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EPA's Myopic Cost Benefit Analysis

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Introduction

In order to comply with the Environmental Protection Agency's (EPA) 2010 emission standards, Navistar, one of the largest manufactures in the trucking industry, developed an engine called MaxxForce that used exhaust gas recirculation technology to re-circulate the exhaust gas within the engine, which burned off soot, to meet the nitrous oxide emission (NOx) thresholds. However, this process lead to a significant increase in the heat of the engine that created various problems, sometimes causing repeated and excessive breakdowns. Currently, several motor carriers that have purchased the MaxxForce engine to meet the pollution reduction standards demanded by EPA for model year 2010 and newer truck engines are suing Navistar which, according to the lawsuits, failed to warn their customers of the potential problems.

Further, these lawsuits come on the heels of the decision by Caterpillar, another large diesel engine manufacturer, to stop making on-road diesel engines for class 8 trucks in the United States. Caterpillar, according to the Owner-Operator Independent Driver (OOIDA) Member Profile Survey produced by the OOIDA Foundation bi-annually, was the most popular engine for independent owner-operators. Between 2007 and 2010, Caterpillar manufactured engines (ACERT) to comply with EPA's emission standards, and similar to Navistar's MaxxForce, these engines were claimed to be defective. These claims were focused on Caterpillar's emission control system that consists of a diesel particulate filter, after treatment regeneration devices, and an electronic control module.

Although it is easy to place the blame of these defective engines on sloppy engineering and on the greed of the engine manufacturers, it is important to realize that these "defects" have severely affected the sales and reputation of these engine manufacturers. A closer examination of the events that led to these defective engines points directly at EPA. Undoubtedly, EPA would take exception to the idea that they were in anyway culpable. However, EPA has to take at least a portion of the responsibility for the loss of jobs created by the downsizing of Caterpillar and Navistar engine manufacturing, and the fact that many customers and truck drivers have lost their businesses, or are struggling, because of these engine malfunctions.

A brief look at the history of the developments that led to these two engine manufacturers to produce and sell engines that ultimately put their reputation and business in jeopardy, reveals that EPA played a leading role in the process. The EPA has been myopic in its determination and mission to improve the quality of air. While certainly laudable in intent, the ensuing unintended consequences have actually resulted in the loss of jobs, fewer choices in engine configuration, and less people investing in the technology. Moreover, several carriers have been obligated to file lawsuits against an engine manufacturer who was forced by EPA to accelerate the schedule for meeting new and more stringent engine standards by 15-months in order to recoup their losses.

The EPA accelerated the compliance date as a form of retribution against the engine manufacturers who, for a number of years, had sold "defeat devices" to customers who needed to improve fuel mileage because they had taken a hit from the required emission control systems that EPA mandated prior to 2000. It is important to note that the economic market compelled engine manufacturers to

produce these "defeat devices" as customers were unwilling and or unable to absorb the added cost of fuel inefficiency caused by the EPA-approved emission-control devices.

Benefit/Cost Analysis

The EPA, as a government regulatory agency, is required by law and under Executive Order No. 15899 (October 29, 1992)[1], to complete a cost/benefit analysis on any regulation it proposes. A Cost/Benefit analysis should incorporate estimated marginal social costs, including external costs or "externalities," because they are costs generated by various economic activities, especially transportation, that often become external (i.e., externalized) to the market.[2] The technical term is "benefit/cost" not "cost-benefit"[3], and the actual measure is a ratio of benefits to costs where total social benefits are greater than total social costs, giving a ratio of 1:1 or better.[4] "The most common mistake in undertaking benefit/cost analysis is to tally the costs or benefits for particular parties and to compare those costs or benefits of other parties in the economy, thereby limiting the analysis to those parties and not extending the analysis to the entire society."[5]

EPA's 2000 Regulatory Impact Analysis of its diesel-truck emission-control program estimated that:

- Engine manufacturers would need to spend $385 million on Research and Development over 5 years;
- Each of the engine manufacturers would need to spend $7 million annually for a team to carry out engine research;
- The new emission-control devices would add $7,000 to the price of the truck; and
- The particulate filter would reduce engine fuel efficiency by 1 percent.

Nonetheless, the reality of the truck market demonstrates that any reduction in fuel efficiency will cause concern for motor carriers, as profit margins are very tight within the industry. Of course, those most affected are the small carriers, which are defined as those with six trucks or less, that represent 96 percent of the industry. Engine manufactures recognized that their customers would be hesitant to purchase the new engines, and they understood that the EPA-approved emission control devices would reduce fuel efficiency. Therefore, the manufacturers developed devices that would bypass, defeat, or render inoperative these devices.

