



VRIJE
UNIVERSITEIT
BRUSSEL

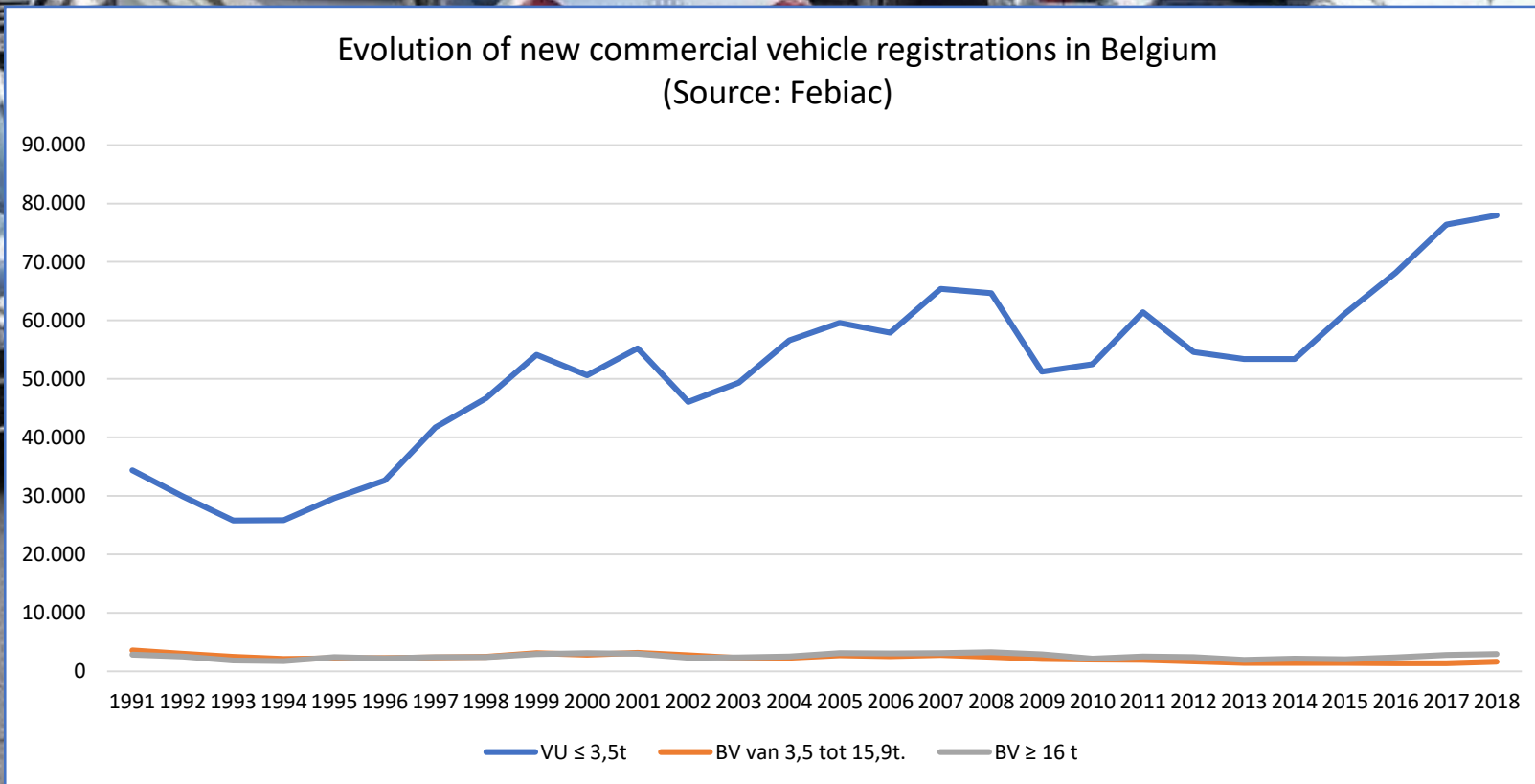


LA LIVRAISON DE MARCHANDISES À VÉLO

UNE COMPARAISON DES IMPACTS ÉCOLOGIQUES DU LAST MILE À VÉLO ET EN CAMIONNETTE

Prof. Dr. Philippe Lebeau (philippe.lebeau@vub.be)

