

PUGET SOUND CLEAN AIR AGENCY

Diesel Fleet Facility Registration Program

Description of Non-Road Equipment Data (Discussion Draft, 3/31/09)

1. Sources of Information on Non-Road Equipment

The most comprehensive single source of information on non-road equipment in the four-county area comes from EPA's NONROAD 2005 model,¹ which was used by PSCAA to estimate non-road emissions for the Agency's 2005 air emissions inventory.² The model estimates how much non-road equipment operates in the four-county area as well as equipment characteristics (e.g., age, horsepower, etc.), fuel use, and emissions. The data excludes non-road equipment in the commercial marine sector, locomotives, and aircraft.

Data on cargo-handling and yard equipment at Port of Seattle and Port of Tacoma facilities is available from the 2007 Puget Sound Maritime Air Emissions Inventory.³ In the Agency's 2005 air emissions inventory, this information on non-road equipment at the ports was used to supplement estimates from the NONROAD 2005 model.

Additional information on non-road equipment rental rates and the average life of non-road equipment is provided in a 2003 national survey done by the research company MacKay & Company.

2. Information from the 2005 PSCAA Air Inventory Using the EPA NONROAD 2005 Model

The EPA NONROAD 2005 model estimates that there are over 57,000 pieces of diesel-powered non-road equipment operating in the four-county area. This includes equipment at all levels of horsepower. Examples of the type of equipment covered by these estimates are:

- Construction: crawlers, pavers, excavators, signal boards, drills, rammers, and bull dozers
- Industrial: cranes, refrigeration units, and material handling machinery
- Commercial: forklifts, pumps, compressors, washers, and small generators

Table 1 shows a breakout of diesel equipment by horsepower. It lists the number and percentage of pieces of non-road equipment in each horsepower category. It also shows how much of the total non-road horsepower in the region is accounted for by each category. For example, 22% of the non-road equipment in the region is 100 horsepower or more, and this equipment collectively accounts for 58% of the total non-road diesel horsepower in the region.

¹ See: <http://www.epa.gov/otag/nonrdmdl.htm>.

² See: <http://www.pscleanair.org/news/library/reports/>

³ See: <http://www.maritimeairforum.org/emissions.shtml>.

Table 1: Breakout of Diesel Non-Road Equipment by Horsepower

Horsepower Category	Number of Units in Category	% of Total Units	Cumulative % of Units	Total Horsepower in Category	% of Total Horsepower	Cumulative % of Horsepower
1000+	121	0.21%	0.21%	189,900	3.73%	4%
500-999	407	0.71%	0.92%	299,074	5.87%	10%
300-499	1,758	3.07%	3.98%	734,649	14.42%	24%
100-299	10,407	18.15%	22.13%	1,723,314	33.83%	58%
50-99	21,476	37.45%	59.59%	1,565,413	30.73%	89%
<50	23,175	40.41%	100.00%	581,290	11.41%	100%
Total:	57,343			5,093,639		

Figures 1 and 2 depict the estimated sectoral breakdown of non-road diesel equipment ownership (all levels of horsepower). The construction sector accounts for the largest share of non-road equipment in terms of the number of pieces of equipment (Figure 1) and fuel use (Figure 2).