Seven of the nation's largest engine manufacturers, which accounted for almost 90 percent of the U.S. heavy-duty diesel engine market, sold 1.3 million trucks equipped with defeat devices.[6] In response,

[1] http://www.whitehouse.gov/omb/circulars_a094
[2] Committee for Study of Public Policy for Surface Freight Transportation, *Paying Our Way: Estimating Marginal Social Costs of Freight Transportation,* Transportation Research Board (1996).
[3] Ibid, pg. 71252.
[4] Gramlich, 1981; Portney 2002.
[5] Michael Belzer, *Truck Driver Hours of Service, Interim Final Rule,* Sound Science, Inc. (2007)
[6] *Air Pollution: EPA Could Take Additional Steps to Help Maximize the Benefits of the 2007 Diesel Emission Standards*, GAO (March 2004).

EPA took up enforcement action against these manufacturers and issued consent decrees that imposed almost $1 billion in costs. As previously mentioned, one of these consent decrees compelled the engine manufacturers to accelerate their schedule for meeting new, more stringent engine standards by 15-months. Trucking companies maintained that they needed 18-24 months in order to conduct the proper road tests and determine engine's reliability in all weather and operating conditions, and to develop their future purchasing plans.[7]

Instead of examining why these engine manufacturers even developed defeat devices (Myopia) in the first place, EPA forced the manufacturers to manufacture engines that were not adequately tested. In fact, one company reported that roughly half of its 140 new heavy-duty engines experienced an engine valve failure prior to 50,000 miles. In addition, these officials noted that roughly 20 percent of their heavy-duty vehicles with new engines were out of service at any given time due to maintenance concerns, compared to 5 percent for the remainder of their fleet. Several of these officials expressed a concern that some companies may have difficulty absorbing increased costs from such maintenance problems.[8]

Following the basic principles of marketing, EPA and the engine manufacturers perhaps should have predicted what would occur following the EPA's 2000 emission standard, the now famous pre-buys that occurred prior to the October 2002 deadline. The pre-buys were in response to EPA's consent decrees, and they caused a rippling effect on the engine manufacturers according to the representatives of the five engine manufacturers when contacted by GAO . The representatives stated that in order to meet the increased demand for pre-October 2002 model year engines, their companies hired new workers and increased operations, and experienced concurrently increasing sales.

However, after the deadline, engine orders dropped and did not level off again until the end of the 2003 fiscal year. The rapid decline in orders forced the manufacturers to both lay off many new-hires and even to suspend operations at some plants. According to the engine manufacturers' representatives, such instability resulted in increased costs and a net loss of revenue.[9] In addition, according to the Government Accountability Office (GAO), those manufacturers that produced cleaner engines lost out in the marketplace because the cleaner engines had significant problems relative to the older engines, and the companies had difficulty selling them.

EPA estimated that within the first 15-months, 233,000 new cleaner engines would have been on the road, when in market reality only 148,000 were actually on the road.[10] EPA also estimated that the consent decrees would require 865,000 older trucks to adjust their computers in order to reduce NOx emissions. However, GAO found that only 12 percent of that number actually adjusted their computers.[11] Further, a recent market analysis done by the American Truck Dealers in 2012, noted that the EPA grossly underestimated emission system costs to the industry. Looking at the cost estimates of

[7] Ibid, pg. 6.
[8] Ibid, pg. 20.
[9] Ibid, pg. 5.
[10] Ibid, pg. 22.
[11] Ibid, pg. 24.

EPA along with the actual increase in cost of the new cleaner engines, the report finds that the actual cost was more than $21,000 while the EPA estimate was $5,000.[12]

All of the facts presented above demonstrate one of the most fundamental problems associated with EPA's estimates and their myopic vision of emission standards, which is, though the agency can mandate cleaner engines, they cannot mandate that people buy them. This is known as "risk aversion," and according to the National Economic Research Associates, is not accounted for in environmental policy evaluations.[13]

Interestingly, EPA delayed their own goals of reducing pollution by not adjusting their time schedule, and by refusing to examine why the industry was so willing and demanding that engines retain, or increase, their fuel efficiency by including defeat devices. EPA continues to push for even further stringent standards, which have not been properly tested in the real market place.

The unrealistic expectations of engine manufacturers, the underestimation of costs, the failure to anticipate the risk aversion of buyers, and a lack of understanding of the trucking industry have all contributed to undermining the environmental goals of the agency, and have intensified the mistrust and judgment of the agency as well.

A benefit/cost analysis that affects so many different entities must look beyond the guidelines established in Circular A-4 that were developed by the U.S. Office of Management and Budget (OMB), and it must be a more comprehensive economic outlook than what the OMB guidelines propose. All government agencies, including the EPA, need to be aware of not only the direct effect on parties involved in rulemakings when conducting a benefit/cost analysis, but also how those parties may affect others. For an example, when EPA estimates how many carriers may go out of business because of the cost associated with the rule, the agency should also look at whom else the rule may affect.

