Operational Insights from Logistics Actors: Running 70 Electric Heavy-Duty Trucks in Sweden

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Executive Summary
Opportunities and challenges in regional electrified logistics have been demonstrated by an innovative project; REEL, which combines both confidential and open research and innovation. The system demonstration includes 70 battery electric heavy-duty trucks, operating in various types of commercial goods flows. A total of 45 Swedish stakeholders, including 32 logistics operators, are part of the project. At the workshop, findings from an in-depth interview study conducted with the logistics operators will be presented. The study explores key areas such as operational experiences with electric trucks and charging infrastructure, policy concerns, business model implications, and the potential for scaling up the system.

1 Background and Methodology

The need of transition to electrified logistics systems, as mandated by initiatives like those of the European Union, has led to the establishment of a Swedish research and innovation project called REEL. This project is aimed at supporting the implementation of electrified logistics based on real-world experiences. A system demonstrator has been developed, involving over 70 electric heavy-duty trucks, including 18 prototype vehicles. These trucks operate across various goods flows, such as food, general cargo, and bulk, enabling the evaluation of both the current benefits and challenges while laying the groundwork for future developments.

The project structure, as illustrated in Figure 1, combines both separate ("vertical") activities that focus on demonstrating and implementing different logistics systems to gather experiences and data, with collaborative ("horizontal") activities. These joint efforts, carried out by business actors, societal stakeholders, and academic researchers address broader issues that must be resolved before a large-scale transition can take place. A total of 45 Swedish stakeholders, including transport buyers, freight forwarders, haulers, terminal and grid operators, OEMs, national authorities, and academic partners, are participating in the project.

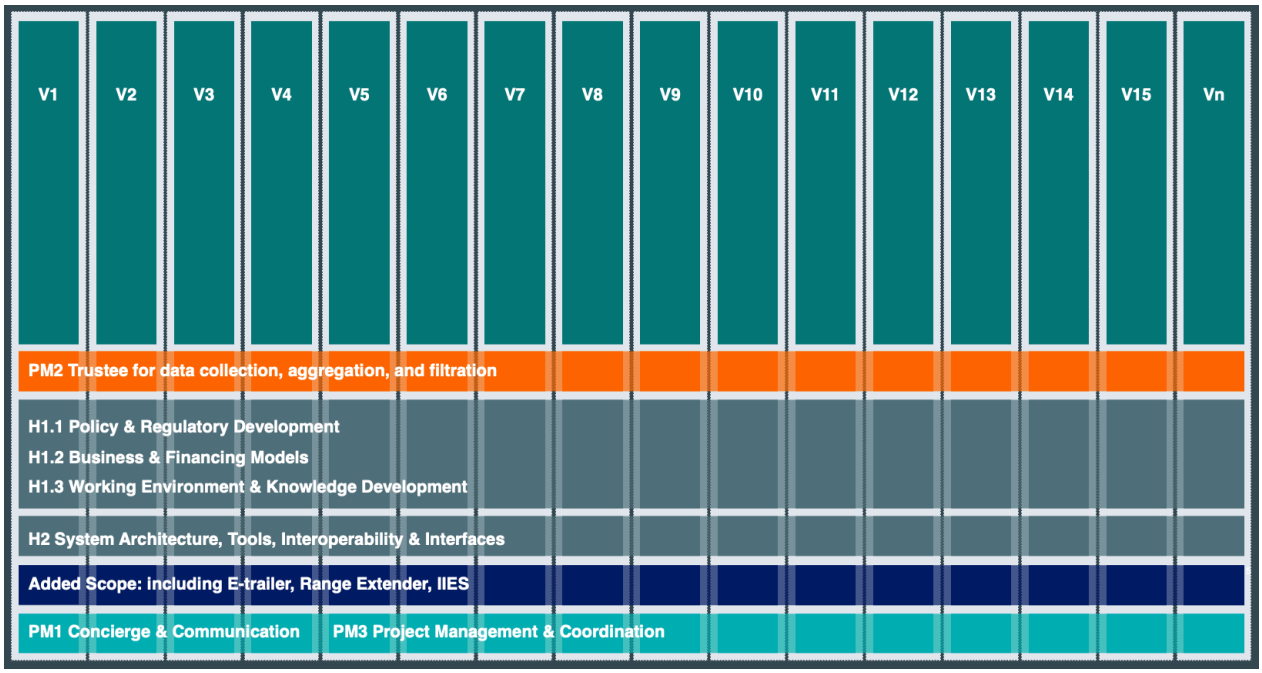

Figure 1 REEL project structure

The trustee unit in the REEL project serves as a central entity responsible for managing the flow of information and insights between vertical and horizontal activities, while upholding business confidentiality. This unit is responsible for collecting data from project participants throughout the project, which runs from November 2020 to November 2025.

