

## Summary

# Emissions from transport of goods related to construction activities in Oslo

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*The City of Oslo must make significant cuts in CO<sub>2</sub> emissions by 2030. The transport sector is a major source of emissions in Oslo and utility transport must take its share of the emission cuts needed. In order to assess effective measures for the transport of goods related to construction activities, the Climate Agency asked the Institute of Transport Economics to analyse traffic data and calculate emissions based on data reported in the national "Survey on road goods transport by Norwegian lorries". We have only included trips that start and/or end in Oslo. "Soil, rocks and gravel, peat and clay" constitutes the category with the most tonnes transported, but the trips are short and the emissions are therefore relatively low compared to other categories. "Materials and equipment", on the other hand, is a category where more kilometres are driven, and higher emissions thus result. In total, we have calculated that the "Construction activities" category contributes 19% of total CO<sub>2</sub> emissions emitted from the lorry transport of goods within the municipality of Oslo.*

## What is the emission contribution from construction activities?

In this study, we compiled and analysed data from the national survey on road goods transport by Norwegian lorries (Lastebilundersøkelsen, LBU). Emissions were calculated in order to assess the contribution from transport of different commodities as defined in the LBU. We looked at data over several years and compared data for transport within and outside Oslo's municipal boundary for trips that either started and /or ended in Oslo. The main purpose was to compare commodity groups to gain insight into the relative contribution to total CO<sub>2</sub> emissions from construction related transport.

## Traffic numbers and commodity groups

The commodity groups reported in the LBU were categorized into aggregated categories, of which three categories were associated with construction activities. These three categories were defined as "Soil, rocks and gravel, peat and clay", "Materials and equipment" and "Other waste". Other categories, not associated with construction activities, were "Agriculture and Food", "Mining and Extraction, Oil and Oil Products", "Consumables, Machinery and Industrial Products", "Wood pulp", "Chemicals", "Household and municipal waste", "Empty containers and pallets", "General cargo", "Empty trips" and "Other".

The results show that the category "Soil, rocks and gravel, peat and clay" transported the largest amount of tonnage, with the tonnage transported varying somewhat from year to year. However, the tonnes transported are distributed over many relatively short trips, meaning the total number of kilometres driven for this category is not as high as for the "Materials and equipment" category. In total for all categories, the kilometres driven for "Construction" related categories accounted for 18% in 2016 and 15% in 2017 of total kilometres driven, based on trips that started and/or ended in Oslo.

In this study, we allocated the reported kilometres driven in the LBU for the selected trips within and outside Oslo's borders using a simplified distribution model. If we only look at the kilometres driven within the municipality, the contribution from "Construction" is somewhat higher in percentage than if we look at the total both within and outside of the city. The category that has the most mileage in total is "Empty trips". "Empty trips" is also the category that has the most kilometres driven within the borders of Oslo. Some of these trips will be associated with activity for "Construction", but we do not have information in the LBU about what generates the most such trips. If we look at internal transport, i.e. trips that both start and end in Oslo, it is the categories "Household and municipal waste" and "General cargo" that contribute the most kilometres in addition to "Empty trips". For Oslo, most trips and commodities related to the "Construction" category, come from or are going to Akershus. Therefore, if one wishes to look at possible measures, it may be useful to cooperate with municipalities in Akershus.

## **Emissions**

A large proportion of the vehicle kilometres driven derived from Euro VI vehicles. These are newer vehicles and are important for lower pollution of, for example, exhaust particle emissions and nitrogen oxides (NO<sub>x</sub>), components that adversely affect air quality. However, the reduction in CO<sub>2</sub> emissions is limited.

The categories we allocated to "Construction" are estimated to emit 12.2 thousand tonnes CO<sub>2</sub> which is 19% of the total emissions from transport of goods within Oslo in 2017. In contrast, the two largest categories for emissions from transport of goods within Oslo are "Empty trips" and "General cargo". with 13.7 and 13.5 thousand tonnes of CO<sub>2</sub> respectively. The "Empty trips" category was responsible for a higher number of kilometres driven, but because these trips were carried out without cargo, the emissions per km are lower and the difference in emissions from the two categories is therefore less than the difference in kilometres. Looking at total emissions both inside and outside Oslo (for our selection of trips) the "Agriculture and Food" category dominates, which is primarily related to the transport of food and drink.

## **Uncertainties**

For the emission figures presented, the total is probably somewhat underestimated compared to actual emissions since various parameters affecting emissions (for example, idling, road inclination, ambient temperature, congestion and other parameters) are not included. Also the emission ratio of the different categories can change if the driving pattern and conditions under which the transport is carried out varies among categories. If there is a lot of congestion, the emissions will be higher and if there is a large proportion of km on regional roads (or access roads) it will contribute to somewhat lower emissions. We have assumed all vehicles use ordinary diesel, and have not addressed mixing of biofuels.

There are also several uncertainties related to how the kilometers and emissions are distributed within and outside Oslo for the various commodity groups, as we have made several assumptions to distribute the transport work. Especially the assumption that all km from trips that starts and end in Oslo are driven within the city borders are likely more inaccurate for some groups than others. However, the total kilometers are not affected by the allocation method. In addition, the LBU has its own uncertainties related to methods

and data collection. The method changed in 2016 and some variables are therefore not directly comparable before and after this year.

## **Some main results in short**

- “Construction” activities account for 58% and 51% of the total number of tonnes transported for the years 2016 and 2017, respectively.
- Most tonnes transported related to “Construction” are transported to and from municipalities in Akershus.
- “Construction” activities account for approximately 60 million kilometres driven in 2016, which corresponds to a share of 18% of total kilometres driven by all categories for trips which started and/or ended in Oslo. Corresponding figures for 2017 are approx. 50 million kilometres driven and a share of total kilometres driven of 15%. Of the categories within “Construction”, “Materials and equipment” provides the most kilometres driven in total.
- The category “Soil, rocks and gravel, peat and clay” has an average trip length of 22 km in 2017.
- “Construction” activities contributed 17% of the total emissions in 2017 and 19% of the total emissions allocated within Oslo from goods transport by trucks.
- The largest emission category in total is "Agriculture and Food".
- “General cargo” and “Empty trips” are also categories with large emissions.