

# Estimation and Evaluation of the Effects of Future Implementation of GPS-based Bus Priority at Traffic Signals in Copenhagen

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## **BACKGROUND**

One of the main challenges within transport is to cope with ever-growing mobility demand without increasing congestion, air pollution and noise, especially in urban areas. With regard to passenger transport, a modal shift from private car to public transport is generally seen as the key to solve the problem. In fact, public transport vehicles can carry much more passengers than cars, thus reducing the number of vehicles on the road and, therefore, both congestion and pollution. Since the modal shift can only be achieved by increasing the attractiveness of public transport, measures enhancing the service are extremely valuable, as mentioned in Transport Initiative 2 in the Copenhagen Climate Plan.

## **PROJECT IDEA**

The idea behind the project is to use the potential of Intelligent Transport Systems (ITS) to enhance bus service, in line with Transport Initiative 10 in the Copenhagen Climate Plan.

More precisely, the idea is to make use of GPS technology to provide buses with priority at traffic signals. According to that, a bus will be detected when approaching a signalized intersection and priority will be given, either by extending the green phase, anticipating it or inserting an extra phase in the signal cycle. In this way, buses will be able to reduce travel times and improve punctuality. Moreover, the use of GPS instead of other technologies, e.g. inductive loops or roadside beacons, has some significant operational advantages, due to the fact that physical detectors are replaced by "virtual" detectors, thus resulting in:

- Low installation and maintenance costs
- Easiness to extend the system to many intersections
- Flexibility in the relocation of detectors, to respond to changes in the network.

Furthermore, once the buses are equipped with GPS, real-time information can also be easily provided, thus increasing comfort. Since market analyses have shown that passengers, when deciding on transport mode, give the most weight to short travel times, high reliability and comfort, the significance of these achievements is straightforward.

## **PROJECT APPLICATION**

The concept described above is applied to the bus network around Flintholm station, in Copenhagen. The area is crucial, being one of the main public transport hubs in Copenhagen, which will become even more vital after the implementation of Metro City Ring in 2018. The project includes the development of bus priority logic and its testing by means of simulations carried out with the software VISSIM. The results, in terms of bus travel times and disruption to other traffic, will be evaluated in order to assess both the operational savings for the bus company and the potential for the modal shift.