

E-Shuttle AG // 5G LOGINOV

Docks the Future Network of Excellence - Members Gathering #11

www.e-shuttle.de

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BACKGROUND

E-Shuttle AG is a logistic and rental car provider with more than 20 years of experience. Sustainability and e-mobility are important cornerstones of our future strategy. We have been pioneers in e-mobility since 2013 and are constantly driving the electrification of our fleet. In this context we always look for opportunities to optimize our fleet and to reduce our CO_2 emissions. CO_2 reduction is also an important topic for our external stakeholders (Amazon).





More than 120 employees are currently working at e-Shuttle. In our logistic department we operate with 85 transporter as a parcel service provider in multiple locations. Also, we do up to 200 trips per day in the field of personal transportation. We are operating 24/7, which leads to a running performance for some cars of more 1.000 km per day / per car. With this background, fuel consumption and the related CO_2 emissions are essential KPI's.



Fuel Consumption (in I)

With an average consumption of around 40.000 I, our monthly costs are more than 70.000 \in . Therefore, we always look for opportunities to reduce our fuel consumption and hence our costs. This is important since it offers a huge cost saving potential but also in terms of environmental protection (less CO₂ emission) and sustainability.



<u>Fuel costs (in €)</u>

The amount of CO_2 a car emits is directly related to the amount of fuel it consumes. Therefore, all methods which reduce the CO_2 emissions, lead to a reduced fuel consumption (win-win). With 5G Loginov, which is an innovated project we gained access to a great network and methods in the area of traffic optimization. By using this kind of new concepts and new technologies for improvement of the traffic operations, the CO_2 emissions can be reduced.





²⁾ Source: https://www.researchgate.net/figure/Relationship-of-fuel-consumption-and-CO-2-emissions-with-vehicle-speed_fig1_46444074



During our activities in 5G LOGINOV we equipped our vehicles with 5G IOT Hardware from Continental and tec4U Car-PC and LCMM smartphones. The goal was to **collect multiple data** like vehicle speed, acceleration and of course CO_2 emission. The test field was in Hamburg at the Teststecke für automatisiertes Fahren (TAVF) and all test were performed in 2021 and 2022.



Telematic Test System

SGLOGINNOV 5

Test fleet



A total of **80 trips** was recorded in 2021 and **150 trips** in the field trial period in **2022**. During this time, e-Shuttle was the lead vehicle in the platoon.

Also, we supported the 5G Loginov Project Team to find potential savings, while driving without the 5G time-to-green information System during the test trip period in 2021.



Test track in Hamburg

5GLOG



We used the collected data for analyzing various aspect in the field of traffic management and optimization. In the picture below for example, we evaluated if the real time data are complained with the WLTP (Worldwide harmonized Light vehicles Test Procedure).



Grün ≤ WLTP 100% / Gelb zwischen WLTP 100 und 150% / Rot größer WLTP 150%



RESULTS (EXTRACT)



1) Test drives (2021) without GLOSA

- Vehicles stopped 4 times
- Test drive regarding to ISO and LCMM



- Green light coordination
- Vehicle is "rolling out" instead of harsh breaking
- 2 Stops less compared to trip 1



Way Profi

O2 Emissions (a/km

Acceleration [m/s^2

GLOSA: Green Light Optimal Speed Advisory

= This means around 50 gCO₂ per Km and segment

Details

Within in EU Project "5G Loginov" we could identify and quantity a lot of potential savings with a positive environmental impact due to the using of 5G cellular V2X communication systems. Acceleration (relative to the standard driving cycle WLTP) was found to be reduced by -32% and braking indexed by average deceleration by -11%. The strongest impact comes with regards to standstill. The trips analyzed showed a reduction in standstill time of – times 3.



INFORMATION



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