

LEEFF

LOW EMISSION ELECTRIC FREIGHT FLEETS

Road freight transport is responsible for a large proportion of the world's greenhouse gas emissions. If electrically powered vehicles were to be used in the transport industry, the environmental impact of the transport sector could be reduced significantly. The LEEFF flagship project is seeking to develop new electric mobility solutions for freight transport along with appropriate planning and communication tools for electric fleets.

CONTACT

Bartosz Piekarz
i-LOG Integrated Logistics GmbH
bp@i-log.at

PROJECT PARTNERS

Kreisel Electric GmbH /
Oberaigner Powertrain GmbH /
SMATRICS GmbH & Co KG /
SPAR Österreichische
Warenhandels-AG / Schachinger
Logistik Holding GmbH /
Quehenberger Logistics GmbH
/ Greenway E-Mobility GmbH
/ Energie Ingenieure GmbH /
Consistix GmbH / University
of Natural Resources and
Life Sciences, Council für
nachhaltige Logistik CNL /
Satiama GmbH / University
of Vienna, Institut für
Betriebswirtschaftslehre /
University of Applied Sciences
of Upper Austria – Hagenberg
campus

The project, which was launched in 2016, covers the full range of vehicle technology, the charging infrastructure and also new business models for using electrically powered vehicles in freight fleets. Under the leadership of i-LOG Integrated Logistics GmbH, the project team is not only looking at technical aspects but also at organisational and socio-economic issues.

As part of the project, an electric van with an adapted battery system is being developed along with an intelligent charging station that is suitable for commercial use at logistics centres. A further aim is to come up with an innovative business model for fleet operators along with tailored planning tools (in the form of a prototype) and to test these out during a demonstration phase.

Vehicle technology

By developing an electric transporter van that is ready for series production, the hope is that new discoveries will be generated in the area of electrically powered light commercial vehicles (LCVs). The advanced e-van is to feature a 120 kW rear wheel electric drive and a range of 200 to 300 km. It will be equipped with an on-board charger that supports rapid charging.

A single-stage gearbox for electric vehicles is being specially developed and this will be suitable for speeds of up to 12,000 rpm. It will also have a parking lock and a connection for a tachograph.

Most of the costs associated with electric vehicles are attributable to the energy storage system. The key technologies here are the battery and charging equipment. That is why research work is so focused on finding the right layout for a powerful and cost-effective battery/charging technology.



Photo: i-Log GmbH

"As far as Tesla boss Elon Musk is concerned, there can be no doubt that the future of mobility is electric. It is high time that this started applying to urban delivery logistics as well. Electric stacker trucks are already used as standard in intralogistics. In view of the constantly increasing volume of e-commerce parcels, delivery vehicles such as those used for courier, express and parcel services should – ideally – also play their part in minimising noise and emissions in the main conurbations. Particularly in the case of major cities that are growing strongly, such as Vienna, this is becoming an important part of the smart city concept. Together with our top project partners, we want to make a major contribution in this regard."

Bartosz Piekarz
Project Leader, LEEFF
i-LOG Integrated Logistics GmbH

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HIGHLIGHTS ▼

- Enhancement of electric vehicles for use in freight fleets
- Solutions for creating an intelligent charging infrastructure
- New fleet concepts
- Optimisation of mixed fleets
- Innovative operating and business models
- New logistics, scheduling and routing solutions
- Integration of user needs

Lithium-ion battery packs are being optimised so that a higher energy density (4.1 kg/kWh and 1.95 dm³/kWh) can be achieved for various applications with a low-weight solution that is more compact. The development work also encompasses the thermal management of the batteries plus optional use of the batteries for active vehicle heating and cooling. Several charging strategies (from high-performance charging through to battery changes) are being investigated as part of the project.

Optimisation of charging management and planning tools

As far as the charging infrastructure is concerned, ICT-based solutions are being devised to enable charging control and energy management within a commercial fleet setting. The process

of integrating these technically into existing fleet management systems is being analysed and tested. The project also involves developing prototypes for a new fleet management tool and a mobile application that will actively support drivers. Intelligent routing and planning tools are the key to implementing electric mobility successfully within a route planning context.

The new technologies are being combined with suitable business models with a view to creating something that is both cost-effective and highly convenient for users. The plan is for the developments to be demonstrated from 2017 onwards. This will rely on a relatively large demonstration fleet at the logistics facilities of the Schachinger Logistik Group in Hörsching as well as at SPAR and Quehenberger Logistics.



Photo: SMATRICES



Photo: Satiamo



Photo: Greenway



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