

Preface of the Operating Agent

System Optimization—The Key to Success

Current trends in energy supply and use are unsustainable, in terms of environment, economy, and society. We have to change the path that we are now on—we have to reduce greenhouse gas emissions (GHG) and we have to improve energy efficiency. Therefore, low-carbon energy technologies/environmentally friendly mobility will play a crucial role and is one of today's major challenges for the global automotive industry on par with the growing trend towards urbanization, the increasing scarcity of natural resources, the steady rise in the world's population, and global climate change. Especially the transport sector—one of today's fastest growing sectors—is a contributor to many environmental problems due to its dependency on fossil fuels.

In the search for a sustainable solution to these challenges, electrical energy is the key to success, particularly when it comes to mobility. Vehicles driven by an electrified powertrain, including pure battery electric vehicles, hybrid electric vehicles, fuel cell electric vehicles, etc. (also known as xEVs) can significantly contribute to the protection of the environment by reducing the consumption of petroleum and other high CO₂-emitting transportation fuels.

However, penetration rates of electric vehicles are still low, mainly because of the high battery cost, range anxiety, and the still low level of existing charging infrastructure. Research and development plays a crucial role in the process of developing alternative power technologies, especially when it comes to the optimization of electrified vehicles.

This publication was prepared under the umbrella of the International Energy Agency's Implementing Agreement for Hybrid and Electric Vehicles (IEA-IA-HEV), which tries to analyze the potentials of these vehicles, by working on different Tasks.

One of them—Task 17—"System Optimization and Vehicle Integration"—analyzed technology options for the optimization of electric and hybrid vehicle components and drive train configurations which will enhance vehicle energy efficiency performance. Furthermore, it was the only Task within the IEA-IA-HEV,

which analyzed the possibilities for the overall vehicle integration of different components, needed for an electric vehicle, like the integration of the drive train into lightweight vehicles.

After 5 years of effective networking among the various industries involved in system optimization, Task 17 successfully demonstrated the benefits, potentials, technical challenges but also chances of the overall vehicle performance.

This report highlights the final Task results, by compiling an up-to-date, neutral, and comprehensive assessment of current trends in technical as well as technological policy aspects for hybrid and electric vehicles.

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