Creating a Green Industry Based on Diesel Retrofit Devices in Los Angeles

Environmental Defense, in partnership with a Masters student at the UCLA Department of Urban Planning, explored the job creation opportunities surrounding the diesel retrofit industry particular to port trucking. The purpose of this report was to understand the supply chain of diesel retrofit devices and explore the possibilities of creating a green industry in Los Angeles based on diesel truck retrofit technology that would both clean the region’s air and provide meaningful employment opportunities for the unemployed or underemployed in communities surrounding the San Pedro Bay Ports. The city of Los Angeles can capitalize on the demand generated from the Clean Air Action Plan to help to foster an industry surrounding the installation and maintenance of emission control devices for port trucks.

Attracting green industry into L. A. is good for the economy and the environment.

There is a lot of excitement throughout the city around attracting green industry into Los Angeles. The Mayor has pledged to make the City of Los Angeles the greenest big city in the country. Attracting green industry into the city, and greening existing establishments, is one way to achieve these green objectives. There is a growing political will to bring green industry into the City of Los Angeles.

Green goods and services or the clean technology sector can be defined as those goods and services that measure, prevent, limit, minimize or correct environmental damage to water, air and soil or those goods and services that measure, prevent, limit or minimize problems related to waste, noise and ecosystems. Green industry can be divided into 2 groups: Producers of green technologies; and Consumers of green technology (i.e. environmentally friendly companies).

In Los Angeles, estimates from the Economic Roundtable and the Lewis Center for Public Affairs indicate that there are currently around 150 green establishments in Los Angeles. Three main sectors of “green industry” may be are the most likely candidates for expansion:

1) Green industry related to green building and construction
2) Green industry that will promote sources of alternative energy
3) Producers of clean technology related to transportation.

Our research focuses on the third sector of green industry, with a focus on the port trucking industry. Results of our research suggest that green industry as it relates to the diesel trucking industry, might be a perfect fit for the City. Los Angeles is a logical place for this type of green industry given: the region’s struggle with chronic air pollution, increasing volumes of truck traffic from the rapidly growing...
San Pedro Bay, and the San Pedro Bay Ports’ recent Clean Air Action Plan which includes two measures for controlling emissions from heavy-duty vehicles. Our results suggest this sector, particularly in terms of the distribution rather than the manufacturing end, holds promise. It is good for the environment and good for our economy.

Diesel retrofits will improve the environment by reducing emissions.

Diesel exhaust from mobile sources, such as heavy-duty trucks, is a major contributor to the poor air quality and increased health risks experienced by Los Angeles residents. There are three pollutants found in diesel exhaust that are of particular concern: diesel particulate matter, nitrogen oxides (NOx) and sulfur oxides (SOx). Communities near the Ports of Los Angeles and Long Beach and along major trucking routes or other goods movement facilities are particularly at risk.ii High levels of diesel emissions from trucks and other sources in Los Angeles increase residents’ risk of asthma, cancer and premature death.iii

Fortunately there are retrofit technologies currently available to clean up harmful diesel emissions from older heavy-duty trucks such as diesel particulate filters (DPF), diesel oxidation catalysts (DOC), selected catalytic reductant (SCR), and fuel emulsifiers. To realize clean air benefits sooner there must be a concerted effort to replace and retrofit old heavy-duty diesel trucks with cleaner technologies.

Diesel Retrofits can create jobs.

The San Pedro Bay Ports Clean Air Action Plan creates demand for the installation and maintenance of DPFs. A measure in the Plan called SPBP-HDV1 – Performance Standards for On-Road Heavy Duty Vehicles requires that all frequent and semi-frequent caller trucks at the San Pedro Bay Ports that are model year 1992 and older will meet or be cleaner than the EPA 2007 standard and use the cleanest available NOx technology when the truck is replaced. Additionally, semi-frequent caller container trucks model years 1993 to 2003 will be equipped with the minimum CARB verified emissions reduction technologies currently available.

The need to retrofit over 10,000 trucks is a good opportunity to make sure that the underemployed in Los Angeles and communities around the Ports to benefit economically. By partnering with LA Trade Tech, the San Pedro Bay Ports, and other stakeholders can create a diesel mechanic training and employment program that would provide a career ladder and livable wages for the underemployed. There is private industry interest in this idea as well.

Study Methods

The two industry sectors explored are: 1) Manufacturing and 2) Installation of retrofit devices coupled with maintenance of the vehicles. Interviews were conducted with 7 manufactures located throughout the United States. Interviews were also conducted with three distributing centers within a 40 mile radius of the Port of Los Angeles that perform the retrofits and subsequent maintenance. No company names are associated with specific responses and the results are reported in an aggregate fashion in order to protect the identities of the companies who consented to be interviewed. Interviews were also conducted with Manufacturers of
Emissions Controls Association (MECA) and with LA Trade Tech and other community colleges in order to explore current retrofit options.