Congestion

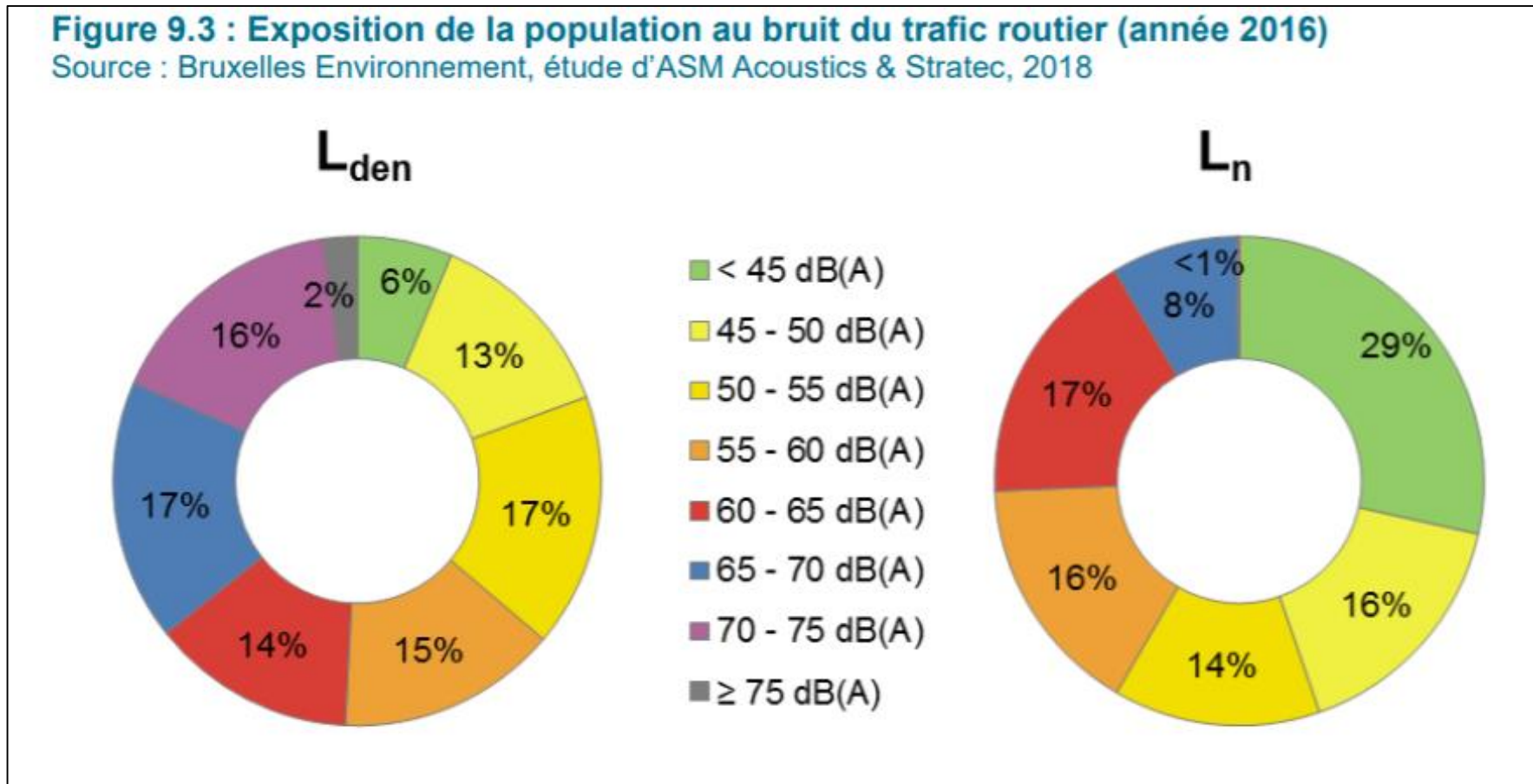


Air quality and climate change

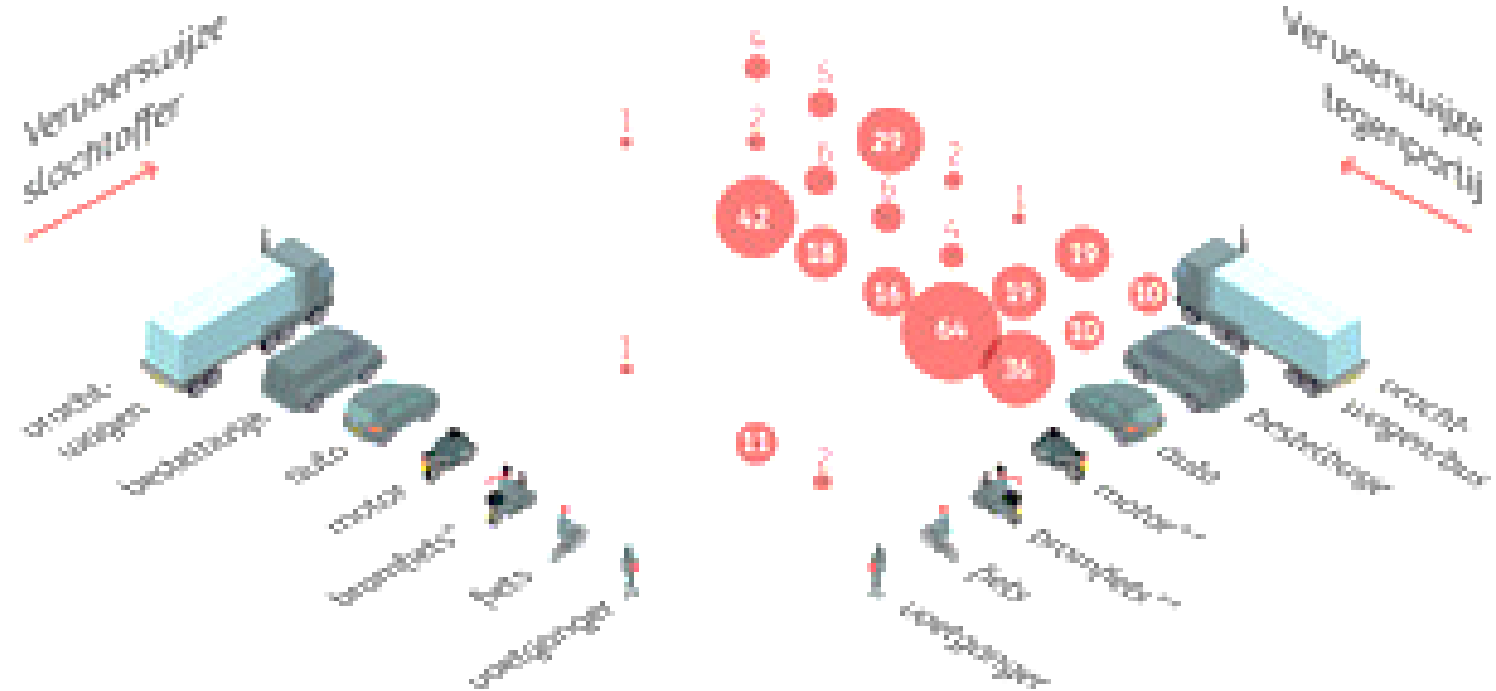
Vans & trucks
in Brussels
are responsible of

25% of CO₂ emissions
30% of NO_x emissions
30% of PM emissions

Exposition au bruit du trafic routier



Accidents

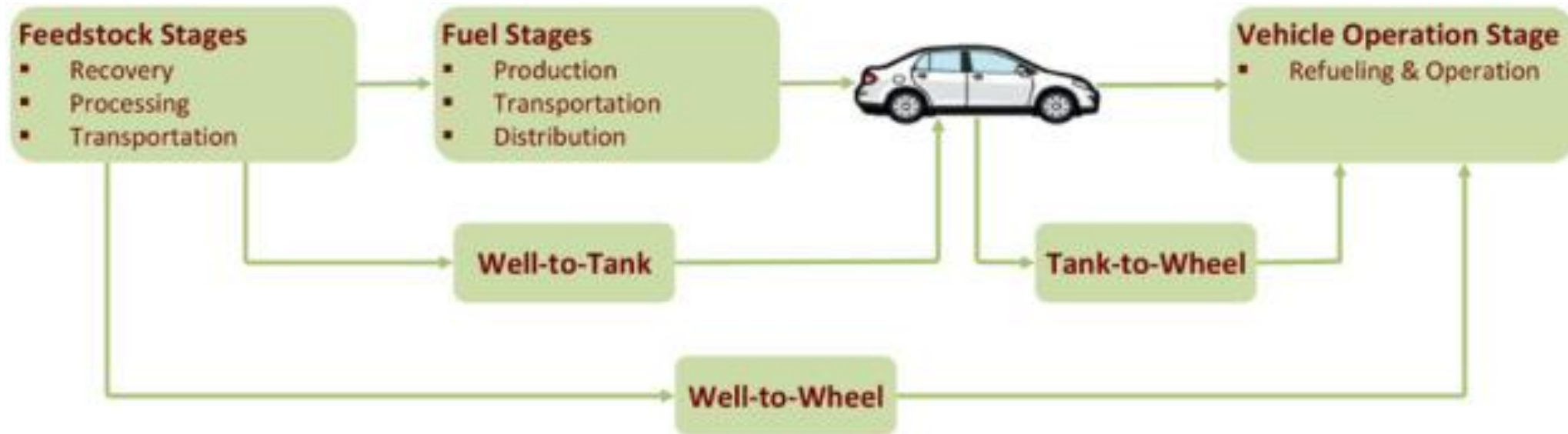


* incl. snorfijfers

** gegevens motor/bromfijets als tegenpartij niet beschikbaar

2019-2020

Well-To-Tank





Research question

To what extent may electric cargo bicycles improve the environmental performance of city logistics?

Methodology

Four case studies



Parcel carrier



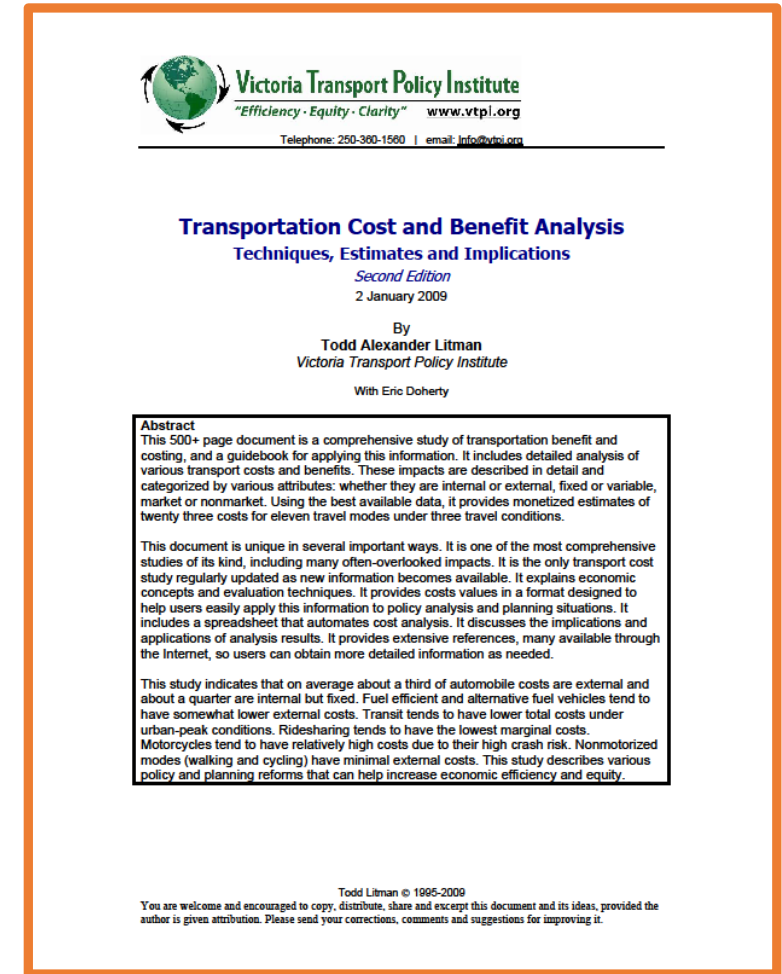
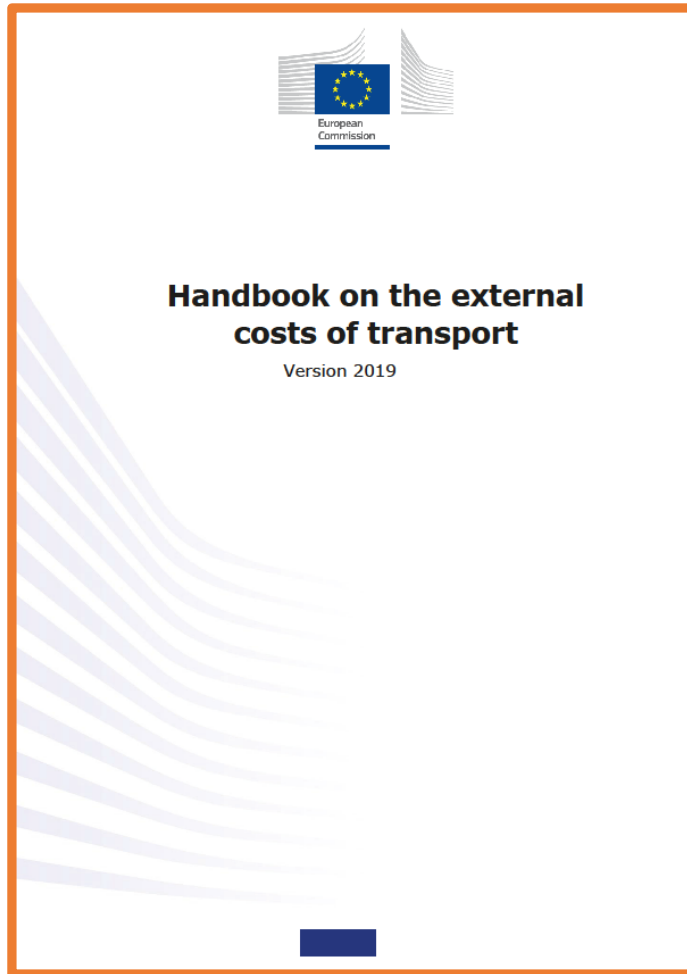
Pharma

