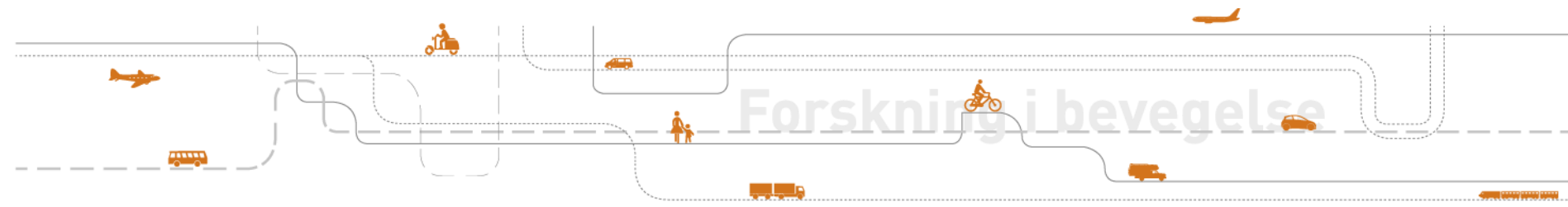


Better use of delivery spaces in Oslo

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Disposition

- Background
- Data
- The current situation
- Alternative priority schemes
- Costs and benefits
- Conclusions and lessons learned

Background (1/2)

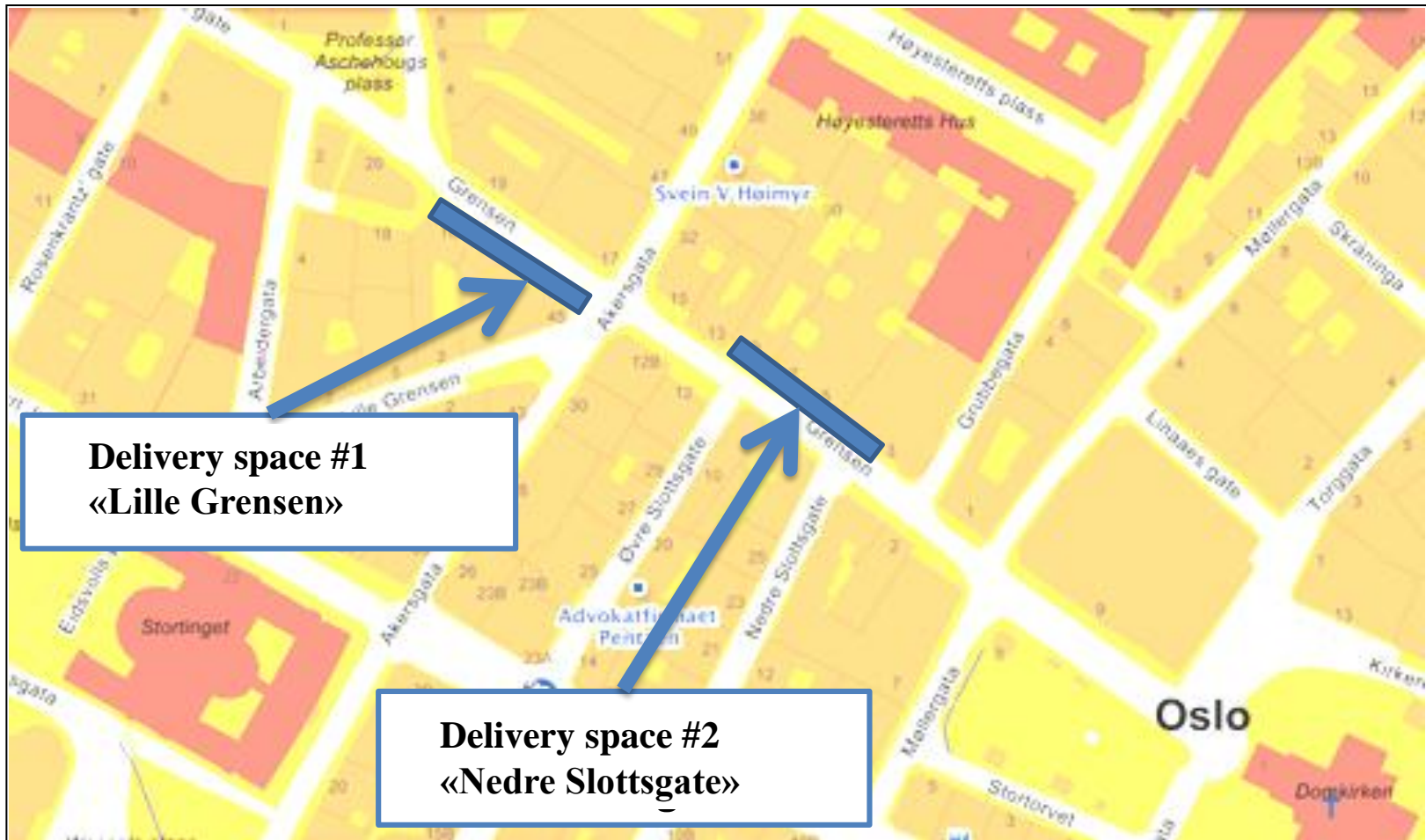
- Lack of space in urban areas is an important barrier to freight deliveries
- In Norway, most delivery spaces have signs that states that parking is prohibited. However, all stakeholders (citizens, taxis, craftsmen, etc.) are allowed to use the areas for short stops
- This results in problems in areas with high traffic flows and low spare capacity