**Manufacturing of DPFs for Trucks**

There are currently an estimated 12 manufacturers nationwide. The industry is dominated by a few large players that have sales and manufacturing facilities all over the world. In addition, smaller firms engage in research and development as well as small scale manufacturing, or they partner with larger firms to manufacture their products. There are three broad classes of industry that comprise the diesel exhaust emissions control technology sector:

1. **Substrate manufacturers.** These companies produce devices that look like honeycomb and are made out of either ceramic or metal. The substrate is one component of a catalytic converter. Diesel exhaust must travel through the honeycomb-like substrate in order to get filtered;

2. **Catalyst coaters.** These companies coat the substrate with a slurry of precious metals such as platinum or palladium, which serve as the catalyst that breaks down the different elements in the exhaust stream;

3. **Component manufacturers.** These companies put the coated substrate into steel cans, similar to a muffler. They may also install sensors to make the catalyst perform its function once it is installed on a vehicle.

There is very little integration across these three broad categories. It is rare for one company to perform all of these functions. Engine and vehicle manufacturers who build exhaust control devices into their original product typically deal with each of the three components through separate contracts.

The industry for diesel emissions control equipment is also split into two categories. One category is diesel after treatment devices that are sold to Original Equipment Manufacturers (OEMs) who are producing new vehicles that meet the latest emissions standards set forth by the EPA. The second category is diesel retrofits which are emission control devices installed on older trucks to clean up their emissions. Though the manufacturer interviews covered both the market for diesel aftertreatments sold to OEMs and the retrofit market, this report is primarily interested in the retrofit market that will facilitate the clean up of the pre-existing diesel fleet.

The United States Environmental Protection Agency (US EPA) and the California Air Resources Board (CARB) dictate the emissions levels and product warranties that each device must meet in order to be verified for use.

**Size and scope of Manufacturing plants varied widely.**

Six out of the seven companies interviewed have their own manufacturing plant. Four out of those six companies had only one manufacturing plant in North America. One fairly small sized firm had three plants in North America, and one large firm had more than a dozen plants in North America, though it was unclear whether all those plants focus on diesel emission control devices.

The manufacturing plants are predominantly located in the Midwest or Southeast regions of the United States. They tend to be in small to medium sized towns. The Midwestern locations are advantageous due to proximity to the
automotive industry. Many of the plants are in fairly rural areas, or already industrialized areas, and are close to large urban areas that have access to airports as well as a large labor pool. One company that arguably has one of the more urban locations for its plant chose that location because they were able to convert a pre-existing (but no longer used) manufacturing facility to fit their needs. By far the most common reason why companies chose their location was that it was where the company founder lived or where the parent company got started.

Of interviewed companies, manufacturers varied widely by size and by age. Larger companies develop and sell other products such as engines or engine parts and have a separate division that works on retrofit technologies, whereas the majority of the smaller companies tend to focus on developing retrofit technologies. Some of them do parts of the manufacturing themselves and others team with the larger companies to actually build the devices. All companies pursue some research and development as part of their operation.

All seven companies produce diesel oxidation catalysts (DOCs) and 6 out of the 7 produce diesel particulate filters (DPFs). Two companies already produce SCRs and one additional company is working on commercializing an SCR. One company is already selling a DPF cleaning station that can be used by mechanics and technicians to complete the annual filter cleaning. A second company is developing a similar technology. One company makes a fuel born catalyst to enhance combustion.

**There is mixed job creation potential jobs in the manufacturing sector:**

Employees who work on research and development are materials scientists, chemists, and mechanical engineers. Many of them have doctorate degrees in their field. Sales personnel are also a critical part of the industry. The sales are very technical so an aptitude for technical knowledge is required. Many of the sales people at the firms I interviewed are engineers themselves or have degrees in business.

Many of these companies also have significant manufacturing components, especially the largest firms. The largest number of manufacturing jobs that a firm reported was around 600. Employees who work in manufacturing tend to be line workers and can often be done high school graduates. Some firms have employment tests that potential workers must pass in order to be hired. Still, some of the manufacturing jobs do require knowledge of welding, machining, and computer systems. Production managers and higher skill manufacturing jobs may require two or three years of training.

**Manufactures currently report significant barriers to entry into Los Angeles:**

When asked what might make them move or expand their businesses to Los Angeles, respondents mostly gave reasons why they would not locate to Los Angeles. These reasons included:

1. The manufacturing plant already has significant capacity and likely will not need to expand in the near future.
2. Labor costs in LA are high. Companies currently have non-union workers.
3. California and especially Los Angeles have complicated and daunting tax structures.
5. California has rolling blackouts and water is in tight supply.
6. Their customers are predominantly located in the Midwest near the automotive industry.
7. If the company does expand it would likely be overseas.
8. The company already has distributors in the Los Angeles region.
9. The owner is rooted to the present company location and doesn’t want to move.

There were a few favorable responses in regards to moving or expanding to LA. Companies that were more positive about the possibility of locating in LA were smaller firms that focused primarily on development of diesel emission control devices. The responses were:
1. The firm would locate in LA if the market was sustainable and it was a good business case. The most important factor is market size and potential.
2. California is where the market is. It is good to be near the end-use market.

