



Clean Construction Policies

Healthier Building, Socially Responsible Spending for Chicago



Introduction

Construction sites can put lung health at risk. This is because construction sites rely on the use of diesel engines more than any other sector.¹ In Cook County, about 30% of diesel pollution comes from construction equipment.² Diesel pollution is harmful to human health, contributing to asthma attacks, heart attacks, lung cancer, stroke and premature death. Simple, effective solutions are available to make diesel engines much cleaner; however, more needs to be done to ensure that this technology is being fully implemented. Clean construction policies are an innovative, cost efficient solution to reduce the long term costs of Chicagoans' exposure to this deadly pollution. Respiratory Health Association (RHA), Environmental Law and Policy Center, and other community organizations are actively working to promote the adoption of clean construction principles at sensitive sites such as hospitals and to encourage the City of Chicago to repair and strengthen its existing Clean Construction Ordinance (2-92-595).

Diesel Pollution Harms Health

When diesel engines burn fuel, they produce a dangerous mix of emissions. These emissions contain more than 40 toxins, carcinogens, smog-forming compounds, and fine particulate matter (PM, aka "soot").³ PM is small enough to evade the body's natural defenses and penetrate the deepest parts of the lungs. Exposure to PM pollution is linked to increased risk of heart attacks, asthma attacks, and other respiratory conditions.⁴ It is estimated that more than 47% of diesel PM emissions nationwide come from nonroad diesels, including construction equipment.⁵ In fact, just one old bulldozer can emit as much soot as 500 cars.⁶

Because diesel equipment often operates on the street level, this pollution is emitted directly where people breathe. This exposure has a deadly toll: a study by the Clean Air Task Force estimates that diesel soot pollution causes 482 deaths, 585 heart attacks, and 17,847 asthma attacks in metro Chicago each year.⁷ Fortunately, studies show that PM-related mortality can be reduced when emissions are reduced.⁸

Diesel Pollution Contributes to Global Warming

Diesel is also the largest source of emissions of black carbon in the U.S. – a leading agent of global warming – with over half of these emissions coming from diesel engines.⁹ Black carbon is second only to CO₂ as an agent of global warming.¹⁰ Black carbon is very short lived and lingers in the atmosphere for only about a week. Therefore, the climate benefits from reducing emissions of black carbon can be almost immediate.

The Need for Clean Diesel Policy Solutions

All new diesel trucks (model year 2007 and newer for highway vehicles), non-road machines (model year 2012 and newer for most construction equipment) are required by the EPA to emit 90% less particulate matter than vehicle models year 2006 and earlier.¹¹ Unfortunately, there are no emission reduction requirements for older engines (legacy fleets). Diesel engines are durable and have long lifespans, so older, high-polluting engines are still in operation. Nationally, there are more than 2 million pieces of diesel construction equipment in use, most of which lack modern pollution controls.¹² Requirements to retrofit these vehicles would result in immediate health and climate benefits. Clean diesel technology can be easily retrofitted onto existing engines to greatly reduce harmful emissions. Without action, it could take 20-30 years for legacy fleets to be naturally phased out.

Effective Retrofit Technology is Widely Available

There are several varieties of diesel pollution controls, but the two most common are:

Diesel Particulate Filters (DPFs) DPFs are installed in engine exhaust systems and physically trap particles in the exhaust before they leave the tailpipe. Particles trapped in the filter are oxidized to CO₂ and water. Testing indicates that DPFs are so effective that they can eliminate nearly all harmful soot emissions. When used with widely-available Ultra Low Sulfur Diesel (ULSD) fuel, DPFs can reduce at least 90% of soot emissions.

Diesel Oxidation Catalysts (DOCs) DOCs use a chemical process to break down pollutants in the exhaust into less harmful components. As exhaust gases pass through a DOC's honeycomb structure, a portion of the pollutants and soot are chemically oxidized to harmless gases. DOCs can reduce about 20-30% of soot emissions.