Background (2/2)

- Green Urban Distribution (GUD) is set to develop environmentally friendly and efficient solutions for freight deliveries 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.
- One of the tasks of the GUD project has been to study delivery spaces on a street in the center of Oslo, and to analyze whether the delivery spaces could be better utilized

Area



Data (1/3)

Registration of vehicles at the delivery spaces

1. Time of arrival
 2. Time of departure
 3. Vehicle type
 4. Spare capacity at the delivery spaces
 5. Purpose (freight deliveries or other)
- Registration took place at three week days for each delivery space
 - 445 vehicles were registered altogether

Data (2/3)

Semi-structured interviews with main stakeholders

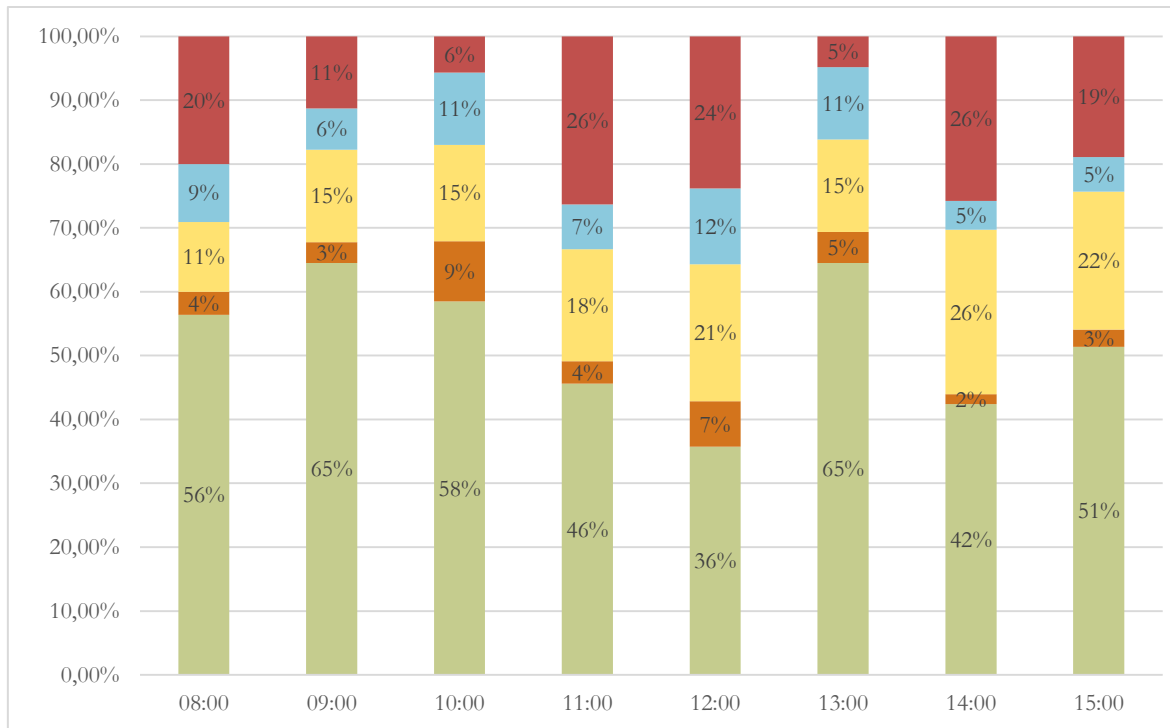
1. Receivers around the delivery spaces (workers and shop owners)
 2. Drivers using the delivery spaces
- About 1/3 of the approached stakeholders were able to give an interview
 - 30 interviews were conducted altogether

