



# Lead Industries Association, Inc.

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March 20, 1972

SUBJECT: ENVIRONMENTAL IMPACT  
STUDY: GASOLINE CARS  
VERSUS ELECTRIC CARS

TO: MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION, INC.

Gentlemen:

Attached are two summary sheets from a study on the subject sponsored by the Electric Vehicle Council. The study was undertaken in order to assess the expectation of effluents from electric power generation assuming that an electric car would eventually replace the gasoline version.

The total study, by Gordian Associates, New York, is available from the Electric Vehicle Council 90 Park Avenue, New York 10016 at \$4.00 per copy, postpaid. Meantime, we have two copies in this office for temporary reference.

Yours very truly,

CONNEL A. BAKER, JR.

CAB:ip  
Encl.

Figure 8-1: The Comparative Environmental Impact  
in 1980 of Gasoline-Powered Motor  
Vehicles (GMV) Versus Electric-Powered  
Motor Vehicles (EMV)

| <u>Pollutant</u>                                         | <u>1980 Pollutant Emissions Due to the:</u>                                                                                                                                                       |                                                                                    |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                          | <u>EMV</u>                                                                                                                                                                                        | <u>GMV</u>                                                                         |
| Total Particulates                                       | 821,960 tons                                                                                                                                                                                      | 343,768 tons                                                                       |
| Respirable Particulates<br>(under 5 microns<br>diameter) | 133,829 tons                                                                                                                                                                                      | 189,190 tons                                                                       |
| Benzo(a)Pyrene<br>Particulates                           | 0.53 tons                                                                                                                                                                                         | 11.26 tons                                                                         |
| Sulfur Dioxide                                           | 5,773,618 tons                                                                                                                                                                                    | 1,717,620 tons                                                                     |
| Nitrogen Oxides                                          | 2,857,000 tons                                                                                                                                                                                    | 4,470,400 tons                                                                     |
| Carbon Monoxide                                          | 130,858 tons                                                                                                                                                                                      | 21,322,250 tons                                                                    |
| Hydrocarbons                                             | 100,825 tons                                                                                                                                                                                      | 4,744,050 tons                                                                     |
| Carbon Dioxide                                           | 1,068,100,000 tons                                                                                                                                                                                | 1,531,450,000 tons                                                                 |
| Total Heat                                               | $21,702 \times 10^{12}$ BTU <sup>a</sup>                                                                                                                                                          | $19,450 \times 10^{12}$ BTU <sup>a</sup>                                           |
| Radiation                                                | Added radiation that in<br>no case exceeds 5% of<br>natural background radia-<br>tion for the general<br>population and that<br>averages far less than<br>this over the entire<br>U.S. population |                                                                                    |
| Noise                                                    | --                                                                                                                                                                                                | Significantly greater<br>noise from operation<br>of the GMV relative<br>to the EMV |
| Miscellaneous                                            | 5050 tons of oil emitted<br>into waterways, aesthetic<br>impact of additional<br>transmission and dis-<br>tribution lines for the<br>added electricity<br>requirements of the EMV                 | 29,348 tons of oil<br>emitted into water-<br>ways                                  |

The Comparative Environmental Impact in 1980 Of  
Gasoline-Powered Motor Vehicles (GMV) Versus  
Electric-Powered Motor Vehicles (EMV) On a Per  
Vehicle Basis (a)

| <u>Environmental</u><br><u>Pollutant</u> | <u>Emissions per vehicle per year for:</u>       |                                                  |
|------------------------------------------|--------------------------------------------------|--------------------------------------------------|
|                                          | <u>Gasoline-Powered</u><br><u>Motor Vehicles</u> | <u>Electric-Powered</u><br><u>Motor Vehicles</u> |
| <u>Air Pollutants:</u>                   |                                                  |                                                  |
| Total Particulates                       | 4.83 lbs.                                        | 11.55 lbs.                                       |
| Respirable Particulates                  | 2.66 lbs.                                        | 1.88 lbs.                                        |
| Benzo(a)Pyrene Particulates              | $1.58 \times 10^{-4}$ lbs.                       | $0.07 \times 10^{-4}$ lbs.                       |
| Sulfur Dioxide                           | 24.1 lbs.                                        | 81.2 lbs.                                        |
| Nitrogen Oxides                          | 62.8 lbs.                                        | 40.2 lbs.                                        |
| Carbon Monoxide                          | 300 lbs.                                         | 1.84 lbs.                                        |
| Hydrocarbons                             | 66.7 lbs.                                        | 1.42 lbs.                                        |
| Carbon Dioxide                           | 21,550 lbs.                                      | 15,020 lbs.                                      |
| <u>Total Heat</u> (b)                    | $1.37 \times 10^8$ BTU                           | $1.55 \times 10^8$ BTU                           |
| <u>Radiation</u> (c)                     |                                                  |                                                  |
| <u>Noise</u> (d)                         |                                                  |                                                  |
| <u>Miscellaneous</u> (e)                 |                                                  |                                                  |

