

Preface

The world's population is growing rapidly; it is expected to increase from 7 billion people today to between 8 and 9 billion in 2030. In the same time frame, the global road fleet will grow from 1 billion vehicles today to an expected 1.7 billion. This, together with rising gross national products, will push energy consumption to ever higher levels, causing further increases in atmospheric CO₂ levels.

Moreover, air pollution is becoming a serious issue in megacities. There is a broad consensus that the burning of fossil fuels must be reduced in the future, mainly by increasing energy efficiency but also by gradually increasing the contribution of renewable fuels to the global energy mix.

There are many factors that will affect future developments in transport and energy use, including the availability and cost of fuel; regulatory standards governing fuel economy, exhaust emissions, and the use of renewable fuels; technological advances; globalization and urbanization (especially changes in the way vehicles are used and the organization of transportation hubs); infrastructure; and economic growth, especially in emerging and developing markets.

The automotive industry is undoubtedly a major driving force for much of the technological development that occurs in modern society, and this is likely to remain the case for the foreseeable future.

In the medium term, research and development activities relating to cars, trucks, and buses will be primarily focused on improving engine and vehicle efficiency, while maintaining compliance with increasingly stringent exhaust emissions standards.

Key areas of vehicle technology that will be targeted to improve fuel efficiency between 2015 and 2025 include propulsion systems, overall vehicle design and aerodynamics, materials, electrification, parasitic losses, heat recovery, and integration.

While many of the new technologies that will be needed have already been tested and demonstrated in principle, their details remain to be worked out and they will have to be integrated in a holistic way. This will necessitate the development of new control systems and methods for optimizing overall vehicle efficiency.

This book on Sustainable “Automotive Technologies” describes a cross-section of current international research activities aiming to address the challenges that will be presented by both the market and regulatory authorities in the near future.

The book comprises six main chapters; (i) Electromobility, (ii) Systems solutions for sustainable mobility, (iii) Combustion engines, (iv) Materials and Light Weight Design, (v) Alternative and renewable fuels, and (vi) Sustainability. Papers selected for publication in this book have been presented at the 6th International Conference on Sustainable Automotive Technologies, ICSAT2014, held in Göteborg, Sweden in September 2014.

All of the contributions included in this book have been reviewed independently by international experts with experience in relevant fields and have been edited accordingly prior to publication.

We wish to take this opportunity to thank all of the participating researchers and reviewers for their contributions, without which it would have been impossible to produce this book. We also gratefully acknowledge Springer’s continuing support of this research field, which has enabled us to establish and publish an international book series on Sustainable Automotive Technologies that has attracted worldwide interest.

Finally, special thanks are due to Elenor Norberg for her brilliant work in organizing ICSAT 2014.

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