Data (3/3)

GPS data from transport operators

1. Delivery times
 2. Vehicle routes
 3. Behavior when not finding a place to park
 4. Accuracy when it comes to delivery spots
- GPS data from 290,000 deliveries and 83,000 vehicles were collected and analysed

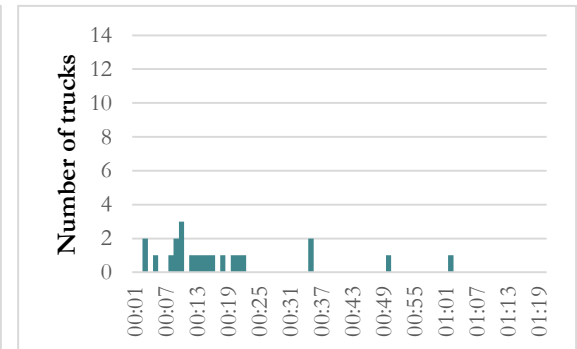
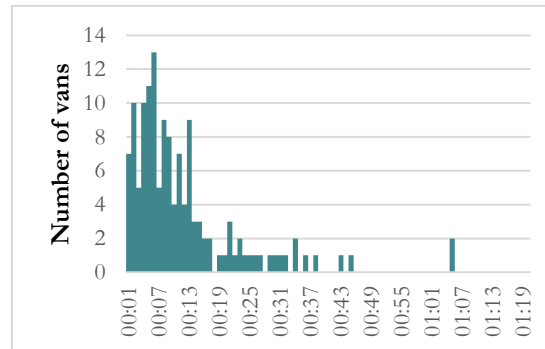
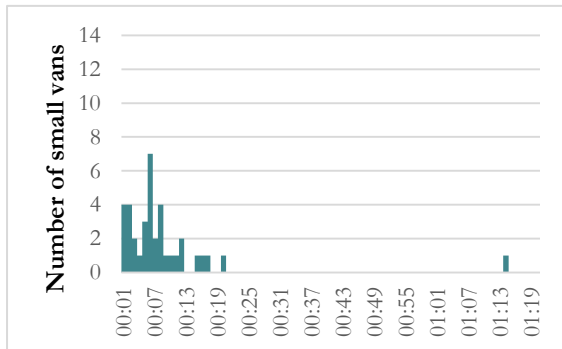
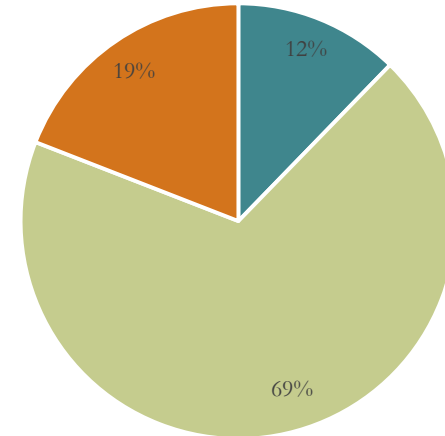
Who are the users of the delivery spaces?