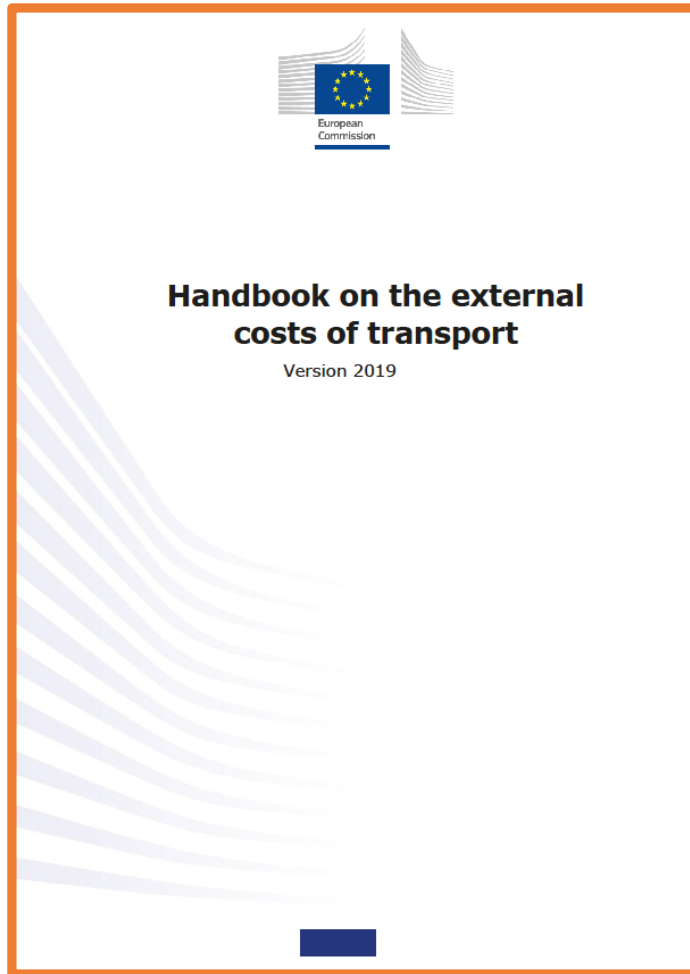


Retail



Home-care services





1) ACCIDENT COSTS

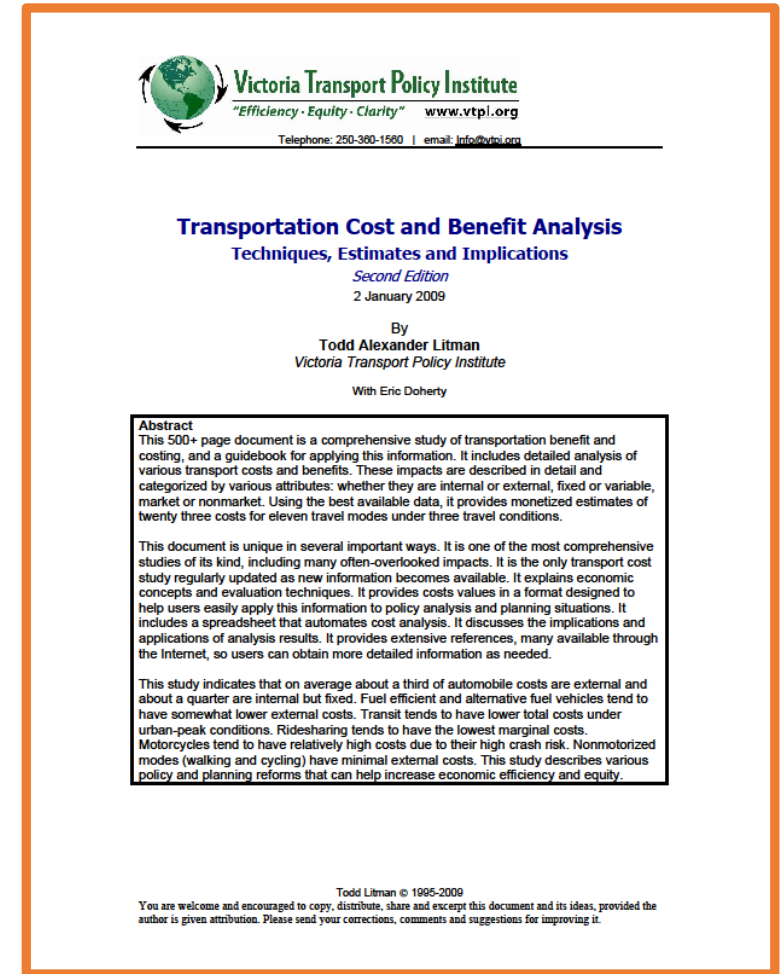
2) AIR POLLUTION COSTS

3) CLIMATE CHANGE COSTS

4) NOISE POLLUTION

5) CONGESTION

6) WELL-TO-TANK EMISSIONS

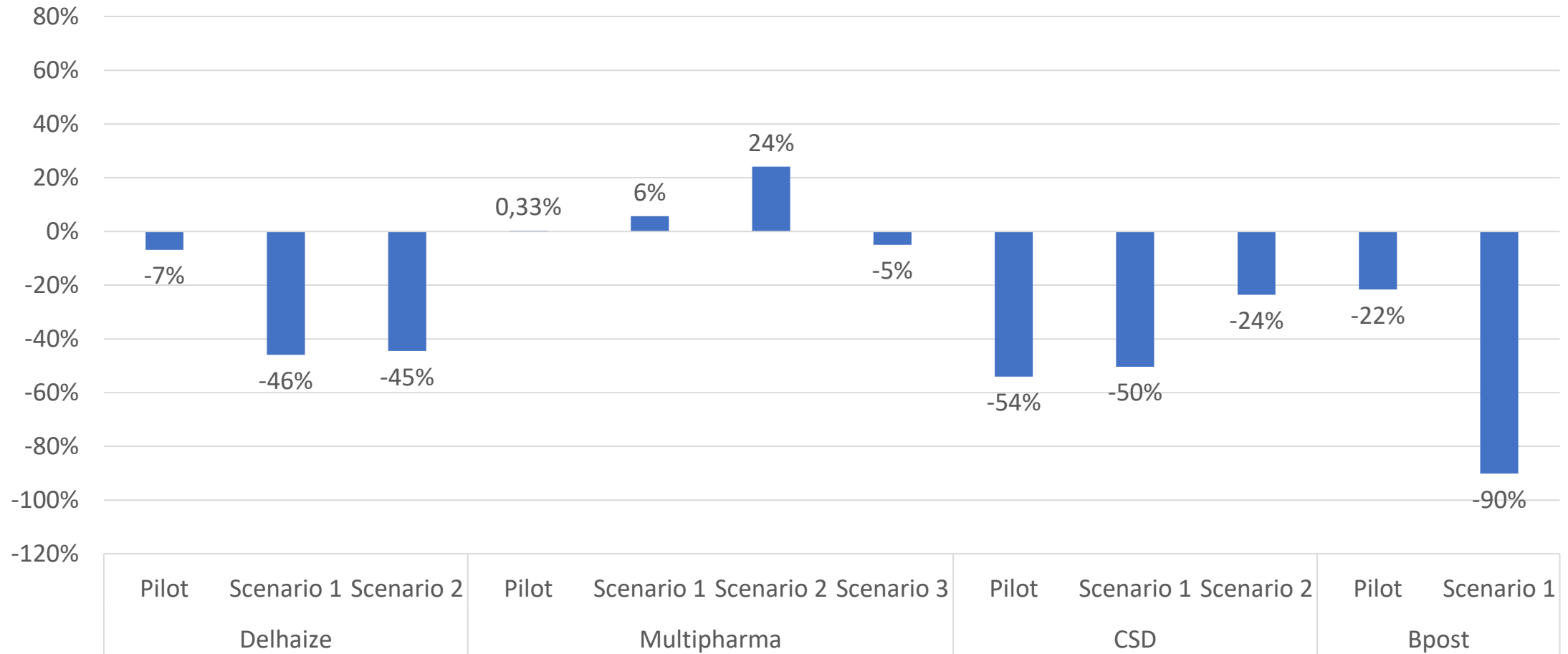


External costs per vehicle (Eurocents/vkm)

