



Presentation of Research Results

Optimized and Innovative Techniques for Energy Efficient Operation of Electric Car Chargers (OpTec E-Charge)

ΚΟΥΠΟΝΙ ΚΑΙΝΟΤΟΜΙΑΣ (INNOVOUCHERS / 1022 / 0168)

«Με τη χρηματοδότηση της Ευρωπαϊκής Ένωσης – NextGenerationEU», ιδίως κατά την προώθηση των δράσεων και των αποτελεσμάτων τους, παρέχοντας συνεκτική, αποτελεσματική και αναλογική στοχευμένη πληροφόρηση σε πολλαπλά ακροατήρια, συμπεριλαμβανομένων των μέσων ενημέρωσης και του κοινού.»

Date: June: 29th, 2023

Time: 9:00AM – 12:00PM

Location: Blue Sun Automation LTD

Archbishop Makarios III 87, Latsia 2223

Presenter: Dr Stelios Ioannou

Abstract: The aim of this work, as recently suggested by new research studies is to investigate the possibility of multi-cell structures or Power Supply Unit (PSU) multiplexing techniques can improve energy efficiency and minimize energy losses in power electronic converters.

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Κύπρος — το αύριο
ΣΧΕΔΙΟ ΑΝΑΚΑΜΨΗΣ ΚΑΙ ΑΝΕΞΗΓΗΤΟΤΗΤΑΣ



Με τη χρηματοδότηση
 της Ευρωπαϊκής Ένωσης
 NextGenerationEU



Outline



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FOUNDATION



- Introduction
 - Commercially Available Electric Vehicles
 - Battery Technologies
 - Electric Vehicle Charging
- Modelling and Simulation of Charger Losses
 - Software: PSIM Thermal Module
- Testing of Commercial EV Charger Efficiency
- Introduction to Multi-module and Multiplexing Approach
- Conclusions and Future Work



Project Aims



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- The aim of this work, as recently suggested by new research studies, is to investigate the possibility of multi-cell structures or Power Supply Unit (PSU) multiplexing techniques can improve energy efficiency and minimize energy losses in power electronic converters.



Project Objectives



- Literature review of commercially available electric vehicles and their characteristics.
- Investigation into the types of batteries.
- Investigation into the types of charging options.
- Investigation into Battery Management Systems (BMS)
- Modelling and Simulations (PSIM software) of the conversion processes
- Analysis of simulation results
- Testing the efficiency of the charging process of a commercially available charger and electric vehicle
- Modelling and Simulations (PSIM software) of the conversion processes using multi-module approach
- Analysis of simulation results
- Conclusions and suggested future improvements

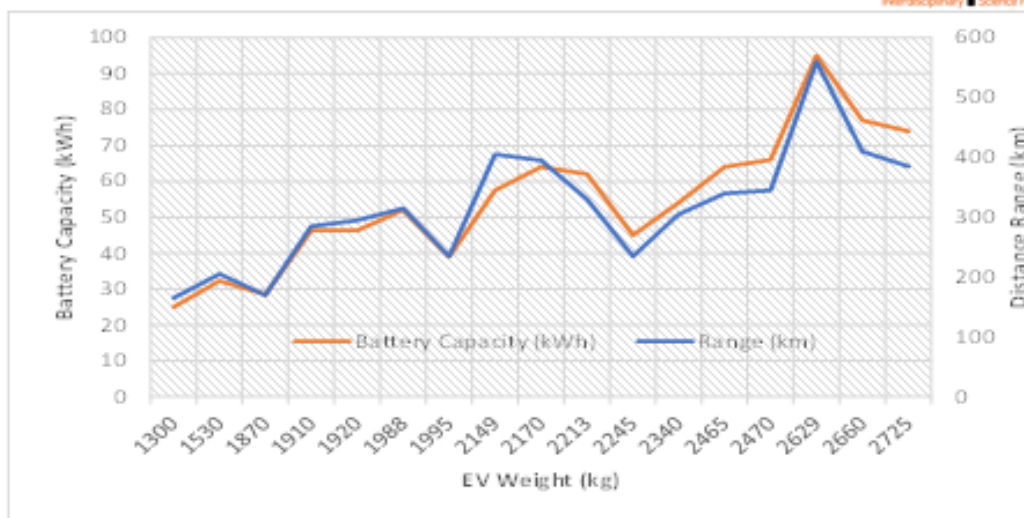
5 - OpTec E-Charge - 29/6/23



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Relationship between EV Weight and Battery Capacity and Distance



As the EV becomes bigger, then theoretically the payload increases which allows for bigger battery which leads to further driving distances.

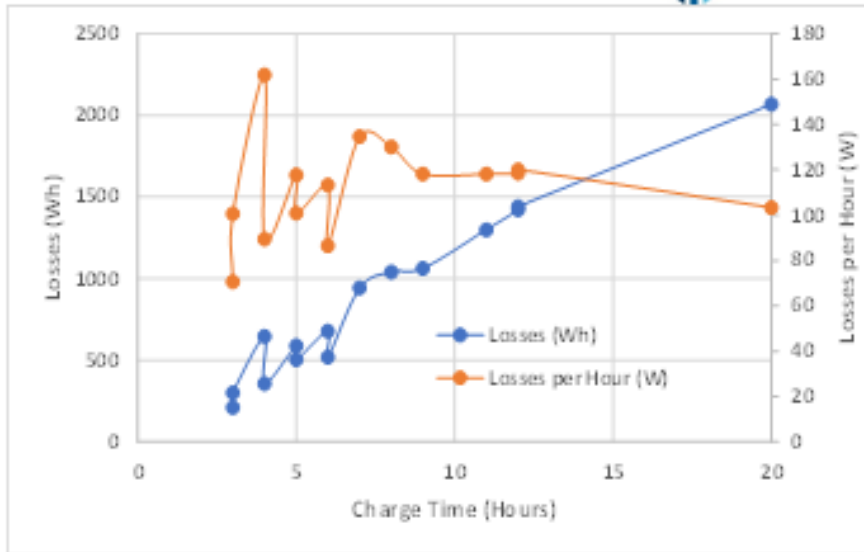
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Analysis of Results and Discussion



The Figure shows that the charging losses are directly proportional to the charge time. However, irrelevant to the charge time the losses per hour are averaging approximately at 113W.





Many Thanks and Gratitude to
Blue Sun Automation LTD
for Trusting us with this Project



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