Power Electronics for Electric Vehicles 2016-2026

Description:
This report of over 190 very detailed slide format pages is replete with new forecasts, analysis and infographics seeing the roadmap and financial projections to a future where land, water and airborne vehicles will be electric. The emphasis is land vehicles. It fully explains why power electronics is becoming more important in the performance and cost of an electric vehicle, hybrid or pure electric.

Reasons given include expected tough 2025 and 2030 regulations making most conventional powertrains illegal and the ongoing quest for performance improvement including better life and reliability. The report explains how power electronics may be part of the powertrain traction system, loosely related to it or not related and what that means, given in many new graphical summaries.

The key parts of recent presentations by the key players are assessed in this work, which was researched in 2016 by PhD level analysts travelling worldwide. Interviews, databases, web searches and conference attendance were extensively used. Old information is useless in this now fast moving field.

The report starts with a comprehensive Executive Summary and Conclusions which includes a close look at all the key issues. Ten year forecasts for power electronics are broken down into motor controllers, recuperation, electricity import, electricity export, BMS with boost converters, climate control and then other, with a full explanation of the many things in these categories. The total printed electronics market in billions of dollars and as percentage of the electric vehicle market is projected, backed up by ten year forecasts by number of 46 categories of electric vehicle land, water and air.

The Introduction then looks at many examples of power electronics explained in the context of powertrain options, future successes and expected failures. It covers such things as why universal and merged motor controllers are both elusive but more per vehicle will appear. Network integration, powertrain options, voltage trends and structural electronics potential are detailed. Design of Power Electronics comes next, embracing where, why and what new forms are appearing. Issues concerning power modules and battery management system design are here, for example.

The fourth chapter consists of new materials and components for power electronics because they are so key to the future. That includes SiC and GaN power semiconductors and new harvesting chemistries. Chapter 5 covers power electronics for 48V mild hybrid and beyond, carefully explaining the rapidly increasing complexity of power circuits and peripherals for these and successor powertrains. Detailed technology roadmaps complete this chapter which is followed by supplier comparisons and a key interview, a large number of other interviews being embedded in the earlier text.

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