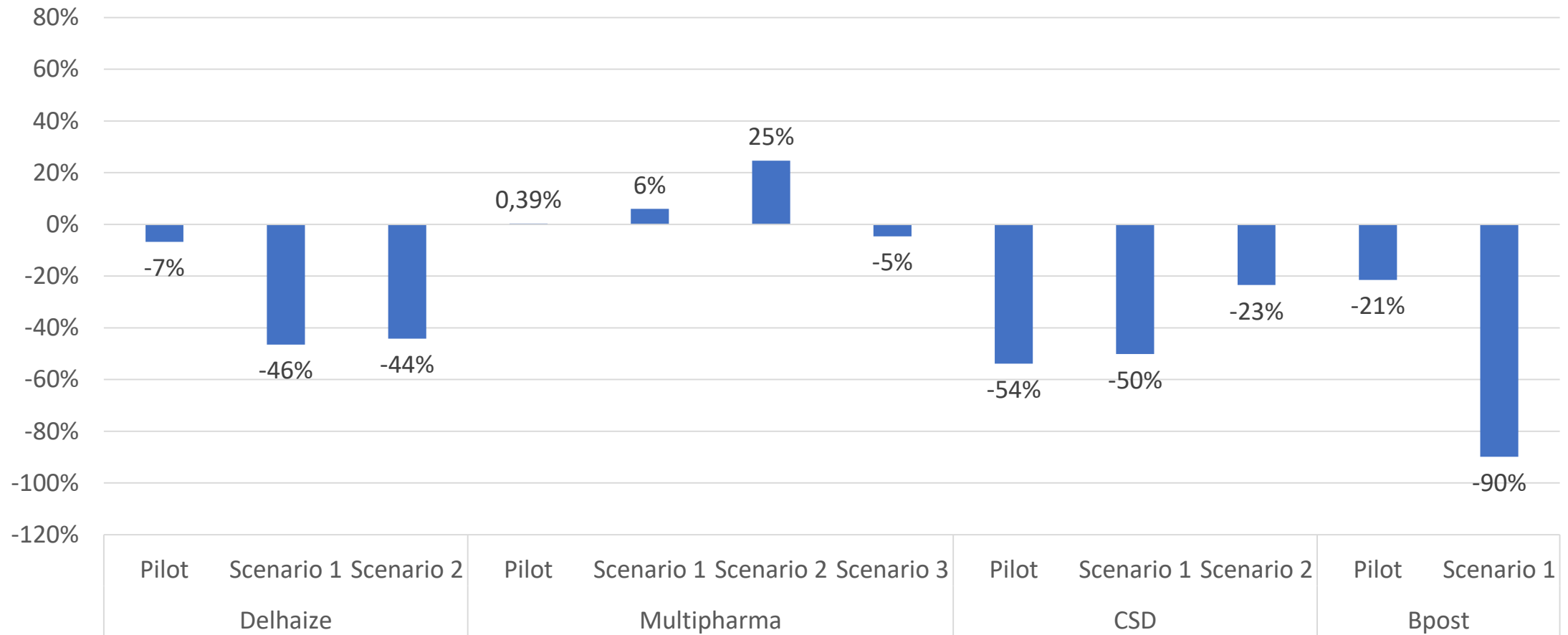
| Type of vehicle | Climate change costs | Air pollution costs | Noise pollution costs | WTT costs | Accident costs | Congestion costs |
|-------------------|----------------------|---------------------|-----------------------|-----------|----------------|------------------|
| LCV diesel EUR 5 | 2.40 | 2.65 | 0.09 | 0.62 | 1.76 | 100.88 |
| HGV 7.5-12t EUR 6 | 5.43 | 1.48 | 0.5 | 1.26 | 1.82 | 134.5 |
| Cargo Bike | 0.00 | 0.00 | 0.00 | 0.16 | 0.42 | 1.39 18.06 |