Companies also made some suggestions about what resources are important to them when choosing where to do business such as:
1. the availability of infrastructure
2. the skills of the available labor pool
3. assistance with relocation costs and low taxes

The interviewees responses indicate that though it may be possible to bring these types of companies to LA, it would be very difficult to bring in firms that have a significant number of manufacturing jobs. It would be easier to attract firms that focus on development of new emission control devices which would provide jobs to engineers and other highly skilled professionals. The more promising sector of the diesel retrofit device industry for workers without a degree is in the diesel mechanic sector.

**There is Growth Potential for Distributors of Diesel Emission Control Devices.**

Our study results suggest that there is growth potential in the distributing side of the emission reduction device industry. The distributor provides sales and product support including installation and maintenance of the device. There is a potential to train a new class of diesel mechanics to install and maintain emission control devices.

Diesel mechanics require a higher level of training and sophistication than automobile mechanics. Two diesel trucks of the same make and model can be very different depending on what they are being used for. Each truck can be customized in response to the needs of the driver and the vehicle’s function. Therefore, the distributor can help solve any technical issues that arise with each individual installation.

Currently, there are more than a dozen distributors of diesel retrofit devices within 40 miles of the Port of Los Angeles. Eight distributors were contacted for
interviews and three responded. Respondents provided some important insights into the types of jobs available, possible career ladders, and the educational training needed to enter the field.

There is a Career Ladder for Diesel Mechanics

Generally speaking, there are three levels of diesel mechanics. Entry-level mechanics are straight out of a diesel mechanics program. These programs are offered by community colleges and take from one or two years to complete. Long Beach City College offers a career certificates in Diesel Mechanics that takes one to two years to complete and an associates degree that takes two years to finish. LA Trade Tech also offers a certificate in Diesel and Related Technology. The program at LA Trade Tech includes courses such as diesel engine fundamentals, diesel fuel systems and electronic component theory, heavy duty drive train fundamentals, and tune up and troubleshooting. Mid-level mechanics are mechanics that have completed a certificate or degree program and have a couple years of on the job training as well. Journey-men are the highest level of mechanic. The distributors I interviewed had differing views of how many years it takes to become a journeyman. One said 5 to 7 years was the training required of a mid-level mechanic, and another said 5 to 7 years of on the job experience and training were enough to become a journeyman. Journey-men are adept at working with the electrical systems that have been integrated with newer diesel engines. Diesel engines built from the late 1980s on are much more complex and include electrical components. When doing retrofits on diesel exhaust systems mechanics with only a little experience can do part of an installation and then receive help from a more experienced mechanic to do the electrical part of the installation.

The distributors interviewed had between ten and twenty mechanics that were a mix of entry-level, mid-level, and journeyman mechanics. All mechanics were full time employees.

When asked about their customers, the distributors tend to work on buses, refuse haulers, and municipal trucks. They also work on heavy-duty trucks that are rather new and still under warranty. They reported that they do serve a small number of Port truckers, but most Port truckers go to “lower-rung” mechanic shops where the rates are lower. The problems are 1) that independent port truckers lack the funds to pay for repairs and 2) they have very old and dilapidated trucks that can be difficult to work with. It was for these reasons that the distributors did not see themselves gaining much business from retrofitting port trucks.

What the City of Los Angeles can do:

The City can capitalize on the demand generated by the CAAP by providing training.

Distributors and representatives from the diesel program at LA Trade Tech expressed difficulty finding diesel mechanics to fill existing positions. Given the expected growth in the trucking industry, and the San Pedro Bay Port’s desire to retrofit 10,000 trucks, this shortage in the workforce will grow unless more workers are trained to enter the field.
Other municipalities, like the City of Long Beach, are concentrating their efforts on the logistics sector in general. The City of Los Angeles can focus their efforts specifically on diesel mechanics and on training diesel mechanics to retrofit trucks with DPFs. The private sector has expressed some level of interest in providing training for diesel mechanics to retrofit trucks, including the establishment of a retrofit center to provide training to the low income communities surrounding the Port.

*The City can also focus on business attraction through a broader green industry strategy.*

The City should provide a leadership role to attract green industry, including green industry as it relates to transportation, into the city. The city should explore a variety of options to grow green industry, both in terms of consumers, and producers of green goods and services. The below summarizes a few actions that the City might consider taking to grow green industry citywide.

- **Provide a clearinghouse for information, coordinate between disparate efforts and reach out to potential businesses and investors through a green business taskforce and a sustainable business action plan:**
  Participants could include relevant city officials, producers of green technologies, consumers of green technologies, venture capitalists that invest in green industry, environmental and community stakeholders, and relevant academics and local university experts. The City could consolidate all of these recommendations into an action plan that can be published and distributed.

- **Establish a Green Procurement Policy for the City of Los Angeles:**
  This will create demand for green goods and services and encourage their location within the City. To fully take advantage of a purchasing program, therefore, the City could focus on those goods and services that can also be purchased by private industry in order to get the widest economic development impact from municipal purchasing efforts.

- **Establish a green certification program:**
  A green certification program could identify both producers of green goods and services, and the environmentally friendly companies that consume their products and services. This can be linked into the city’s procurement policy and can be used as a networking and promotional tool. EPA has pledged their support to help Los Angeles develop a Green Business Certification Program (similar to the program already established in the bay area.).

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