In Spring 2022, the first round of in-depth interviews was conducted with 32 logistics actors involved in electric transport flows. These interviews were structured around 175 questions, covering various topics such as organizational structure, logistics and operational setups, hardware and software specifications, the need for policy development, business model implications, working environment, system architecture, interfaces, and scale-up potential. The questions were designed after initial discussions with logistics stakeholders and developed in collaboration with academic partners.

In 2024, a second round of in-depth interviews was conducted, with a format consisting of 170 questions. This round focused on collecting experiences from the two- to three-year operation of electric transport flows, including data on energy consumption, routes, charging strategies, and logistics set-up. Additionally, it explored participants' views on e.g., incentive schemes, policies, business models, financing implications, stakeholder relationships, tools for planning and management, and system scale-up potential and challenges.

2 Results from interviews

The two rounds of interviews furnish a distinctive opportunity to observe alterations in behaviour and attitudes amongst the same interviewees over the course of time. In the presentation at the workshop, the authors intend to present findings from both interview studies, with particular emphasis on the operational experiences, business and Total Cost of Ownership (TCO) implications, stakeholders' views on necessary policy and regulatory developments to facilitate and expedite the transition, and other perspectives regarding electrified logistics that have emerged during the project's duration.

2.1 Operational Experiences of Trucks and Charging Infrastructure

The trucks in REEL operate both in urban or regional transport flows with a daily mileage varying from 100 to 1,000 kilometers for the various trucks [1,2]. The transport flows have mainly been dependent on logistics operators own charging infrastructure located at terminals and depots [3]. Areas that will be further detailed in the full paper includes routes, charging strategies, logistic implications, operational reliability, barriers in

the start-up and operational phase.

2.2 Business Model Implications

Electrifying logistics flows impacts the balance between capital and operational expenditures compared to diesel-powered logistics flows [1]. The findings will provide a comprehensive analysis of the total cost of ownership (TCO) for both electric and diesel duty cycles. The presentation will also address preferred financing models for trucks and charging infrastructure, covering expectations regarding residual value, depreciation periods, and uncertainties in cost development.

2.3 Policy Concerns

Logistics actors emphasized that the most necessary policy incentives are public co-funding of electric trucks and non-public charging infrastructure [1]. The presentation will detail which available policy incentives, primarily at the national level in Sweden, have been utilized by actors, both in relation to the project cases and other electrified logistics initiatives that may have emerged. This includes the success rates of funding applications. Further, experiences of applying for the various incentives and potential challenges in the application process, input on desired changes of the current incentives will be covered. Insights into views on the overall level of government support for the transition to electrified logistics, along with policy measures—such as low-emission zones, differentiated road tolls, weight restrictions, and safety guidelines—that could accelerate this transition, will also be presented.

2.4 Scale-Up Potential

A summary of routes and logistics flows that will be prioritized in the further electrification of REEL partners, along with the main reasons for those priorities, will be presented. The presentation will also include a description of the potential analyses and simulations that may have been made on the fleet-wide level to evaluate the technical and logistical suitability to electrify a larger share of heavy-duty trucks among project partners. Further, the main challenges in increasing the electrified share of trucks in fleets, perceived by logistics companies will be summarized. Potential plans in terms of number of electric trucks in the logistics actors' fleets by 2025 and 2030 along with plans for building future charging infrastructure are included.

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References

[1] *CLOSER REEL Report based on interviews with logistic actors,* https://closer.lindholmen.se/sites/default/files/2022-11/reel-report_0.pdf, accessed on 241017

[2] *CLOSER REEL Case Overview Report,* https://closer.lindholmen.se/sites/default/files/2024-01/reel-report-202312.pdf, accessed on 241017

[3] *CLOSER, REEL Charging infrastructure for trucks,* https://closer.lindholmen.se/sites/default/files/2024-02/reel-charging-infra-for-trucks-2024.02.pdf, accessed on 241017

Presenter Biography

Andreas Josefsson joined the Swedish innovation platform for sustainable logistics; CLOSER, in 2018 holding the role as responsible for developing and driving projects to accelerate the transition to energy-efficient and fossil-free freight transport in collaboration with industrial actors, academic institutions, and societal organizations, e.g. the REEL project targeting the electrification of regional logistics systems through demonstrating 70 electric HDVs in various types of goods flows together with 45 stakeholders. Before joining CLOSER, Andreas worked at Volvo Cars and Accenture Strategy where he ran multiple projects related to logistics and supply chain development, in both Europe and China. He holds a M.Sc. in Supply Chain Management from Chalmers University of Technology and CSR & Sustainable Management from University of Buenos Aires.

Nikita Zaiko joined Lindholmen Science Park (LSP), a non-economic organization hosting several R&I-programs e.g., mobility, in 2020 in the role of project manager, coordinating and participating in several complex innovation projects involving multiple stakeholders from the industry, academia, and public sector, with electrification of heavy-duty vehicles being the common theme. He holds a M.Sc. in Logistics and Transport Management from School of Business, Economics and Law at Gothenburg University.