Results

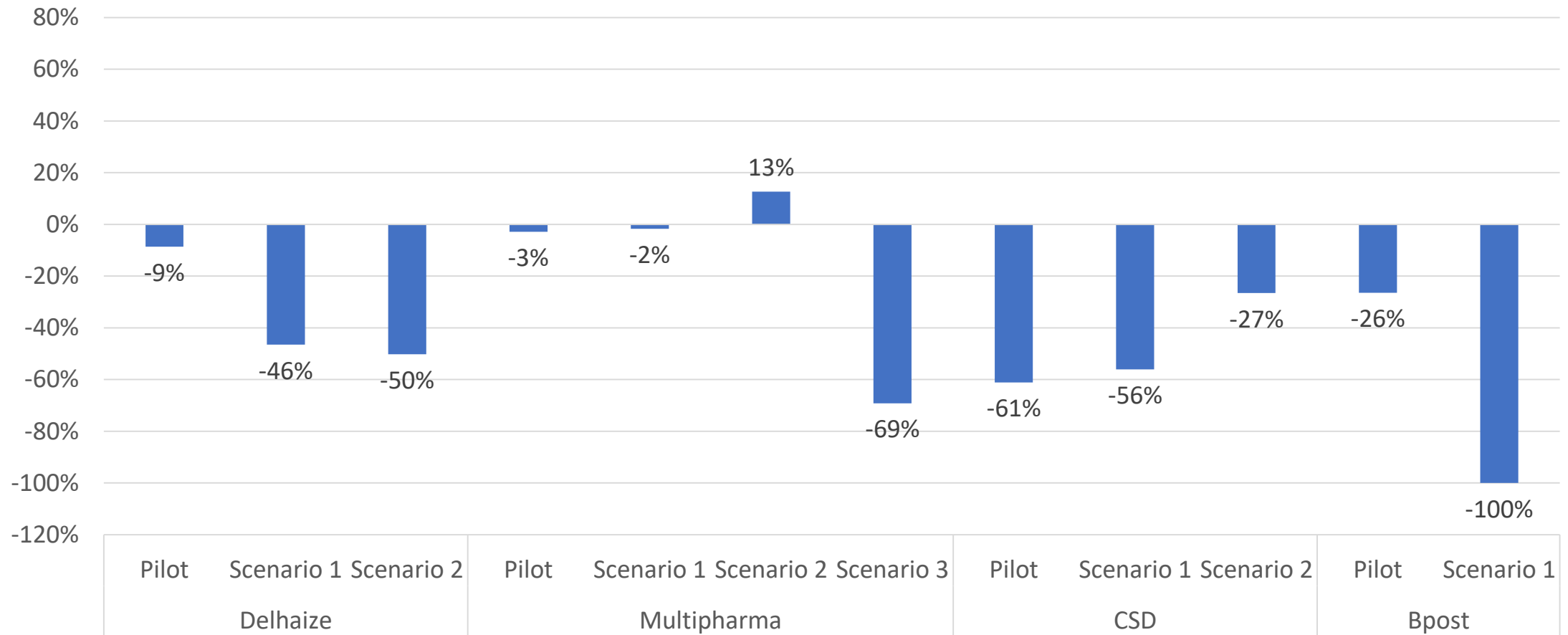
Total costs/savings



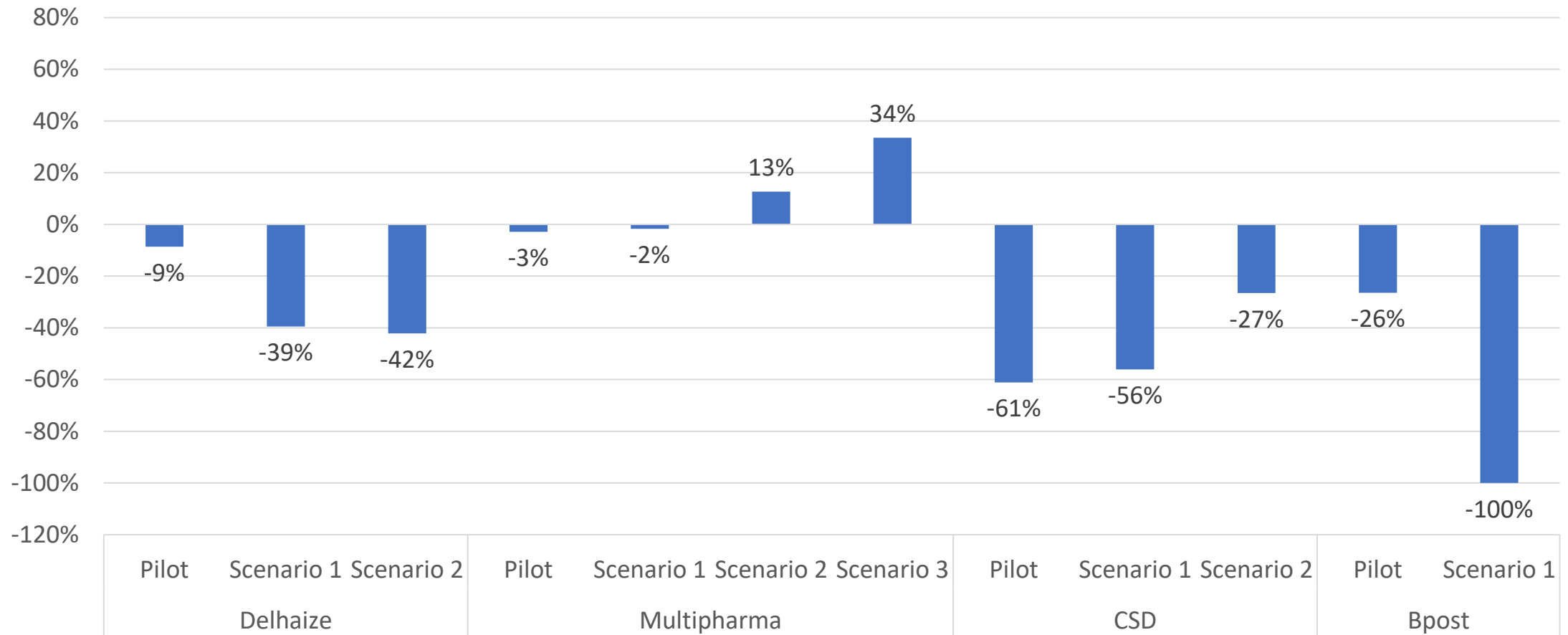
Costs/savings of congestion



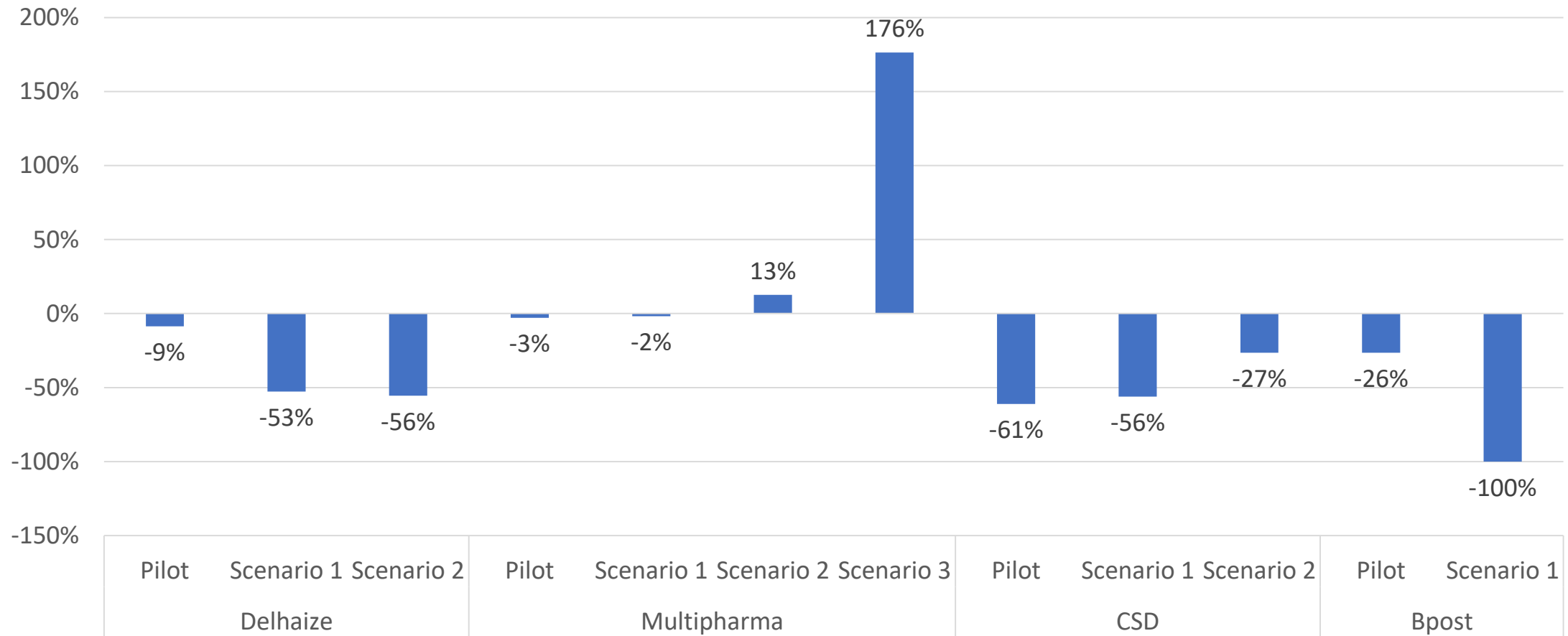
Costs/savings of air pollution



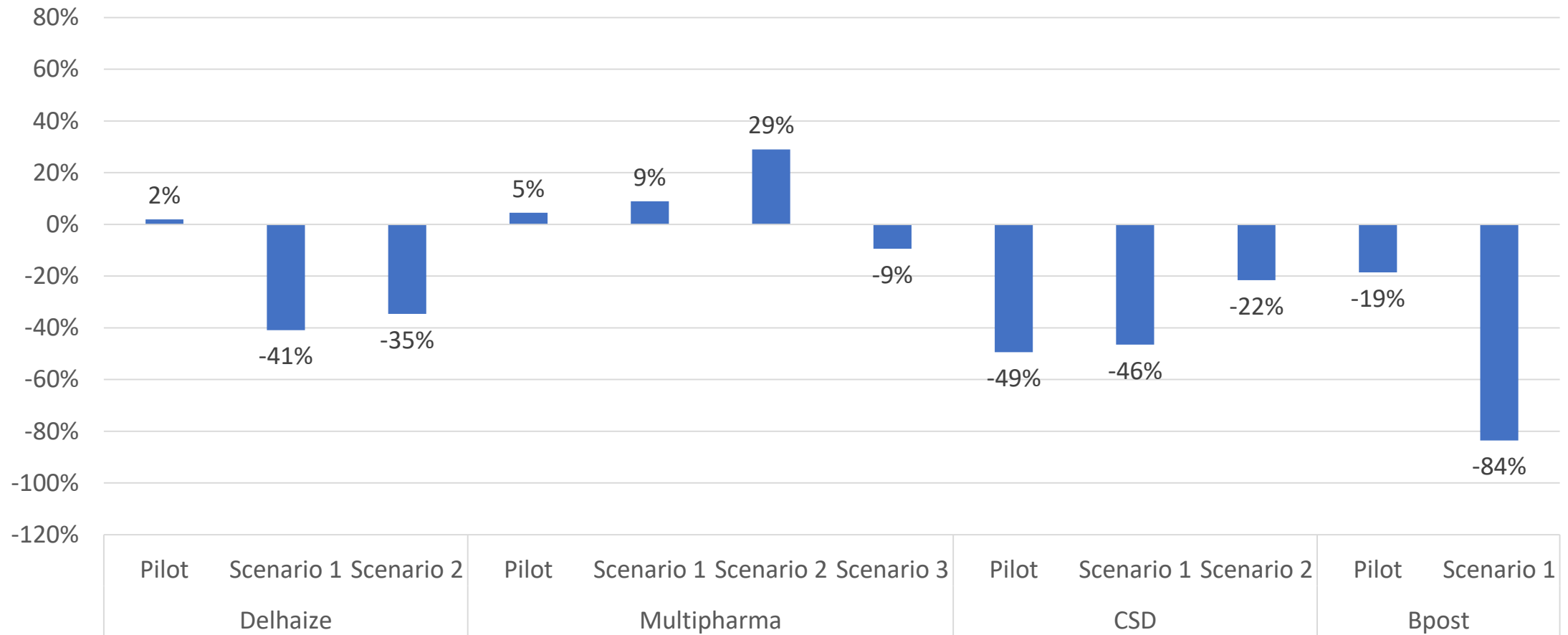
Cost/savings of climate change



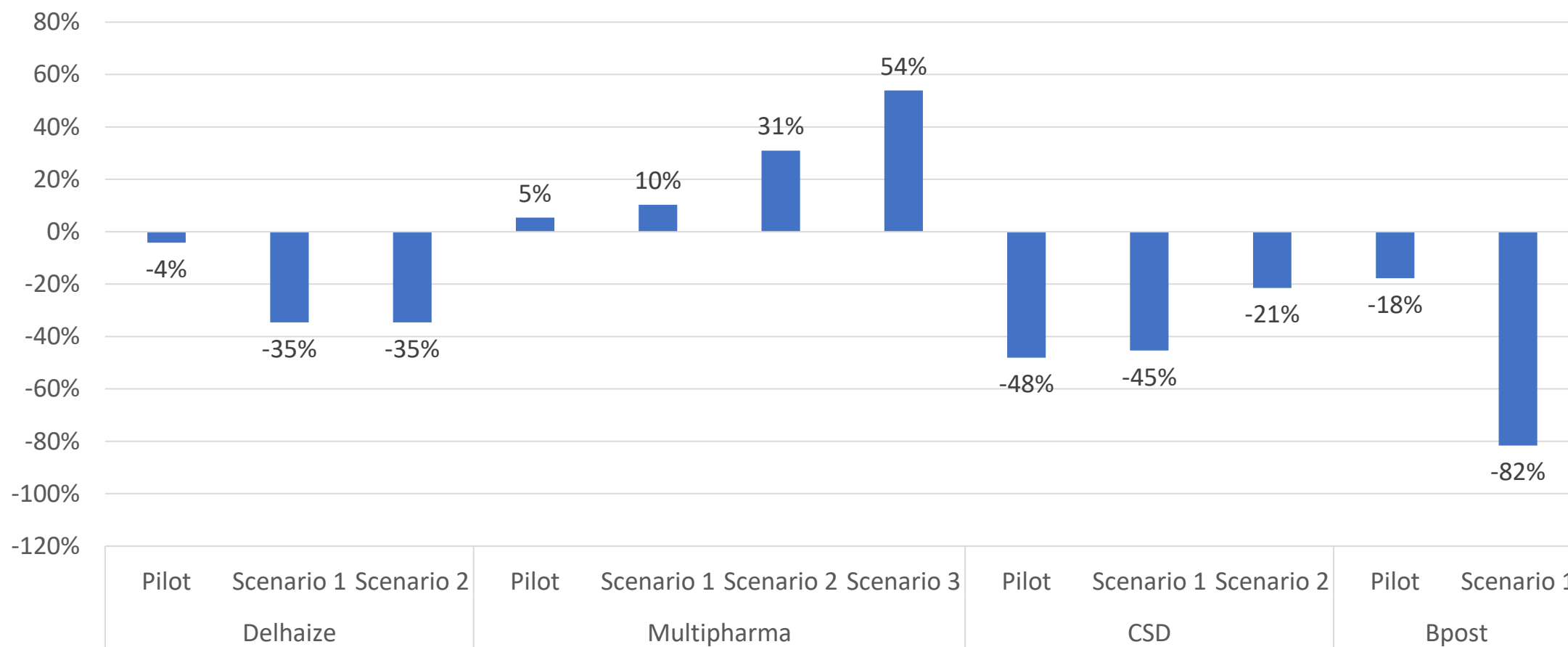
Costs/savings of noise pollution



Costs/savings of accidents



Costs/savings of WTT emissions



So what?