In the case of small carriers, which represent 96 percent of the industry, the EPA must also examine the possible domino effect on those small shippers and small businesses that rely on the small carriers to transport their product to the market. Small carriers offer transportation for small businesses, and small businesses make up 99 percent of all employer businesses in the U.S. If small carriers go out of business because of the costs of expensive mandates, small businesses will also go out of business, and the problems will be magnified., EPA and most federal agencies do not complete any more than what is necessary by the OMB Circular A-4 guidelines when calculating Benefit/Cost analysis.

The estimated benefits at the conclusion of EPA's 2004 and 2010 mandates need to be revised, as the actual benefits and participation by truck owners was far below expectations, while the cost of the program was greatly under estimated. No reevaluation has been done by the EPA nor is any planned.

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[12] Patrick Caplin and Esteban Plaza-Jennings, *A look Back at EPAs Cost and other Impact projections for MY 2004-2010 Heavy-Duty Truck Emissions Standards*, (2012).
[13] Noah Kaufman, *Why is Risk Aversion Unaccounted for in Environmental Policy Evaluations?*, NERA Economic Consulting (2014).

EPA and MTBE

The history of EPA is replete with well intentioned attempts at reducing air pollutants and increasing fuel efficiency. The greater combustion of fuel leads to increased fuel efficiency, as most fuel is wasted. Originally, lead was used as a component of fuel to provide greater combustion and additional fuel efficiency. Nevertheless, when EPA decided that leaded gasoline was toxic to the air, cars were required to have catalytic converters to reduce NOx and carbon monoxide (CO) in 1975. Lead disabled the catalysts and a new unleaded gasoline formulation was developed. In 1979, the EPA approved an additive for fuel called methyl tertiary butyl ether (MTBE) as an octane booster. Other octane boosters included aromatics and ethanol but MTBE was the most popular. The EPA eventually mandated MTBE for areas of non-attainment of ambient air quality standards as determined by the EPA, while aromatics were phased out of most additive programs because it was determined that aromatics such as benzene, toluene, and xylene were air toxins and were shown to have carcinogenic effects.

The Clean Air Amendments of 1990 established a rigid standard for reformulated gasoline (RFG) that resulted in a far greater use of MTBE than would otherwise have occurred. Ethanol was difficult for refiners to work with because it absorbed moisture easily and pipelines could not transport it. Therefore, MTBE became the additive of choice.

However, congressional leaders from farming states strongly pushed for greater use of ethanol, which eventually was used in one of two oxygenated fuel programs. Beginning in 1992, oxyfuel was required in areas that did not meet the CO attainment air qualities. Both ethanol and MTBE were to replace the aromatics as octane boosters in gasoline. It is of interest to note here that ethanol, which was highly pushed by farm states, was the subject of concern by the EPA in 1990 and later in 2005.

In fact, a 2005 draft report for the California Air Resources Board found significant concerns with evaporates emissions of ethanol after the state banned the use of MTBE. "The presence of ethanol in gasoline results in significant increase in the permeation of gasoline constituents through motor vehicle's fuel system components. This increases evaporative hydrocarbon emissions by about 45 tons per day on a typical ozone day or 75 tons per day on a high-ozone day."[14]

It is important to note that EPA was attempting to increase the amount of ethanol in gasoline to 15 percent, which was beneficial for the farm states but bad for the environment. In fact, the concern over evaporative properties of ethanol created added cost to the petroleum industry that was passed on to the small franchise operators of fuel stations. Further, the stations that operated in non-attainment areas were required to have their fueling nozzles equipped with a type of gasket on the nozzle that acted as a seal to prevent evaporative gasses from escaping. This cost was also passed on to the consumers.

[14] *A Summary Of The Staff's Assessment Regarding The Effect Of Ethanol In California Gasoline On Emissions*, Air Resources Board (2005).

What Happened to MTBE

It is important to recall that EPA had not only regulated MTBE as an additive for gasoline, but also approved the use of MTBE on multiple occasions. However, it is important to ask what happened to MTBE. Interestingly, it was found that MTBE easily contaminates groundwater. Furthermore, EPA added MTBE to the priority list for health effects under the Toxic Substances Control Act in 1986. Nine months after identifying MTBE as a "high-risk-chemical for contamination of drinking water supplies and their sources," EPA approved an expansion of up to 15 percent of MTBE blends in gasoline. In fact, Congress established the Leaking Underground Storage Tank (LUST) Trust Fund in 1986, which is still being funded by the federal excise tax on fuel currently.

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