Not only are retrofits effective pollution reducers, they are also cost efficient. While DPF retrofits can range in cost from \$5,000-\$15,000 and DOCs can range from \$600-\$2,000, studies show that clean diesel retrofits can achieve a lifetime cost-effectiveness of \$18,000-\$87,000 per ton of PM reduced.¹³ More importantly, studies show that for every dollar spent reducing diesel pollution, there is an estimated \$13 savings in long term health care costs.¹⁴ A number of programs exist to help contractors cover the cost of retrofits, including: Diesel Emission Reduction Act (DERA) funding through U.S. EPA and states;¹⁵ Congestion Mitigation and Air Quality (CMAQ)¹⁶ in metropolitan areas through agencies such as the Illinois Environmental Protection Agency (IEPA);¹⁷ and Supplemental Environmental Projects (SEPs).¹⁸



Diesel Particulate Filters (DPFs) like the one pictured above when used with Ultra Low Sulfur Diesel (ULSD) can reduce emissions by 90%

How Clean Construction Policies Work

Clean construction seeks to prevent the health and environmental consequences of diesel emissions by reducing emissions and using resources more efficiently. Clean construction achieves these goals by requiring the use of new, clean diesel engines or retrofitted older engines, specifying the fuel type, and limiting vehicle idling, among other strategies. Clean construction policies can be adopted voluntarily by a contractor, can be part of the bidding requirements for specific projects, or can include government projects via a local ordinance.



Leopardo Construction used clean construction principles to build a new grocery store in Chicago

Common Clean Construction Policy Provisions

Equipment Subject to Policy

There are different means for specifying which vehicles are subject to a clean construction policy. Among them are differentiating between on/off road vehicles, vehicles of certain horsepower (e.g., all equipment 50HP or greater), and by model year.

Emission Controls Requirements

In addition to specifying which equipment are subject to the policy, clean construction policies specify the level of emission controls required. This can be done by specifying the required pollution control technology (DPFs, DOCs, etc.) and/or the minimum tier of federal engine emission standards

(Tier 2, Tier 3, Tier 4).ⁱ Different requirements can be specified for new vs retrofitted vehicles, or on- vs off-road vehicles (e.g., off-road vehicles must be Tier 4 compliant or retrofitted to meet an equivalent pollution control level).

Use of Alternative Fuels

Using widely available Ultra Low Sulfur Diesel (ULSD) fuel alone can reduce soot pollution by 5-9%.¹⁹ Diesel engines equipped with particulate filters need ULSD to ensure pollution control equipment remains effective and all diesel fuels sold are now ULSD.²⁰ Biodiesel, which contains negligible sulfur, can also be used in limited amounts in approved ULSD blends.²¹



ULSD by itself can reduce soot pollution by 5-9%; when paired with a DFP it can reduce pollution by 90%

Idling limits

Vehicle idling increases the concentration of dangerous diesel pollution around construction sites. If the site is by a school, hospital, day care center, or park, this increased pollution puts children, the elderly, and/or patients at increased risk for health complications such as asthma exacerbations, heart attacks and bronchitis. Many

ⁱ Since the early 1990s, the U.S. EPA has taken a tiered approach to reducing vehicle emissions. These tiers set phase in dates for vehicle engine manufactures to meet certain emission standards, based on the horsepower of the engine. Tier I was phased in 1996-99, Tier II 2001-04, Tier III 2006-08, and Tier IV 2012-15. The two primary emissions targeted by these standards are NOx and PM. By the phase-in of Tier 4, the EPA aims for a 90 percent reduction in NOx and a 95% reduction in PM emissions. For a complete detailing of EPA emissions standards and Tier charts, see the EPA Emissions Standards Reference Guide: <https://www.epa.gov/emission-standards-reference-guide>.

clean construction policies restrict all unnecessary idling, and local laws can limit idling to less than 3-5 minutes. These provisions typically include exceptions for safety and proper vehicle operation. Idling limits also help save on fuel costs. In places such as Chicago where a 3 minute idling limit is already required by law, specifying idling limits in a construction contract can also aid in compliance.²² Idle reduction technologies exist that can assist a contractor with keeping a site fully functional without continuously running engines. These include: direct-fired heaters, automatic engine idle devices, auxiliary power units, and other technologies.²³



RHA has worked to protect children from the clouds of emissions than can be produced by idling school buses

Electric Hookup Requirements

A clean construction policy can specify that when feasible, on-site electricity be provided via a connection to the city rather than through use of diesel generators.

Notification to Sensitive Sites

Some clean construction policies require that notice of construction be provided to sensitive sites such as schools and hospitals, so that persons with chronic respiratory illness can be aware of potential increases in respiratory irritants.

Compliance

Clean construction policies can specify who is responsible for maintaining compliance. Many policies place the compliance responsibility on the contractor rather than the site. Compliance is typically enforced by way of fines, with some

projects specifying that the fines be donated to environmental causes.