Conclusions

1. Best savings when one van is replaced by one cargobike
2. Large volumes are challenging due to congestion
3. Hubs support the sustainability of cargobikes
4. Focus should be on the line haul of hubs
5. The developement of cycling lanes reduce impact of cargobikes

Best savings when one van is replaced by one cargobike

CSD

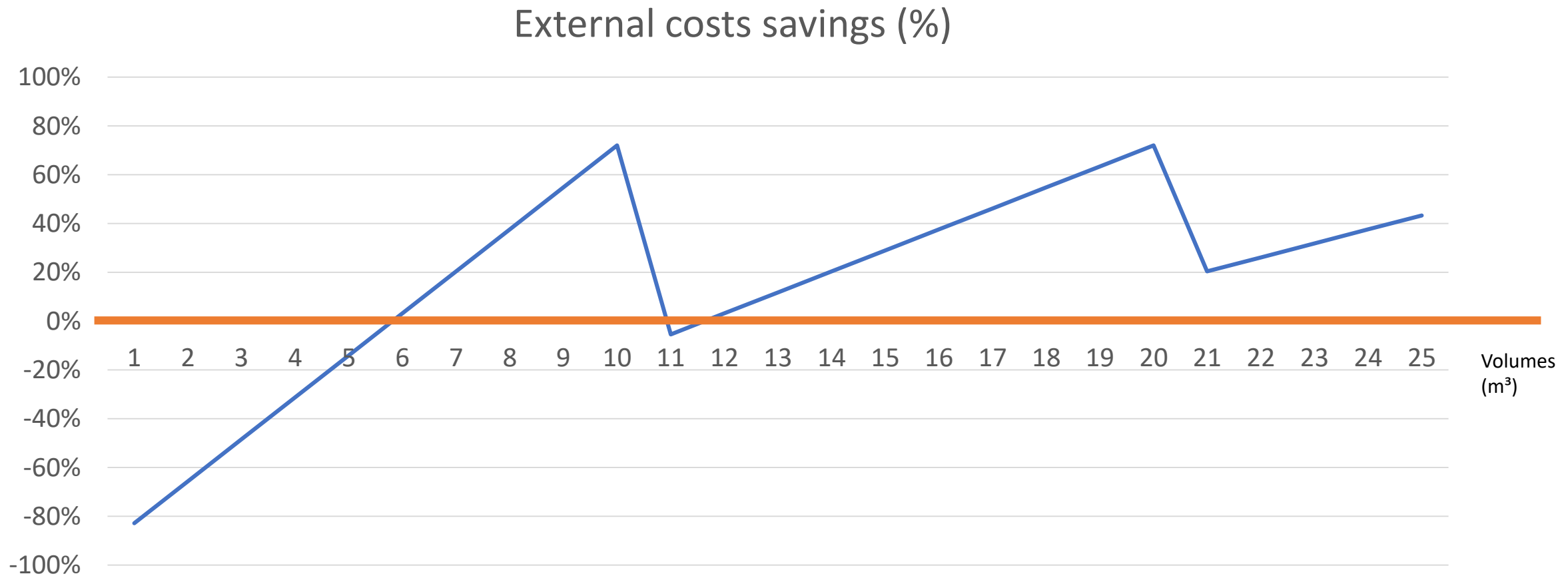


CSD

| Case | KM by van/truck | KM by bicycle | Total |
|-------|-----------------|---------------|-------|
| BAU | 20.13 | 0 | 20.13 |
| Pilot | 7.83 | 9.95 | 17.78 |

