either for commuting or for household-type trips, and characterized by more missions than the first car, but of shorter range. These suburban cars appear the most readily adaptable to electrical conversion.

Consumer prices for gas and oil are rising proportionately faster than the price of electricity, and will do so for the foreseeable future. Electric propulsion of ground vehicles is therefore steadily becoming more attractive economically. Automotive energy conversion would be more efficient and operating costs cheaper if nonfossil electrically regenerable fuels were used.

For these reasons, the design of the electric car is reviewed here with estimates of its energy requirements.

II. GENERAL MAKEUP OF ELECTRIC AUTOMOBILES

Automotive marketing history shows clearly that it is almost impossible to successfully introduce a radically changed car to the motoring public if it departs too noticeably from the established demand and acceptance criteria of the time. To be popularly wanted, manufactured, and sold in large numbers, electric automobiles should conform to the major characteristics of conventional gasoline engine cars. This requirement spells out most of their basic design criteria.

Electric cars should therefore be engineered to resemble or excel present-day cars in most of the following respects:

General appearance and diversity of models;
Convenience, comfort, passenger capacity and protection, interior design;
Performance, top speeds;
Handling, agility, ride;
Range between refueling;
Costs, initial and operating.

After a century of development, the weight composition of automobiles has been dictated by the consumer to reflect the above six points and others. For the great variety of cars on the road today, ranging in curb weight (takeoff gross weight) from 1,500 to over 5,000 pounds, the weight composition is remarkably uniform, both as to proportions of weight and as to linearity with curb weight. Figure 1 is an illustration of the consistency of the weight ratios of major component categories of 1966 domestic and imported models, designed for the above set of criteria.

These ratios are listed in table 1 for 16 component subgroupings, and are the starting point for any successful design of electric cars. Basing the design on the ratios shown in table 1, assures that the driver at the wheel and his passengers perceive little difference in driving, or riding in, an electric auto versus a conventional car.