STATEMENT SUBMITTED TO THE SUBCOMMITTEE ON SCIENCE, RESEARCH, AND DEVELOPMENT BY GEORGE A. HOFFMAN, UNIVERSITY OF CALIFORNIA, AUGUST 17, 1966

ENERGY REQUIREMENTS FOR ELECTRIC AUTOMOBILES

(By George A. Hoffman, research engineer, Institute of Government and Public Affairs, University of California, Los Angeles, Calif.)

I. INTRODUCTION: WHY ELECTRIC AUTOMOBILES?

Automotive propulsion accounts today for about half of the energy generated by combustion in the United States. A review paper on the energy requirements of automobiles—particularly electrically driven cars—appears therefore to be appropriate for this first conference on energy conversion.

The internal combustion engine was not always the favorite energy conversion device for propelling passenger cars. At the turn of the century there were more battery-operated, electric motor cars in use in this country than either steam or gasoline powered. But the severe range and speed limitations of storage batteries in those days soon doomed the electric car for oblivion. Quantity demand and production of electric automobiles ended half a century ago.

But in the last decade or so some automotive trends specifically favorable to the reconsideration of electrically driven passenger cars have developed. For example:

Electric motor design has progressed very rapidly in recent years. Improvements in electromechanical conversion efficiency and in weight reduction are now at the point where the electric motor merits reinvestigation for automobile traction.

In the past decade, the weight of batteries and regenerative fuel cells per unit of stored energy has dropped to a small fraction of their value of a half-century ago.

The large increase in air pollution from the exhausts of the internal combustion engine has become a serious national problem. The socioeconomic losses due to degrading the quality of the air we must breathe might yet force installation of smog control devices on cars costing as much as the engine itself.[1] Battery-operated electric cars do not contribute significantly to air contamination.

The demand for cars per capita is increasing with a related proliferation in diversity of automobile models. The rate of increase is greatest for the second car in the U.S. family, used

NOTE.—The views expressed in this paper are those of the author. They should not be interpreted as reflecting the views of the institute nor of the university, or the official opinion or policy of the sponsors of this study.

[1] George A. Hoffman, "Los Angeles Smog Control," Rept. MR–56, Institute of Government and Public Affairs, UCLA, March 1966.