
Summary:

Ex-ante evaluations of measures relevant for Oslo

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Freight deliveries in Oslo and other city areas involve a wide variety of challenges. This report is set to conduct ex-ante evaluations of two measures to be implemented in Oslo to improve the situation for freight deliveries by better utilization of road spaces and alternative delivery times. The first measure consists of implementing a prioritization scheme for vehicles at a certain time interval at two delivery spaces in the centre of Oslo. The second measure consists of arranging for deliveries to freight receivers in and around Karl Johan, the main shopping street of Oslo, before the shops open in the morning. We describe the main effects for various stakeholders, quantitatively and qualitatively. The results rely on an extensive data gathering process, consisting of vehicle counts, interviews with shop workers and drivers and GPS data from transport operators. We outline various scenarios, and based on these give recommendations for how the measures should be improved to better suit the situation in the centre of Oslo.

Freight deliveries in Oslo and other city areas involve a wide variety of challenges. Congestion, narrow areas for freight delivery and a large number of stakeholders on a limited area contribute to reducing logistics' efficiency. At the same time, freight deliveries contribute to a series of environmental problems, like poor air quality, noise and emission of greenhouse gasses. The project Green Urban Distribution (GUD) is set to develop environmentally friendly and efficient solutions for urban freight distribution in Oslo, the capital of Norway, by (1) better use of road spaces, (2) better use of day and week time and (3) demonstrate usage of environmentally friendly and energy efficient vehicles for unmanned deliveries.

In this report, two potential measures are analysed. The measures are not yet implemented, hence these are *ex-ante evaluations*. The two measures described and analysed are chosen based on a prioritization process of measures that were supported by the main stakeholder groups and considered relevant for the context of Oslo (Nordtømme et al., 2013). The target of the ex-ante evaluations is to assess potential effects of implementation of the measures in Oslo for main stakeholder groups and for the society in general. The evaluations are based on three main data sources: (1) manual vehicle counts for two delivery spaces, (2) semi-structured interviews with drivers, shop owners and employers for freight receivers and (3) GPS data from transport operators. Such data has not been collected and compiled before, and it is suitable to shed light on numerous problems related to implementation of the two measures described below. The data also give a picture of the current situation for the geographical areas in question at a very detailed level. This information is vital for analysing the potential effect of the two measures. Furthermore, this information is interesting in general, and suitable to increase the

understanding of decision makers for other problems related to urban freight transport as well.

Measure 1: Prioritization of access to delivery spaces

This measure consists of a prioritization scheme for access to certain delivery spaces in the centre of Oslo within a certain time interval. In Norway, such delivery spaces have signs which states that parking is prohibited. However, it is allowed to stop there. This means that not only freight vehicles can use these areas for unloading; also craftsmen, taxis and citizens are allowed to use the areas for short stops. While this is positive for high capacity delivery spaces where overcrowding is not a problem, it results in conflicts in areas with high traffic flows and low spare capacity. Therefore, enhanced regulations when it comes to delivery space permissions will reduce the negative effects of overcrowding. It will also generate benefits for the prioritized vehicles at the expense of vehicles that are not prioritized.

In the ex-ante evaluation, we assume that the group of prioritized vehicles are vehicles with a gross weight of 3.5 tonnes or more. This criterion is mainly used because (1) it represents a clear and impartial separation between vehicles used for goods distribution in city centres, and (2) to improve the conditions for the heavier vehicles is something that can give an environmental benefit, both because of less extra driving with the largest vehicles when the delivery spaces are occupied and because of increased incentive to consolidation. The hypothesis that the measure relies on is that a prioritization scheme will improve the situation for freight deliveries in the area, and improve the situation for trucks in particular. The calculations are based on two specific delivery spaces in the area Grensen, which is in the centre of Oslo, and it is assumed that the restrictions for other vehicles will only last in the period between 8:00 and 14:00. Hence, vehicles less than 3.5 tonnes will have access to the delivery spaces early morning and in the afternoon.

The delivery vehicles below 3.5 tonnes will bear the cost of this measure, since they are not prioritized. A mapping of the activities within these delivery spaces show that also other stakeholders utilizing the areas will be affected. It is difficult to quantify the net effects of the measure, since they are largely dependent on how transport operators utilizing the smaller vehicles will adapt to the new situation. In the calculations, trade-offs between costs and benefits are compared for different scenarios, where the way in which the not prioritized stakeholders behave varies.

