Light Electric Freight Vehicles for Last-Mile Delivery

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Sponsor: PostNL – Dutch Postal Operator

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BACK TO KIOSK MENU

Motivation / Background

- Declining mail market
- Liberalization & E-substitution
- Universal Service Obligation

Synergy opportunities

Light Electric Freight Vehicles (LEFV)

- Growing parcel market
- Capacity expansion
- Competition intensifies

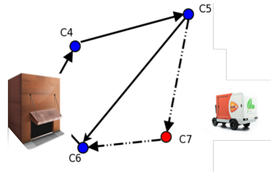
Key Question / Hypothesis

- Will the introduction of LEFV lead to reduced distribution costs in the mail and parcel delivery network?

Relevant Literature

- Winkenbach, M., Kleindorfer, P. R. & Spinler, S., 2015. *Enabling Urban Logistics Services at La Poste through Multi-Echelon Location-Routing*. Transportation Science.
- Nagy, G., & Salhi, S. *Location-routing: Issues, models and methods*. European Journal of Operational Research, 177(2), 649-672, 2007.

Facility location problem



Capacitated Vehicle Routing Problem (VRP)

Methodology

Phase 1 – Literature review and present industry case

Phase 2 – Data preparation & analysis

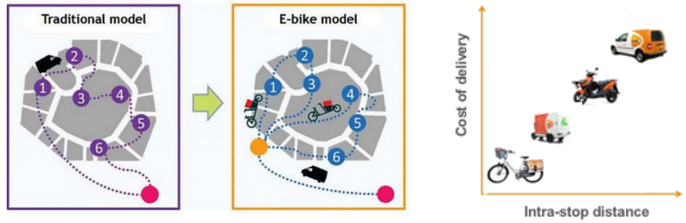
Phase 3 – Development of the Location Routing Model (MILP)

Phase 4 – Run scenario analysis on parcel types.

Phase 5 – Determine the definitive impact of LEFV.

Initial Results

- LEFV require hubs in close proximity to the delivery area, since LEFV are slower on the linehaul than traditional vans.
- High drop density areas are more suited for LEFV.



- The benefit of integrating the mail and parcel network is depending on the characteristics of the geographical area.

Expected Contribution

Quantified benefits of LEFV in last-mile delivery

Geographical characteristics for synergy

Improve the continuous approximation method

Managerial Implications

Real-world applicability at PostNL

Ronald Veldman