Red: Other
Blue: Taxis
Yellow: Private cars
Orange: Craftsmen
Green: Freight deliveries

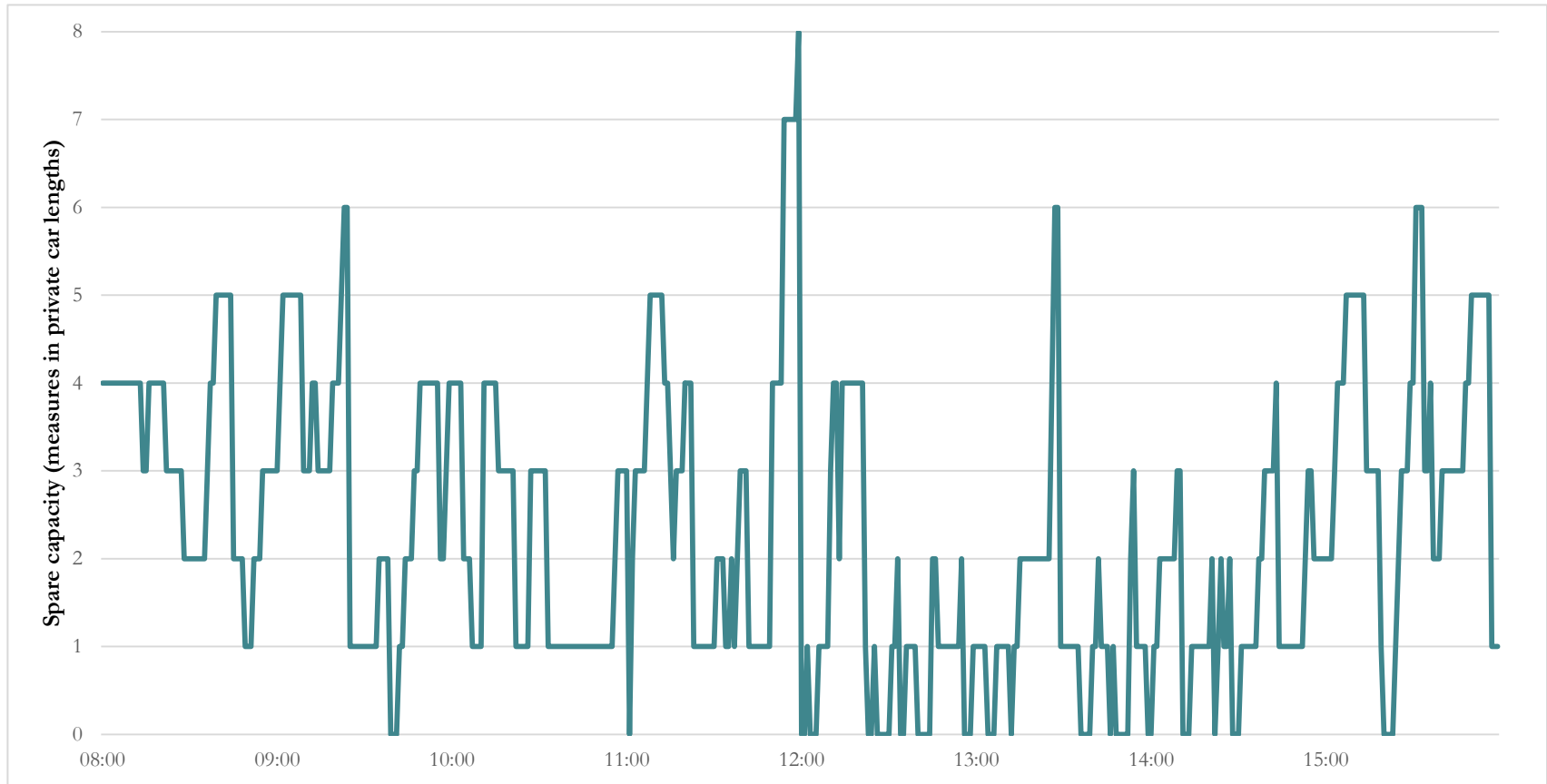
Freight delivery

Vehicle category	Description and examples
Small vans (19%)	Mainly used by the service industry; however, also used for freight deliveries. In particular packages, or freight for small shops. E.g. Volkswagen Caddy, Citroen Berlingo, etc.
Vans (69%)	The main type of vehicle used for goods distribution within the center of Oslo. Used for all kinds of urban freight. E.g. Mercedes Sprinter, etc.
Trucks (12%)	Defined to only contain large goods vehicles, i.e. vehicles with a gross combination mass of over 3.5 tones. Most of the trucks used for urban distribution are also below 7.5 tones in gross combination mass, since narrow streets are problematic for larger vehicles.



