

City of Rockford

At A Glance

The City of Rockford, Illinois conducted a 90 day Trial Program with the Smart Emissions Reducer. Included in the trial were 3 Ford F-150 pick-up trucks, a Ford Explorer SUV, and a Chevrolet Impala. Emissions were tested at idle, and fuel consumption was monitored.

Toxic Emissions

Idle emissions are a mere indicator of potential, not an all inclusive total tonnage report. Therefore, toxic emissions are gauged by the emissions test data, and Greenhouse Gasses (GHGs) are determined by fuel economy readings¹. Toxic emissions noted are Hydrocarbons (HC), Carbon Monoxide (CO), and Oxides of Nitrogen (NO_x).

	HC Before	HC After	Change%	CO Before	CO After	Change%	NO _x Before	NO _x After	Change%
F-150 1	101	20	-80.2%	0.22	0.08	-36.6%	0	0	0
Explorer	108	72	-33.3%	0.32	0.06	-81.3%	126	10	-92%
Impala	15	0	-100%	0.1	0	-100%	0	0	0
F-150 4	10	9	-10%	0.12	0.07	-41.7%	0	0	0
F-150 5	7	2	-71.4%	0.09	0.05	-44.4%	15	10	-33.30%
Average			-58.98%			-60.8%			-25.06%

Table 1 Toxic emissions data

As can be seen from Table 1, toxic emissions are reduced on average between 25% and 61%.

Fuel Economy & GHG

Since the most prevalent Greenhouse Gas emitted from engines is Carbon Dioxide (CO₂), and it is established that 8.15 kg of carbon is emitted by the burning of 1 gallon of gasoline¹, the Carbon Footprint can be approximated by using fuel economy and annual mileage numbers.

	MPG Start	MPG End	MPG Avg	Yr Miles	Fuel Saved	CO ₂ Saved
F-150 1	8.93	14	11.82	11,535	315.82 Gal	2573.93 kg
Explorer	10.24	12.41	13.33	13,265	300 Gal	2447.36 kg
Impala	15.42	17.67	16.32	11,772	42.1 Gal	343.12 kg
F-150 4	7.53	10.44	NA	NA	NA	NA
F-150-5	6.45	7.29	8.69	6192	247.5 Gal	2016.8 kg

Table 2 Fuel Economy & GHG Savings

¹ US EPA states 8.15 kg of CO₂ are emitted per gallon of gasoline burned.

Referencing Table 2, the Ford F-150 #4 had inconclusive data. MPG Average was established by totaling all miles and fuel after the Smart Emissions Reducer retrofit and dividing fuel gallons into miles driven. Yr Miles is estimated annual miles determined by multiplying quarterly miles by 4. Fuel Saved is an estimated annual number established by:

$$(Yr\ Miles/Start\ MPG) - (Yr\ Miles/Avg\ MPG) = Fuel\ Saved$$

At an average price of \$3.50 per gallon of gasoline, tested vehicles will provide an annual savings of:

- **F-150 #1** **\$1105.37**
- **Explorer** **\$1050.00**
- **Impala** **\$147.35**
- **F-150 #5** **\$866.25**

CO₂ Saved is calculated by multiplying Fuel Saved X 8.15, and is given in kilograms annually. As of the date of this Report, the market value for one ton of Carbon is at \$11.00 USD.² For the purpose of Carbon Credit trading, the following values could be applied to each vehicle:

- **F-150 #1** **\$28.31**
- **Explorer** **\$26.92**
- **Impala** **\$3.77**
- **F-150 #5** **\$22.18**

At a cost of \$524 per Smart Emissions Reducer per vehicle, looking at fuel savings and carbon value, the units will pay for themselves:

- **F-150 #1** **24 Weeks** **5.5 Months**
- **Explorer** **25.3 Weeks** **5.8 Months**
- **Impala** **180 Weeks** **41.4 Months**
- **F-150 #5** **30.66 Weeks** **7 Months**

Average Return On Investment (ROI) for the fleet would be approximately 15 months. Not including the Impala, **ROI is about 6 months average.**

² http://greenliving.lovetoknow.com/How_to_Measure_and_Price_Carbon_Credits