

Analysis of integration of electrical and diesel trucks in forestry transportation

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Abstract

Fossil free forestry transports are important to reach climate goals. In Sweden, road transports account for around 50% of the industry's CO₂ emissions and almost 20% of the road freight volumes. While electrification is a cost-effective way for carbon abatement, the requirement for flexible routing makes electrification of forestry transports challenging.

We have developed an analysis tool that computes energy consumptions of both diesel and electrical trucks given road profiles. The tool is then used in detailed route optimization for a mixed fleet of trucks in a forestry transportation application. Case studies with fleets of 50-100 trucks are used to answer the questions: Which flows are cost-effective to electrify? What share of the fleet can/should be electric? Moreover, a sensitivity analysis is performed, to explore how parameters such as charging capacity, battery size, and charging strategy.

Preliminary results indicate that electrified timber trucks can be employed at cost parity with diesel trucks in several cases, but that different routing patterns are needed.

Keywords: forestry transportation; electrification; routing; timber truck; optimization