NOx emissions. The initial 18-year timeline must be reinstituted to allow for further technology development, VDEC approval, and recapitalization of equipment owners.
- At least $200 million in additional Carl Moyer funds per year must be made available and allowed to be used for compliance with the regulation. Prior to the addition of the NOx reductions in the regulation, nearly $100 million in Carl Moyer funds were used to upgrade equipment. More is needed to mitigate the impact on fleet capital.

No other solution is either workable or affordable, which means that failure is the only option—not an acceptable option for our industry or all citizens of California.