Reporting requirements

In order to maintain compliance, clean construction policies typically contain various reporting requirements, including but not limited to equipment inventories, monthly reports, spot checks, and air quality monitoring.

Other

Clean construction contracts can also include other provisions for the consideration of neighbors adjacent to the site. These can include requirements for noise curtains, dust control, truck traffic and staging areas, and locating emission sources away from building air-intakes.

Clean Construction Policies are Being Adopted Across the Country and Across Multiple Sectors

Here are a few examples of where clean construction policies have been adopted elsewhere:

Ordinance/Policy for all government projects:

- Cook County, IL
- New York, NY
- Pittsburgh, PA
- San Francisco, CA
- Providence, RI
- Westchester, NY
- Nassau, NY
- Dallas, TX
- Massachusetts Highway Department
- New York State Department of Transportation
- State of Rhode Island

Project-Based Clean Construction Requirements:

- O’Hare Modernization Project
- Dan Ryan Expressway, Illinois Department of Transportation
- Boston’s Central Artery Project (“Big Dig”)
- Sketchers®, Moreno Valley, CA
- Columbia University Manhattanville campus expansion
- University of Pittsburgh Medical Center

How Chicago Can Expand Clean Construction

Hospitals

Hospitals promote health and well-being, but patient, staff, and visitor health can be compromised when hospital construction relies on dirty diesel engines. This is especially true for people with respiratory illness or weakened immune systems. Hospitals and other care facilities in and around Chicago should adopt clean diesel construction policies. The Illinois Medical District recently committed to adopt clean construction requirements.²⁴ More local hospitals should follow suit to ensure anyone seeking care at their facilities breathes safe air.

Contractors

RHA and partners have been working with contractors to voluntarily adopt clean construction principles. These policies will help them reduce workers' exposure to harmful pollution while on the job, stay in compliance with local clean construction ordinances, be a good neighbor to those near a construction site, and be able to advertise as being a socially responsible and "green" contractor.

Chicago Clean Construction Ordinance

In 2011, the City of Chicago enacted a clean diesel construction ordinance to reduce harmful emissions from vehicles used on city construction projects (2-92-595). While well-intentioned, the ordinance only applies to projects over \$2M, does not apply to the Public Building Commission or sister agencies that do not report directly to the Mayor, and has confusing requirements. As a result, enforcement has been inconsistent. To strengthen Chicago's law, where, when and how the ordinance applies should be clarified and expanded to include all Public Building Commission projects, so construction on public buildings such as libraries, park facilities, and police and fire stations is covered.

Benefits of Clean Construction for Chicago

Health – Clean construction protects the health of workers and those who live, work, learn, or seek medical attention close to the worksite. Diesel exhaust is most concentrated where it is being emitted, creating a zone of greatest exposure for

people nearby. Clean construction offers direct tangible benefits to the community.

Climate – A reduction in diesel emissions means a reduction in substances such as black carbon, which are leading agents of climate change. Reducing black carbon emissions has an immediate and lasting effect in slowing global warming.

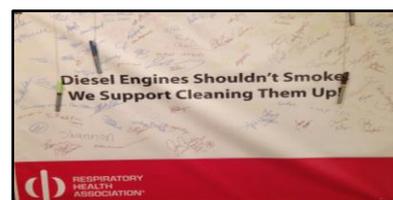
Job Creation – The building of new clean diesel engines and retrofitting and maintenance of older diesel engines requires more skilled workers. Investments in clean diesel technology means more growth in the green jobs sector.

Publicity – Adopting clean construction can mean good public relations for a contractor and project site. Given the emphasis on LEED standards and green building, clean construction would capitalize on a growing trend of socially responsible building. In fact, 2013 LEED created a pilot credit for projects that utilize clean construction.²⁵

Risk Avoidance – Voluntarily adopting clean construction principles can aid in contractor compliance with existing pollution ordinances.

How You Can Take Action

- Join our clean diesel construction campaign. RHA is working in partnership with the Environmental Law and Policy Center and others to bring clean construction to Chicago. Learn more at www.DieselPollutionChicago.org.
- Call or email your alderman and tell them that Chicago's clean construction ordinance (2-92-595) needs to be fixed to protect Chicagoans' health and our environment.
- Become an RHA e-advocate to receive updates on lung health issues and alerts enabling you to take action on clean air legislation. Visit www.lungchicago.org to learn more.



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