Large volumes are challenging due to congestion

External cost sensitivity analysis

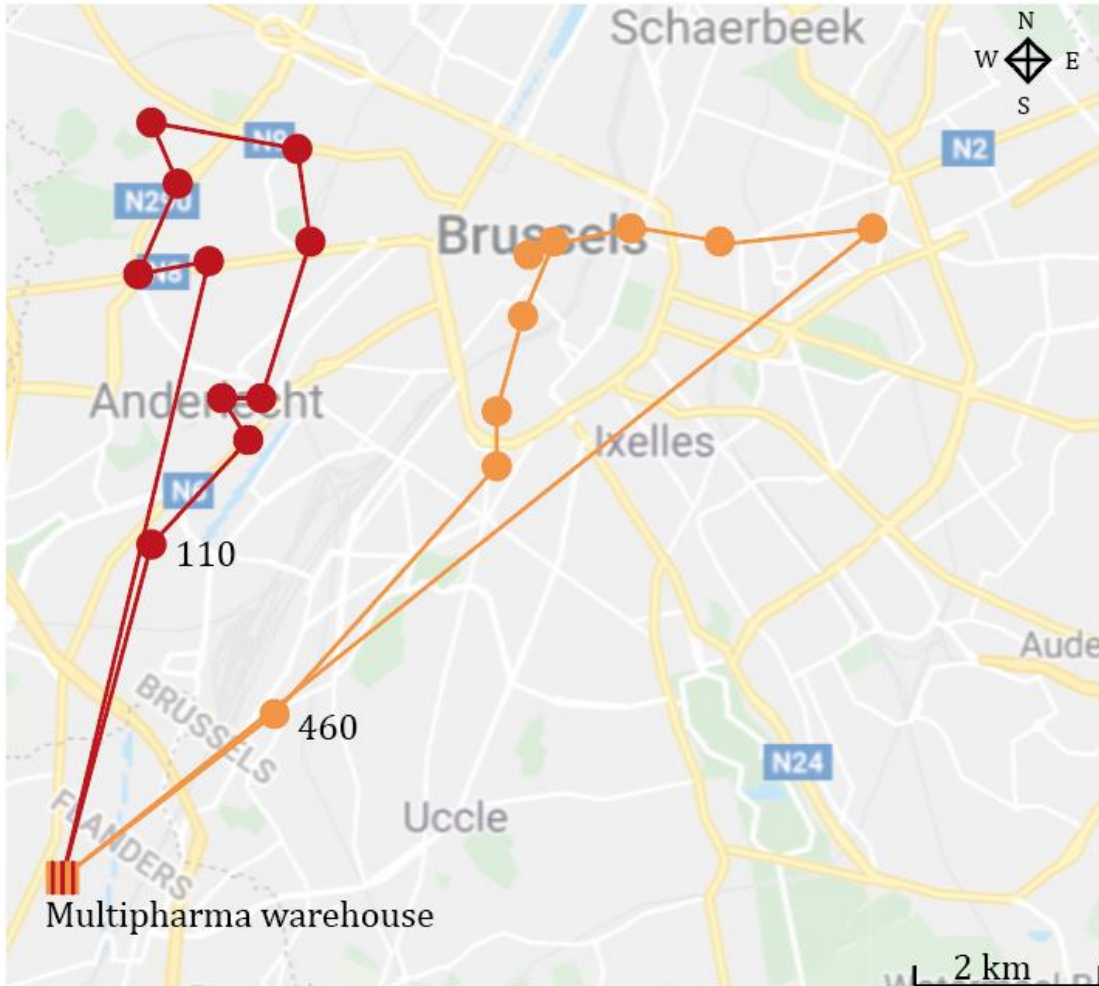


Hubs support the sustainability of cargobikes

Multipharma



Multipharma BAU/PILOT



Multipharma BAU/PILOT



Multipharma SCENARIO 1



Multipharma SCENARIO 2



Multipharma SCENARIO 2



Multipharma SCENARIO 3



Multipharma

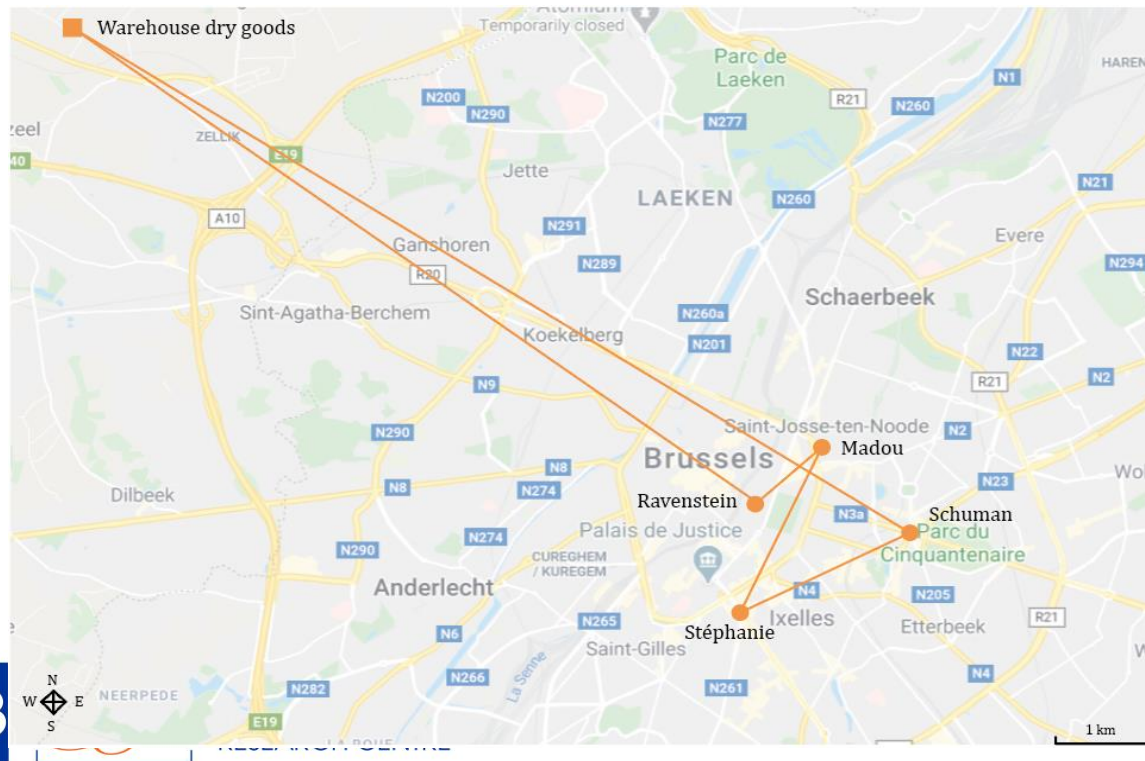
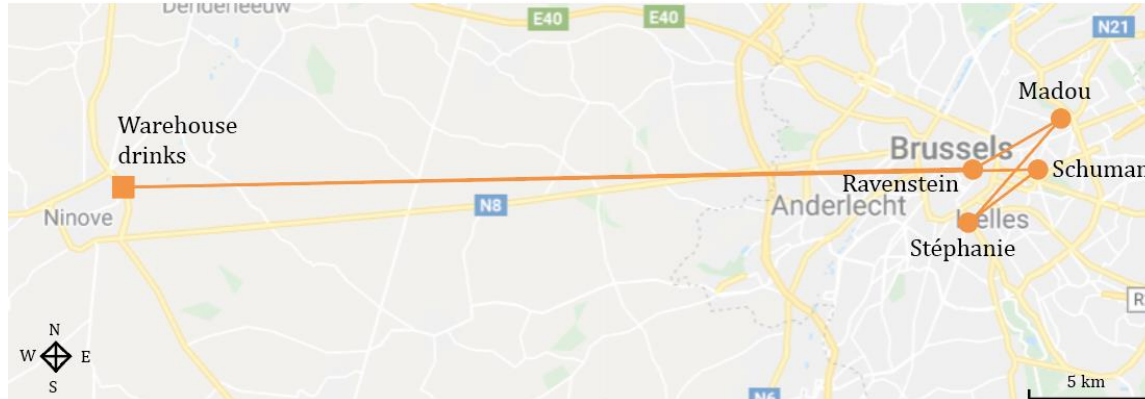
| Case | KM by van/truck | KM by bicycle | Total |
|-----------------------|-----------------|---------------|-------|
| BAU | 52.15 | 0 | 52.15 |
| Pilot | 50.65 | 16.33 | 66.98 |
| Scenario 1 BAU | 30.23 | 0 | 30.23 |
| Scenario 1 | 29.71 | 13.7 | 43.41 |
| Scenario 2 BAU | 52.15 | 0 | 52.15 |
| Scenario 2 | 58.78 | 35.98 | 94.76 |
| Scenario 3 BAU | 52.15 | 0 | 52.15 |
| Scenario 3 | 30.76 | 65.95 | 96.71 |

