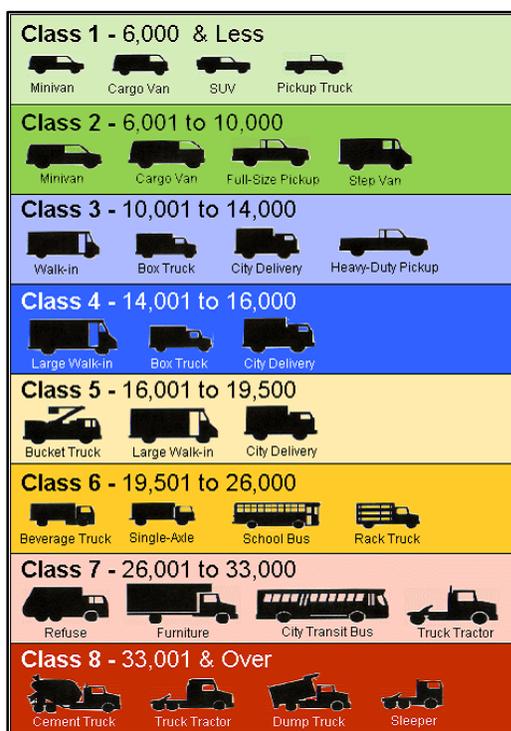


Heavy-Duty Vehicles

Background

Heavy-duty vehicles, large trucks and construction vehicles, produced 15.4 million tons of CO₂ in Ohio. This represents about 23.6% of the total emissions from transportation in Ohio. Heavy-duty vehicles run mostly on diesel fuel, which has higher energy content and greater fuel economy than gasoline. In



recent years, a number of non-gasoline alternatives for fueling these vehicle fleets have become increasingly popular. Liquid natural gas (LNG) is one such potential alternative fuel, which has a lower carbon content than diesel. With increasing supplies of natural gas, and lower prices, LNG is also about 30% cheaper than diesel currently. While compressed natural gas has gained popularity for passenger vehicles and city busses, LNG is preferred in the heavy-duty because it is more amenable for heavy, long-distance driving vehicle. With LNG, most heavy-duty vehicles can travel more than 400 miles before stopping to refuel.

LNG Fleet Conversion Analysis

Although the heavy duty fleet in Ohio creates a sizable carbon emission, this sector is difficult to change. With LPG is one of the only alternatives, it is not substantially better in terms of carbon emissions. Although the tailpipe emissions per mile for LNG vehicles are less than that of diesel, switching to LNG does not promote a carbon savings. This is due to the decreased fuel economy of LNG vehicles, which is only 60% of diesel

fuel economy. The other fuels that could be used, as discussed above, are useful for short distance hauls, but not long distance hauls. As a result, a large fleet switchover would actually increase the total carbon emissions for the fleet. This makes them less practical to be used in the trucking industry. For our wedge analysis, we assume a 1% annual conversion of trucks from diesel to LPG, mainly due to lower costs for LPG, and a 2% annual increase in fuel efficiency.

With the conversion to additional LPG vehicles and increased fuel efficiency, we estimate a relatively modest 44 million ton CO₂ reduction in carbon emissions by 2050. This reduction is important, albeit modest. It reflects the relative difficulties that this industry will have accommodating emissions reductions.

Figure 1: Annual Emissions in tons of carbon dioxide

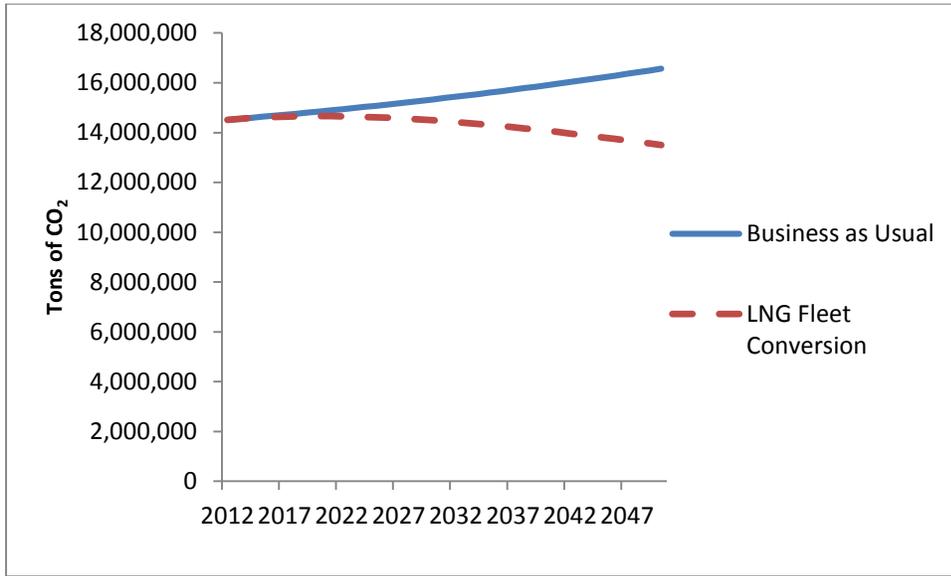
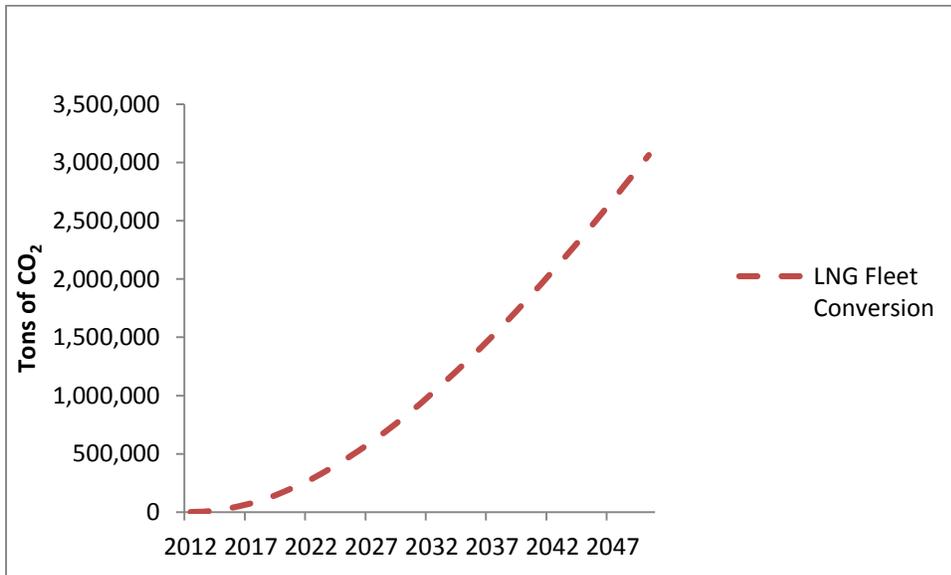


Figure 2: Annual Emission Savings



Carbon Breakdown

| | |
|------------------------------|--------------------------|
| Business as Usual: | 602.19 million tons |
| LNG Fleet Conversion: | 557.87 million tons |
| Proposed Conversion Savings: | 44.32 million tons saved |