

Parcel lockers as delivery solution

Usage patterns and experiences from the pilot phase

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- Parcel lockers are secure, flexible delivery solutions for parcels up to 20 kg, primarily intended to replace home deliveries requiring recipients' attendance. An advantage is that distributors can deliver multiple parcels to a location near customers, rather than to drive to each individual recipient.
- PostNord started development of a parcel locker network during autumn 2020 and aims to have 3000 parcel lockers in use in Norway by 2022-end, within 'slipper distance' (300 m) from their customers.
- In 2021, PostNord carried out a pilot for deliveries to parcel lockers.
- In the pilot phase, the distance between parcel lockers and the recipient's home was calculated to be 600 meters on average.
- Usage patterns and experiences from the pilot phase show that both pick-up time and pick-up distances were lowest for parcel lockers located within housing associations, and longest for locations near offices/educational institutions and public transport hubs. On average, recipients pick up their parcels 1,5 days after delivery to the parcel locker.

Background

The COVID-19 pandemic reinforced strong ongoing growth trends in e-commerce and led to large increases in the demand for home deliveries. Now, with society returning to business-as-usual, the need for flexible deliveries is increasing. One flexible delivery solution that is being phased-in in Norway, are so-called parcel lockers, where consumers can pick up parcels 24/7, using a mobile app with Bluetooth key.

PostNord is one of the players that in recent years has started piloting parcel locker deliveries in Norway, and aims to have 3000 parcel lockers in use in Norway by the end of 2022. This report provides a summary of use patterns and experiences from PostNord's pilot operation of such lockers, based on real shipment data from the start of the first pilot deliveries in the spring of 2021 until the turn of the year.

Parcel locker deliveries are initially primarily intended to offer an alternative to home deliveries that require attendance and signature, as these deliveries are particularly



resource-demanding for the transport firm and generate traffic and other negative externalities for society.

Pilot network

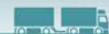
The development of PostNord's network of parcel lockers started in late 2020 and continued throughout 2021. First, small networks were established mainly in and around cities in southern Norway, but gradually, parcel lockers were also installed in other parts of the country. By the end of 2021, PostNord had placed out parcel lockers at nearly 300 locations, of which just under two thirds were taken into operation. The majority of these parcel lockers were installed on the ground of housing associations (borettslag) and larger housing cooperatives (sameier), but also near grocery shops, offices/educational institutions, public transport hubs and shopping centers.

The rationale behind parcel lockers is that they allow consumers to pick up parcels in the vicinity of places they live, pass or frequent in the course of their daily routines. During the pilot phase, around half of all deliveries to parcel lockers took place to lockers in the same post code zone as the recipient's address, just under half was delivered to lockers in a different post code zone, and a small fraction to lockers in other municipalities than the recipient's home. Parcel lockers located at shopping centers somewhat stand out in that many recipients live in different post codes, but mainly within the same municipality, while lockers at public transport hubs stand out by having a somewhat larger share of recipients living in different municipalities than the locker's location. On average, the distance between parcel lockers and recipient's homes has been 620 meters, but under 300 meters for recipients living in the same postal code as the locker's location, albeit with some variation between different types of locations. PostNord's objective is that when the parcel locker network is fully established, parcel lockers should be available within "slipper distance" from the places where recipients live or travel. PostNord defines this as a distance of up to 300 meters.

Phase-in and use

The first deliveries to parcel lockers started with a test in April/May 2021, followed by a new, more extensive test period from July and large volume increases from August. The number of deliveries to parcel lockers reached a maximum in October, but was reduced in November and December to avoid overloading a relatively untested solution during particularly high-volume periods (Black Week and Christmas shopping).

Three quarters of deliveries in 2021 were to locker locations in housing associations/cooperatives, with smaller shares of deliveries to the other types of locations. Nearly all deliveries to parcel lockers took place on working days, with most deliveries on Wednesdays, Tuesdays and Thursdays. Deliveries largely take place during daytime, after 9 AM, with 12-15 PM being the time slot with most deliveries. The distribution of delivery times throughout the day differs slightly between different days of the weeks, and evening deliveries also constituted a significant share of deliveries to parcel lockers in 2021.



Time use during deliveries

The amount of time spent on deliveries to the same location (which can have multiple parcel lockers) can be calculated for deliveries of 2 or more parcels, but does not capture time that drivers spend in and outside of their vehicles before the first parcel is delivered or after the last parcel is delivered. On average, delivery times have been just below 3,5 minutes per location and 44 seconds per parcel. Our analyses reveal scale economies or effectivity gains when more than a handful of parcels is delivered simultaneously, but that these gains decrease when the number of simultaneously delivered parcels is higher. There further appears to be a “learning effect”, with decreases in average delivery times per parcel in the period from April 2021 through-out December.

Data for selected locker locations further indicate that in the pilot phase, parcel locker’s capacity was rarely fully utilized and that new delivery rounds largely took place when capacity utilization was low.

Pick-up times

While deliveries to parcel lockers almost exclusively take place on working days, around 8% of parcels is picked up on Saturdays and 4% on Sundays. However, most parcels are picked up on Wednesdays and Thursdays, followed by Tuesdays, i.e. the days with most deliveries. Pick-up patterns differ somewhat between location types (e.g. parcel lockers at shopping centers or offices) and are discussed in detail in the report. Overall, nearly 60% of parcels (or just under half of all parcels when deliveries for which time information is missing are included in the total) is picked-up within 24 hours, and this share is almost equal for different types of locations. On average, parcels are picked up after 1,5 days, with small differences between location types. Variation in pick-up times is important for operators with regard to parcel locker efficiency and operational decisions. Data further indicate a tendency for parcels to be picked up during the late afternoon and during the evening, and on working days. Also this is discussed in detail in the report. We have further looked at average pick-up times and variation for different geographical areas in Oslo and selected areas outside of Oslo, and find some differences. For example, pick-up times are shortest for the Høybråten area in Oslo (30 hours), and highest in the Vinderen-Holmenkollen area and Greater-Oslo (40 hours).

Goods delivered to parcel lockers

Finally, we consider goods categories delivered to parcel lockers (derived from the sender firm’s industry classification) and sender (in Norway or import from abroad). Around half of all parcels delivered to parcel lockers in 2021 fell into the category clothes/textiles/shoes etc., with the majority stemming from senders outside of Norway. The remaining parcel volumes include a range of different goods categories with varying shares of domestic/foreign senders. We find that books and music goods both have lowest average pick-up times (28 hours) and least variation, that cosmetics, pharmacy products etc. have the longest pick-up times (46 hours), and that parcels likely containing electronics have the largest variation in pick-up times.



Overall, parcel volumes are dominated by senders within mail order/e-commerce industries, of which 80% are sent from abroad. Retail makes up 21% of all parcels, of which around three quarters stem from domestic senders.