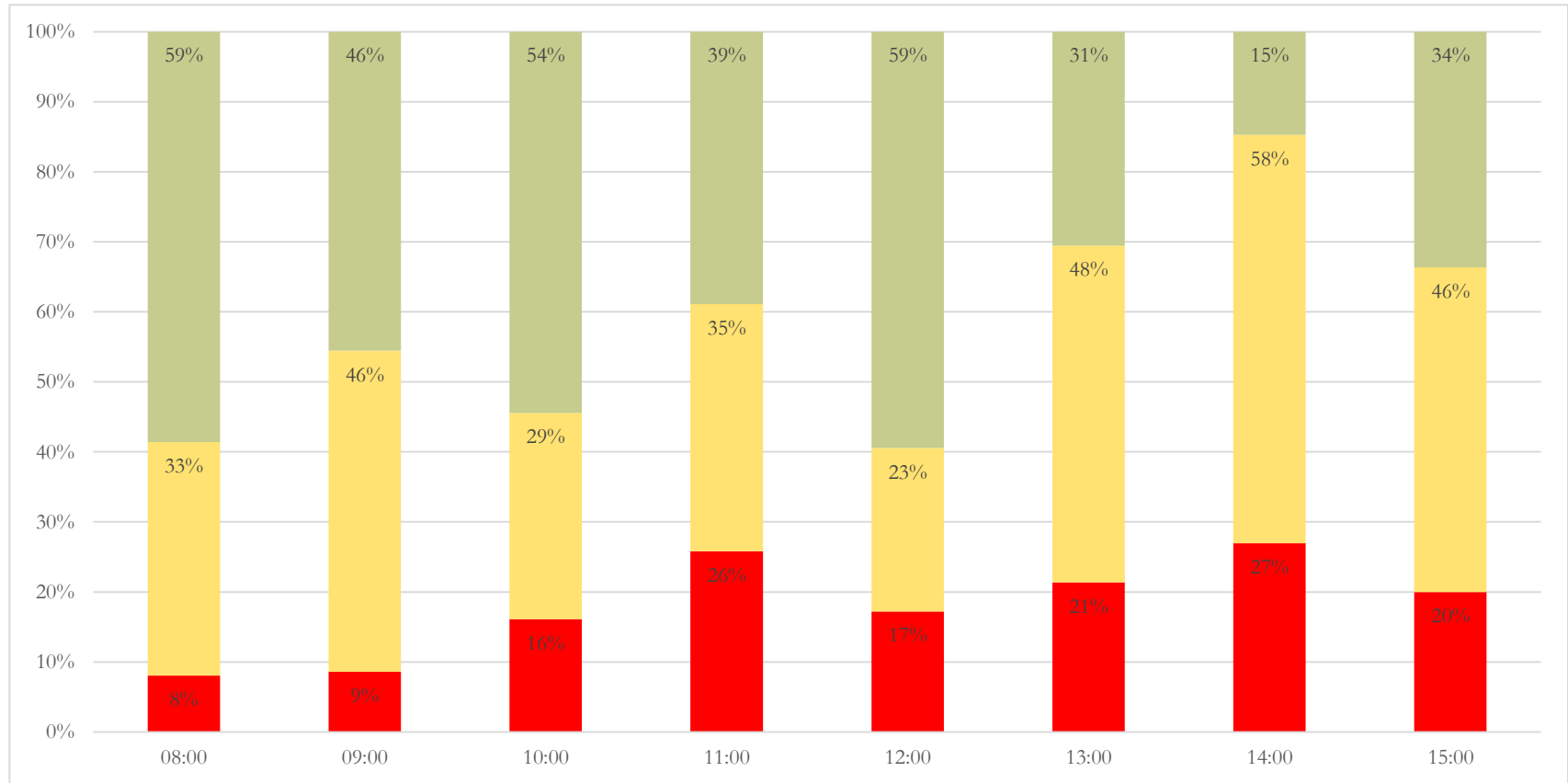
Distribution of number of minutes per stop for different categories of freight vehicles