Focus should be on the line haul of hubs

Delhaize



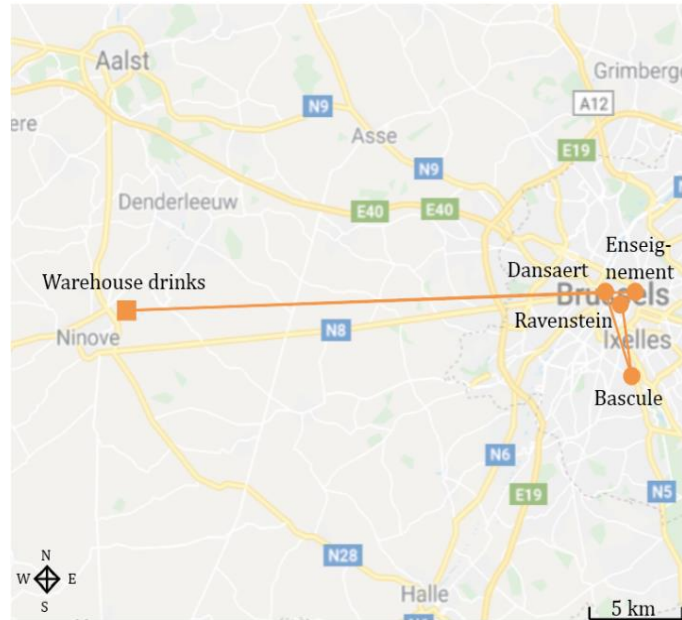
BAU



PILOT



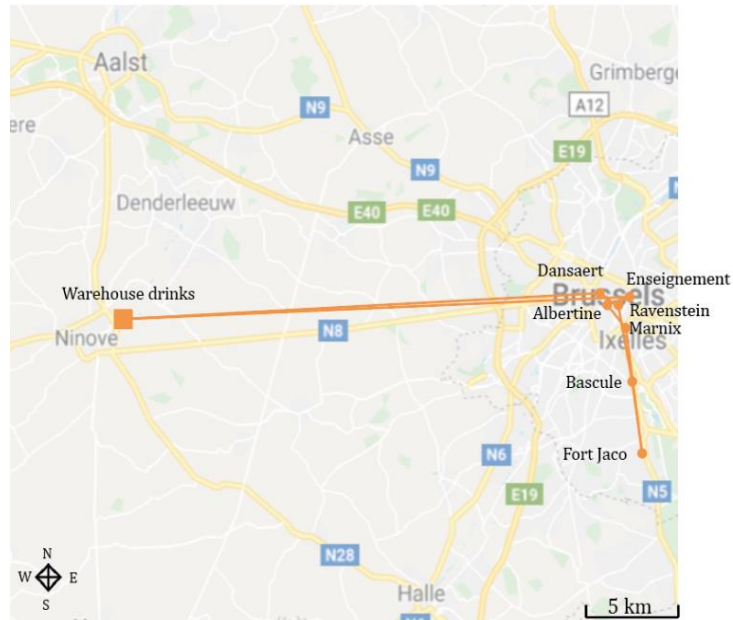
SCENARIO 1 BAU



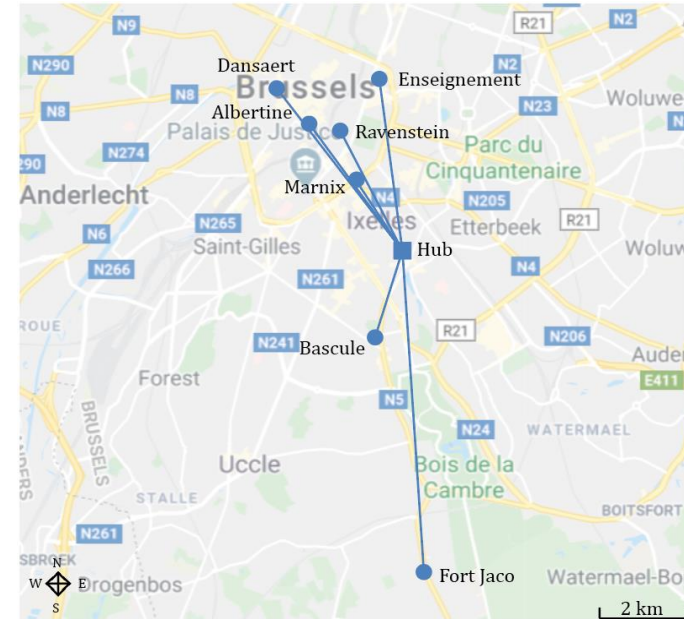
SCENARIO 1 BICYCLE



SCENARIO 2 BAU



SCENARIO 2 BICYCLE

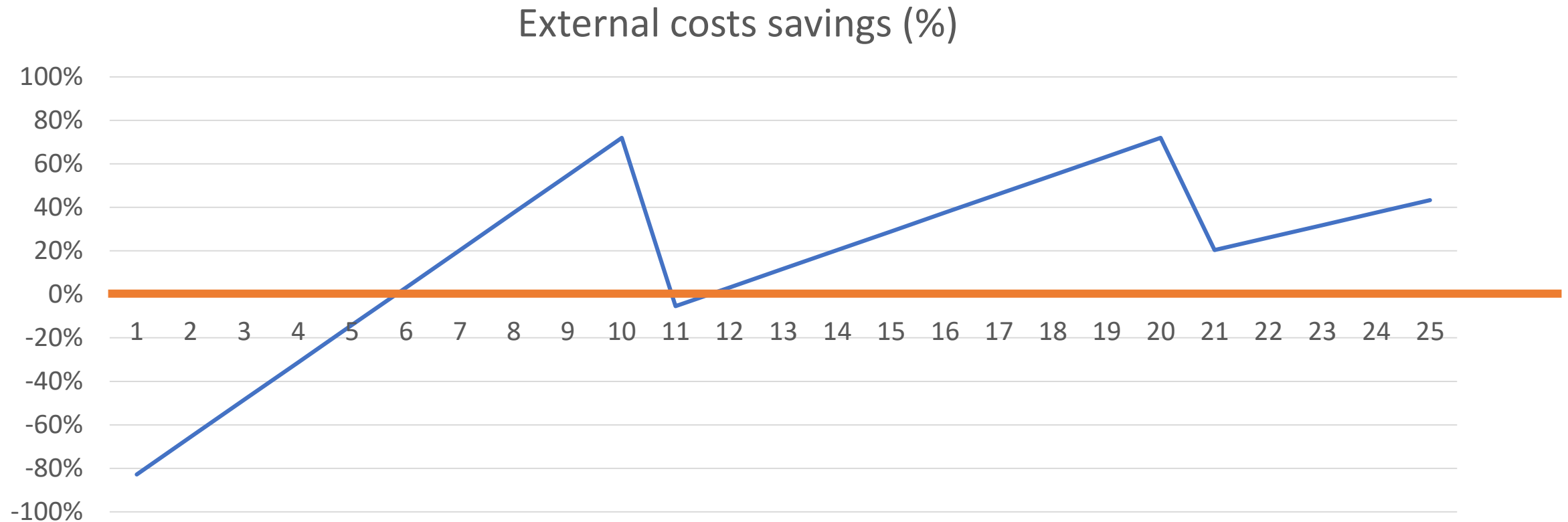


The developement of cycling lanes reduce impact of cargobikes

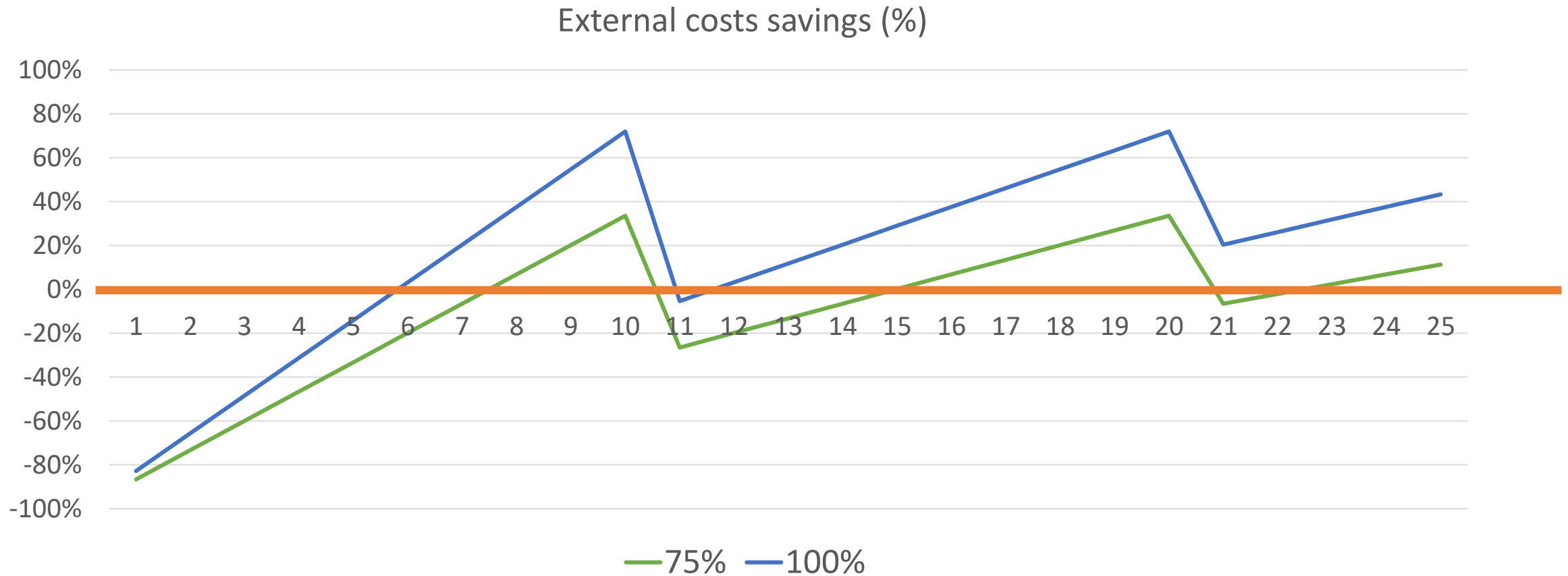
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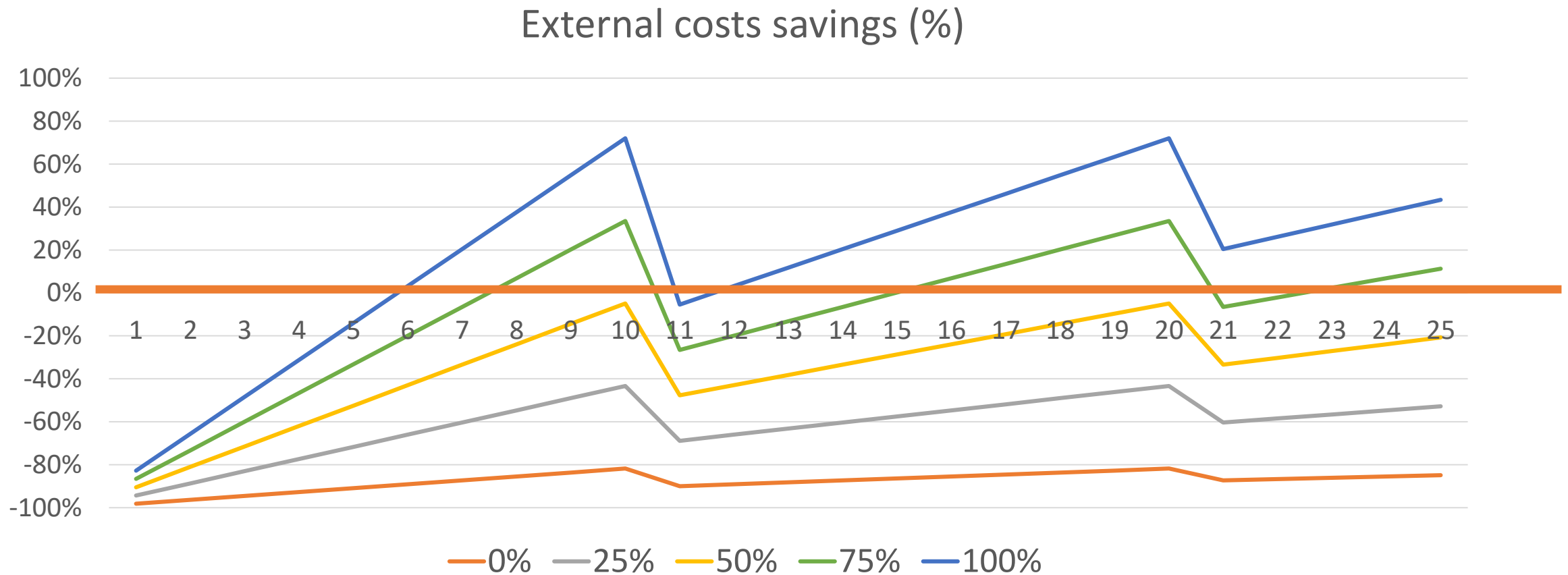
External cost sensitivity analysis



External cost sensitivity analysis



External cost sensitivity analysis



Conclusions

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Further research with Cairgobike as well!



Contact us!



Prof. dr. Cathy Macharis

+32 2 614 83 03
Cathy.Macharis@vub.be
Building PL5 (4.37)



Dr. Koen Mommens

+32 2 614 83 26
Koen.Mommens@vub.be
Building PL5 (4.33)



Nicolas Brusselaers

+32 497 32 73 22
Nicolas.Brusselaers@vub.be
Building PL5 (4.33)



Prof. Dr. Philippe Lebeau

+32 2 629 83 24
Philippe.Lebeau@vub.be
Building PL5 (4.37)



Dr. Sara Verlinde

+32 2 614 83 43
Sara.Verlinde@vub.be
Building PL5 (4.36)



Bart Cok

+32 2 629 83 46
Bart.Cok@vub.be
Building PL5 (4.40)



Clarissa Kees

Clarissa.Kees@vub.be
Building PL5 (4.36)