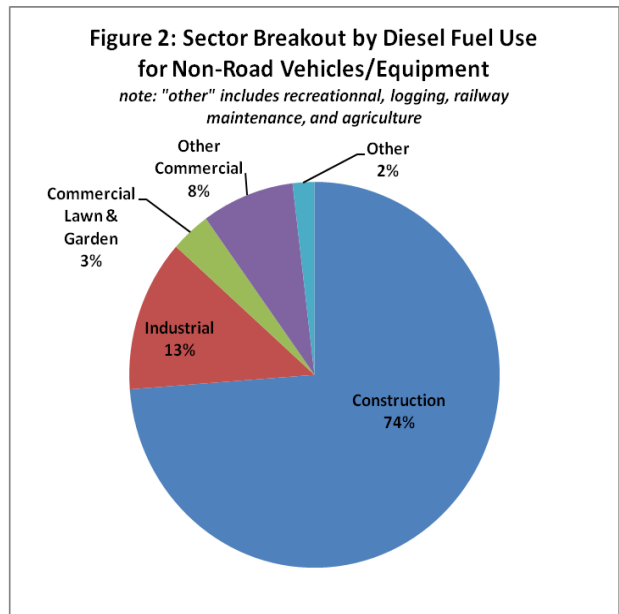
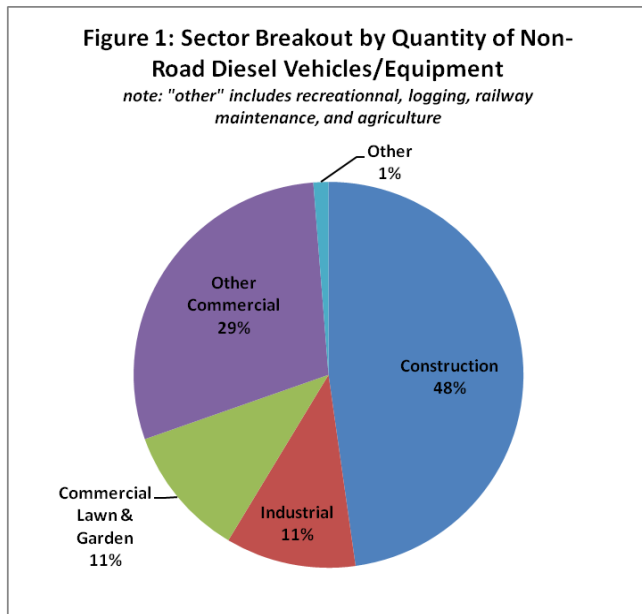
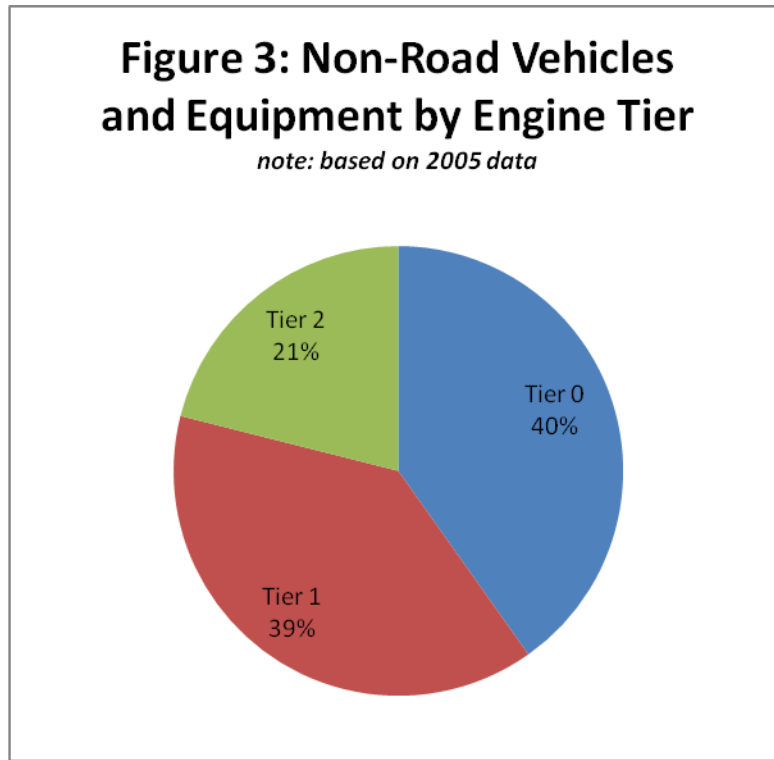


Figure 3 shows the estimated breakout of non-road equipment engine types according to non-road engine standards set by EPA:

- Tier 0 engines are the oldest, highest emitting engines (typically older than 1996)

- Tier 1 engines comply with emissions standards that were phased in for larger engines starting in 1996
- Tier 2 engines are the newest, lowest emitting engines in the NONROAD 2005 results; these standards were phased in for larger engines starting in 2001

Because the NONROAD 2005 model uses data from 2005, it does not reflect estimates of engines that comply with Tier 3 standards, which were introduced in 2006.



3. Data from the Puget Sound Maritime Air Emissions Inventory

To cover non-road equipment at ports, the estimates from the NONROAD 2005 model can be supplemented with data from an inventory of cargo-handling and yard equipment conducted for the Puget Sound Maritime Air Emissions Inventory. The inventory showed 799 pieces of cargo-handling equipment at Ports of Seattle and Tacoma. Most of this equipment was 200 horsepower or above. Thirty-seven percent was Tier 0 and the remainder was Tier 1 or 2.

4. National Data from MacKay and Company’s study: 2003 Universe of Construction Equipment & Machinery

In this study, MacKay and Company reported on the quantity and characteristics of 28 types of heavy non-road equipment operating in the United States. The study described information about equipment

age and ownership status, which is of potential use for the Diesel Fleet Facility Registration Project. Key findings were:

- 23% of non-road equipment is rented (or rented to own), 13% of equipment is leased, and 64% of equipment is owned
- The average age of non-road equipment is 6.7 years.
- The average *primary lifespan* of equipment (i.e., before it needs to be substantially overhauled) is 9.7 years and the average *useful lifespan* of equipment is 15.7 years.