Special Issue List in Section

Metaheuristics Algorithms for Electric Vehicles Applications
Guest Editors: Dr. Tawfiq M. Aljohani and Prof. Dr. Osama A. Mohammed
Deadline: **15 December 2022**

Current Status on the Thermal Management of Electric Vehicles
Guest Editors: Prof. Dr. Feng Cao, Dr. Xiang Yin and Dr. Yulong Song
Deadline: **15 December 2022**

Autonomous Vehicles Perception and Control
Guest Editor: Prof. Dr. Jaerock Kwon
Deadline: **20 December 2022**

Energy Management Strategies for Battery and Hybrid Electric Vehicles
Guest Editors: Dr. Minghui Hu, Dr. Chunyun Fu and Dr. Changzhao Liu
Deadline: **20 December 2022**

Environmental Life Cycle Assessment of Electric Vehicles
Guest Editor: Prof. Dr. Dorota Burchart
Deadline: **30 December 2022**

Electric and Hydrogen Vehicles in Urban Transport Systems: The Current State, Plans, and Technical Requirements
Guest Editors: Dr. Katarzyna Turoń, Dr. Andrzej Kubik and Prof. Dr. Bogusław Łazarz
Deadline: **31 December 2022**

Energy Management of Hybrid Vehicle Networks
Guest Editors: Dr. Valeh Moghaddam and Dr. Nima Izadyar
Deadline: **31 December 2022**

High Efficiency Electric Freight Vehicle
Guest Editors: Prof. Krzysztof Małecki, Dr. Stanisław Iwan and Dr. Kinga Kijewska
Deadline: **31 December 2022**

Advances in Design, Modeling and Analysis of Electrified and Sustainable Transport Systems II
Guest Editors: Dr. Piotr Gołębiowski, Dr. Jolanta Żak and Dr. Jacek Kukulski
Deadline: 31 December 2022

Electric, Hybrid and Fuel Cell Vehicles for Sustainable Mobility
Guest Editors: Prof. Dr. Raffaello Cozzolino and Prof. Dr. Daniele Chiappini
Deadline: **31 December 2022**

Integration of Renewable Energy and Plug-In Electric Vehicles into Power Networks
Guest Editors: Dr. Reza Razi, Prof. Dr. Ahmad Hably and Dr. Mehrdad Gholami
Deadline: **10 February 2023**

New Topologies of Voltage Source Converters and Current Source Converters for Integration of Fast EV Charging Stations within Smart Grids
Guest Editors: Dr. Marek Adamowicz, Prof. Dr. Marek Jasinski and Prof. Dr. Kouzou Abdellah
Deadline: **1 March 2023**

Vehicle Safety and Automated Driving
Guest Editors: Dr. Xianke Lin and Dr. Chao Shen
Deadline: **31 July 2023**

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Section Information

There are a number of advantages to electric vehicles (EVs) over traditional cars such as low carbon emissions, no gas required, Safe to Drive. /Energies/ Section “Electric Vehicles” aims to encourage scientists to publish their experimental and theoretical results in as much detail as possible related to electric vehicles. The main topics of the section include but are not limited to:

- Ground vehicles
- Airborne EVs
- Seaborne EVs
- Electrically powered spacecraft
- Autonomous and Connected Vehicles
- Battery/Ultracapacitor/Fuel Cell
- Charging technology
- Energy management
- Electric vehicles market and policy
- Electric drive system and component technology

Featured Papers

DOI: 10.3390/en13174541

Integration of Electric Vehicles in the Distribution Network: A Review of PV Based Electric Vehicle Modelling

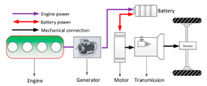
Authors: Asaad Mohammad, Ramon Zamora and Tek Tjing Lie

Abstract: Electric vehicles (EVs) are one of a prominent solution for the sustainability issues needing dire attention like global warming, depleting fossil fuel reserves, and greenhouse gas (GHG) emissions. Conversely, EVs are shown to emit higher emissions (measured from source to tailpipe) for the fossil fuel-based countries, which necessitates renewable energy sources (RES) for maximizing EV benefits. EVs can also act as a storage system, to mitigate the challenges associated with RES and to provide the grid with ancillary services, such as voltage regulation, frequency regulation, spinning reserve, etc. For extracting maximum benefits from EVs and minimizing the associated impact on the distribution network, modelling optimal integration of EVs in the network is required. This paper focuses on reviewing the state-of-the-art literature on the modelling of grid-connected EV-PV (photovoltaics) system. Further, the paper evaluates the uncertainty modelling methods associated with various parameters related to the grid-connected EV-PV system. Finally, the review is concluded with a summary of potential research directions in this area. The paper presents an evaluation of different modelling components of grid-connected EV-PV system to facilitate readers in modelling such system for researching EV-PV integration in the distribution network.