Measure 1: Recommendations

Based on the results from this report, four suggestions and recommendations for how the measure can be adapted to better fit the current situation is outlined: (1) It is the smaller vehicles (vans, etc.) that will bear the costs. A parallel measure that would mitigate the costs for vans would be to establish an urban consolidation centre in the same area. In this way, the vans can deliver to the urban consolidation centre instead, and the goods can be consolidated to other vehicles for the last mile distribution to freight receivers. Vehicles operated by the urban consolidation centre can be allowed access within the prioritization scheme. If a sufficiently large area in close proximity to the urban consolidation centre can be kept free for stopping and unloading

activities for vans, their increase in costs will be very limited. In addition, freight receivers' access to goods will not be impaired, since the freight receivers will be served by the urban consolidation centre. (2) The data indicated that only a small portion of the vehicles utilizing the delivery spaces were above 3.5 tonnes, while a large portion were vans and other small vehicles. Hence, implementation of the evaluated measure can exclude more vehicles than appropriate and lead to too much spare capacity at the delivery spaces. The data also indicated that only about half of the vehicles utilising the delivery spaces were connected to goods' delivery. These two aspects imply that the measure could be converted to prioritize all forms of goods' delivery, and restrict other vehicles and activities. In this way, the measure will still have large benefits for transport operators, while at the same time the costs will be heavily reduced. (3) Since freight receivers in the area to a large extent is dependent on an even flow of commodities, it is important to assess the situation for each freight receiver in the area before implementing measures of this kind. (4) Such measures can easily be combined with measures to promote environmental friendly vehicles. As an example, electric vehicles (passenger cars and/or freight vehicles) can be included in the group of prioritized vehicles.

Measure 2: Alternative delivery times

This measure evaluates the possibility for transport operators to perform early deliveries to freight receivers in the pedestrian area around Karl Johans gate, the main shopping street within the centre of Oslo. In the pedestrian area, freight deliveries are currently allowed until 11:00. Most of the shops open at 10:00, and some of the shops only allow deliveries within the opening hours. Hence, transport operators must plan their routes according to this condition. The hypothesis that the measure relies on is that earlier deliveries will increase the window in which transporters are allowed to deliver goods. Hence, these transport operators will have a larger degree of freedom to optimise their routing structure as to reduce number of vehicle kilometres and number of vehicles in this area. For such a measure to yield a net benefit, it is important that the costs for other stakeholders, mainly the freight receivers that have to arrange for earlier deliveries, are not too large.

This report shows that the measure seems to be well suited for some of the freight receivers, but may be problematic to implement. Firstly, the list of relevant freight receivers is short; a lot of freight receivers in the area are either part of a shopping mall with common entrance, stock high value goods inappropriate for buffer storage (jewellers or drug stores) or have own transport solutions that involve consolidation with other freight receivers in the area. Implementation of the measure in Karl Johan will therefore require that a large portion of the relevant freight receivers will comply to early deliveries for the benefit to be significant. Secondly, many of the interviewed shop employers are sceptical because of uncertainty related to theft, disadvantageous design of the premises and too little room for buffer storage. Thirdly, the positive effects of the measure are highly uncertain, since they depend on the current delivery structure of the transport operators, which has proven to be difficult to reveal.

However, some aspects also indicate that the measure will have a positive effect: (1) counts confirm that there is a lower flow of pedestrians and bicycles between 9:00 and 10:00, than between 10:00 and 11:00. To implement the measure will therefore lead to fewer citizens being negatively affected by freight deliveries. (2) Transport operators themselves respond that they will have large benefits from earlier

deliveries, and that it would make route planning easier. This in turn will reduce the amount of extra driving. Since transport operators are engaged in the subject, and since transport operators' interests and the environmental effects in this case are congruent, there is a reason to believe that this measure in fact will have a positive environmental effect. (3) A lot of trucks are observed in Karl Johan after 11:00. This is something that further increases our confidence in that 10:00-11:00 is a too narrow time window, and that earlier deliveries would improve the current situation. Earlier deliveries would also reduce the negative impact for citizens of having freight deliveries taking place after 11:00. (4) Interviews indicate that certain shop owners pay their employers for starting earlier to receive freight before the shop opens. This indicate that the measure will be beneficial for at least some of the shops. Risk aversion (scepticism to changes) may be one explanation for why other shops does not have similar solutions.

Measure 2: Recommendations

In the report, we outline some suggestions for how the measure may be adapted to suit the current situation in Karl Johans gate better, such as: (1) more information to freight receivers about the benefits of the measure may lead to increased acceptance, (2) price differentiation before and after 10:00 from the transport operators' side should be possible if the transport operators are in fact convinced that the measure will result in reduced costs, (3) implementation on a more superior level, with support from the owners of shopping centres, would provide a first, critical mass, and make the implementation process easier, (4) high activity shops may find it more beneficial to have employers in the shop before opening time to receive the goods; this will also reduce the risk of theft, (5) early deliveries is more beneficial for new shops where the premises are not yet designed, so that an area can be allocated to buffer storage and security systems suitable for the profile of the shop can be installed, and finally (6) since risk aversion from freight receivers seems to be a large obstacle, a demonstration project, in which an external organ is responsible for the risk related to early deliveries, should lead to a larger degree of acceptance in the future.

Demonstration D2: Lessons learned

Experiences and lessons learned from this report will contribute to the planning of the second demonstration of the project (D2). This second demonstration was in the first place planned to consist of two parts: establishing an urban consolidation centre and implementing a prioritization scheme for delivery spaces. However, more planning than what is feasible within the timeframe of the project is required in order to establish a successful urban consolidation centre. Therefore, the demonstration will only include the prioritization scheme. Because of lessons learned from this report however all freight activities will be prioritized instead of only vehicles above 3.5 tonnes.

The Municipality of Oslo is currently in the planning process of implementing an urban consolidation centre. The implementation process will be based on results from this project.