Notes to Figure

(a) These per-vehicle estimates are based on estimated total pollutant emissions in 1980 from all motor vehicles being powered by gasoline versus electricity (source: Gordian Associates, The Comparative Environmental Impact of Gasoline-Powered Motor Vehicles Versus Electric-Powered Motor Vehicles, August 1971, p. 1-9). These per-vehicle estimates are also based on 142,300,000 motor vehicles in operation in 1980 (Source: Dept. of Transportation, Federal Highway Administration statistics on actual 1970 vehicles in operation, actual 1970 vehicle-miles traveled, projected 1980 vehicle-miles of travel, and the assumption that the number of vehicles will increase in direct proportion to the number of vehicle-miles of travel per year.)

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| <u>Pollutant</u>                                         | <u>1980 Pollutant Emissions Due to the:</u>                                                                                                                                                       |                                                                                    |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                          | <u>EMV</u>                                                                                                                                                                                        | <u>GMV</u>                                                                         |
| Total Particulates                                       | 821,960 tons                                                                                                                                                                                      | 343,768 tons                                                                       |
| Respirable Particulates<br>(under 5 microns<br>diameter) | 133,829 tons                                                                                                                                                                                      | 189,190 tons                                                                       |
| Benzo(a)Pyrene<br>Particulates                           | 0.53 tons                                                                                                                                                                                         | 11.26 tons                                                                         |
| Sulfur Dioxide                                           | 5,773,618 tons                                                                                                                                                                                    | 1,717,620 tons                                                                     |
| Nitrogen Oxides                                          | 2,857,000 tons                                                                                                                                                                                    | 4,470,400 tons                                                                     |
| Carbon Monoxide                                          | 130,858 tons                                                                                                                                                                                      | 21,322,250 tons                                                                    |
| Hydrocarbons                                             | 100,826 tons                                                                                                                                                                                      | 4,744,050 tons                                                                     |
| Carbon Dioxide                                           | 1,068,100,000 tons                                                                                                                                                                                | 1,531,450,000 tons                                                                 |
| Total Heat                                               | $21,702 \times 10^{12}$ BTU*                                                                                                                                                                      | $19,450 \times 10^{12}$ BTU*                                                       |
| Radiation                                                | Added radiation that in<br>no case exceeds 5% of<br>natural background radia-<br>tion for the general<br>population and that<br>averages far less than<br>this over the entire<br>U.S. population |                                                                                    |
| Noise                                                    | --                                                                                                                                                                                                | Significantly greater<br>noise from operation<br>of the GMV relative<br>to the EMV |
| Miscellaneous                                            | 5050 tons of oil emitted<br>into waterways, aesthetic<br>impact of additional<br>transmission and dis-<br>tribution lines for the<br>added electricity<br>requirements of the EMV                 | 29,348 tons of oil<br>emitted into water-<br>ways                                  |

\*This total includes some heating of waterways by both the EMV and GMV transportation systems -- the EMV emitting more heat into waterways than the GMV. However by 1980, these thermal discharges into waterways by both the EMV and GMV should be subject to controls intended to prevent any damage to the marine environment.

Notes to Figure (Continued)

(b) The EMV emits more heat into waterways than the GMV. However, total heat is also a measure of the conservation of natural resources. And the GMV uses more than twice the quantity of hydrocarbon natural resources than the EMV, which also uses hydro-power and uranium natural resources.

(c) The EMV adds radiation to the environment that in total averages significantly less than 5% of normal background radiation for the U.S. population.

(d) The GMV contributes a considerably greater level of noise to the environment than the EMV.

(e) The EMV leads to about 5,050 tons of oil emitted into waterways per year plus the adverse aesthetic impact from additional electric lines to provide the added electricity requirements of the EMV. The GMV leads to about 29,348 tons of oil emitted into waterways per year.