DOI: 10.3390/en13133352

Energy Management Strategies for Hybrid Electric Vehicles: Review, Classification, Comparison, and Outlook

Authors: Asaad Mohammad, Ramon Zamora and Tek Tjing Lie



Abstract: Hybrid Electric Vehicles (HEVs) have been proven to be a promising solution to environmental pollution and fuel savings. The benefit of the solution is generally realized as the amount of fuel consumption saved, which by itself represents a challenge to develop the right energy management strategies (EMSs) for HEVs. Moreover, meeting the design requirements are essential for optimal power distribution at the price of conflicting objectives. To this end, a significant number of EMSs have been proposed in the literature, which require a categorization method to better classify the design and control contributions, with an emphasis on fuel economy, providing power demand, and real-time applicability. The presented review targets two main headlines: (a) offline EMSs wherein global optimization-based EMSs and rule-based EMSs are presented; and (b) online EMSs, under which instantaneous optimization-based EMSs, predictive EMSs, and learning-based EMSs are put forward. Numerous methods are introduced, given the main focus on the presented scheme, and the basic principle of each approach is elaborated and compared along with its advantages and disadvantages in all aspects. In this sequel, a comprehensive literature review is provided. Finally, research gaps requiring more attention are identified and future important trends are discussed from different perspectives. The main contributions of this work are twofold. Firstly, state-of-the-art methods are introduced under a unified framework for the first time, with an extensive overview of existing EMSs for HEVs. Secondly, this paper aims to guide researchers and scholars to better choose the right EMS method to fill in the gaps for the development of future-generation HEVs.

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DOI: 10.3390/en14082217

End of Electric Vehicle Batteries: Reuse vs. Recycle

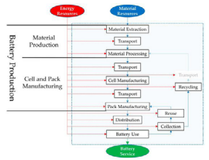
Authors: Yash Kotak, Carlos Marchante Fernández, Lluc Canals Casals, et al.

Abstract: It is a fact that electric vehicles (EVs) are beneficial for climate protection. However, the current challenge is to decide on whether to reuse an EV battery or to recycle it after its first use. This paper theoretically investigates these areas i.e., recycle and reuse. It was found that there are several commercially used recycling processes and also some are under research to regain maximum possible materials and quantity. The concept of reusing (second life) of the battery is promising because, at the end of the first life, batteries from EVs can be used in several applications such as storing energy generated from renewable sources to support the government grid. However, the cost and life-cycle analysis (LCA) demonstrated that there are several aspects involved in battery reuse applications. Henceforth, one LCA generalised method cannot provide an optimal approach for all cases. It is important to have a detailed study on each of the battery reusing applications. Until then, it is safe to say that reusing the battery is a good option as it would give some time to recycling companies to develop cost and energy-efficient methods.

DOI: 10.3390/en13236345

Environmental Life Cycle Impacts of Automotive Batteries Based on a Literature Review

Authors: Christian Aichberger and Gerfried Jungmeier



Abstract: We compiled 50 publications from the years 2005–2020 about life cycle assessment (LCA) of Li-ion batteries to assess the environmental effects of production, use, and end of life for application in electric vehicles. Investigated LCAs showed for the production of a battery pack per kWh battery capacity a median of 280 kWh/kWh_bc (25%-quantile–75%-quantile: 200–500 kWh/kWh_bc) for the primary energy consumption and a median of 120 kg CO_2-eq/kWh_bc (25%-quantile–75%-quantile: 70–175 kg CO_2-eq/kWh_bc) for greenhouse gas emissions. We expect results for current batteries to be in the lower range. Over the lifetime of an electric vehicle, these emissions relate to 20 g CO_2-eq/km (25%-quantile–75%-quantile: 10–50 g CO_2-eq/km). Considering recycling processes, greenhouse gas savings outweigh the negative environmental impacts of recycling and can reduce the life cycle greenhouse gas emissions by a median value of 20 kg CO_2-eq/kWh_bc (25%-quantile–75%-quantile: 5–29 kg CO_2-eq/kWh_bc). Overall, many LCA results overestimated the environmental impact of cell manufacturing, due to the assessments of relatively small or underutilized production facilities. Material emissions, like from mining and especially processing from metals and the cathode paste, could have been underestimated, due to process-based assumptions and non-regionalized primary data. Second-life applications were often not considered.