

# HW 2: Energy Demand and CO2 Emissions

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## 1

Creating a new category combining all buses, single-unit trucks, and combination trucks gives the following:

### 1.1

The average fuel economy is

Table 1: Average Fuel Economy of HDVs

| Year | Fuel economy (mpg) |
|------|--------------------|
| 2020 | 21.2               |
| 2019 | 20.8               |

### 1.2

The CO<sub>2</sub> emissions per mile is given by  $\frac{1}{\text{miles/gal}} \times \frac{\text{CO}_2}{\text{gal}} = \frac{\text{CO}_2}{\text{mile}}$ . This gives

Table 2: HDV Fuel Consumption

| Year | Fuel economy (mpg) | Fuel consumption (gpm) | Emissions (g CO <sub>2</sub> /gal) | Emissions (g CO <sub>2</sub> /mile) |
|------|--------------------|------------------------|------------------------------------|-------------------------------------|
| 2020 | 21.2               | 0.0471698              | 10180                              | 480.1887                            |
| 2019 | 20.8               | 0.0480769              | 10180                              | 489.4231                            |

### 1.3

The total CO<sub>2</sub> emissions for all LDVs and HDVs is

Table 3: Emissions of LDVs and HDVs

| YEAR | category | Fuel consumed (thousand gallons) | Emissions (g CO <sub>2</sub> /gal) | Emissions (g CO <sub>2</sub> ) | Emissions (M tons CO <sub>2</sub> ) |
|------|----------|----------------------------------|------------------------------------|--------------------------------|-------------------------------------|
| 2020 | ALL LDV  | 111930145                        | 8887                               | 9.947232e+14                   | 0.008887                            |
| 2019 | ALL LDV  | 131455731                        | 8887                               | 1.168247e+15                   | 0.008887                            |
| 2020 | ALL HDV  | 46853407                         | 10180                              | 4.769677e+14                   | 0.010180                            |
| 2019 | ALL HDV  | 48094540                         | 10180                              | 4.896024e+14                   | 0.010180                            |