Capacity at the delivery spaces (1/3)



Spare capacity at “Nedre Slottsgate” the first day of registration in the period 8:00-16:00, measured in private car lengths

Capacity at the delivery spaces (2/3)



Average distribution of spare capacity throughout the day for both delivery spaces all six registration days. **Red: too little space** (0-1 car lengths), **yellow: some space** (2-3 car lengths) and **green: enough space** (4 or more car lengths).

Capacity at the delivery spaces (3/3)

Spare capacity	Distribution
Too little space (0-1 private car lengths):	18%
Some space (2-3 private car lengths):	40%
Enough space (4 or more private car lengths):	42%
Sum:	100%

Alternative priority schemes for delivery spaces

- A. Prioritization of trucks within a certain time interval in combination with an urban consolidation centre (UCC): *Only trucks and vehicles designated by the UCC are allowed to use the delivery space between 08:00 and 14:00*
- B. Prioritization of trucks within a certain time interval: *Only trucks are allowed to use the delivery space between 08:00 and 14:00*
- C. Prioritization of freight deliveries within a certain time interval: *Only vehicles delivering freight are allowed to use the delivery space between 08:00 and 14:00*

Costs and benefits for trucks (1/2)

Vehicle category	Capacity	Distance specific costs	Time specific costs
Van	2.2 tones/vehicle	2.62 NOK/km	409 NOK/hour
Truck	5.7 tones/vehicle	3.17 NOK/km	420 NOK/hour

Assumptions:

- Number of trucks are evenly distributed throughout the day
- A truck is able to find space 50% of the times when the capacity is “some space” (see previous figure)
- We assume that 50% of the trucks that cannot find a space wait or drives around, and uses the area for delivery later. Hence, they must not be counted twice

Costs and benefits for trucks (2/2)

- 3.45 trucks per delivery space per day are expected to not find space, and will have to stop somewhere else
- Interviews (supported by GPS data) indicate that the average increase in time used because of this is 20 minutes
- GPS data indicate that 10 of these minutes are used for driving around
- GPS data show that average speed for trucks within Ring 1 is 12 km/h

This correspond to an **increased cost of 508 NOK per day per delivery space**, that could be avoided with an appropriate prioritization scheme

Costs and benefits for vans and small vans

With an UCC

- Costs of not finding a delivery space could be (almost) completely removed, depending on the location of the UCC

Without an UCC

- Difficult to estimate, since:
- Drivers can continue as before
- Drivers can deliver outside the time interval for the prioritization scheme (after 14:00)
- Drivers can utilize trucks instead of vans

Costs and benefits for receivers

- Effect for freight receivers is small...
 - *Shop workers do not care much about delayed deliveries*
- ... Unless implementation of a prioritization scheme blocks their ability to receive freight

- Small niche shops (utilizing vans or small vans for delivery) provide added value to the city center through more varied business climate, increased diversity and more specialized selection of commodities

Conclusions and lessons learned (1/2)

- The paper shows how data may be gathered and utilized to evaluate the effect of prioritization schemes
 - *Extensive data gathering prior to implementation is vital for decision makers that want to achieve desired results*
 - *In particular, the data analysis has concluded that implementation of a prioritization scheme for trucks only not will be beneficial in this case*

Conclusions and lessons learned (2/2)

- Time interval is important
- Stakeholders that are not prioritized will have to bear the costs of such measures
 - *Implementation of e.g. an UCC would mitigate these costs*
- A prioritization schemes for all freight vehicles will be beneficial, since:
 1. *(at least in Oslo) trucks constitute a relatively low portion of freight vehicles utilizing delivery spaces (12%)*
 2. *However, only about 50% of the vehicles utilizing delivery spaces are freight vehicles*
 3. *There a is serious overcrowding problem, increasing both internal and external costs of freight operations*

Thank you for your attention!

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