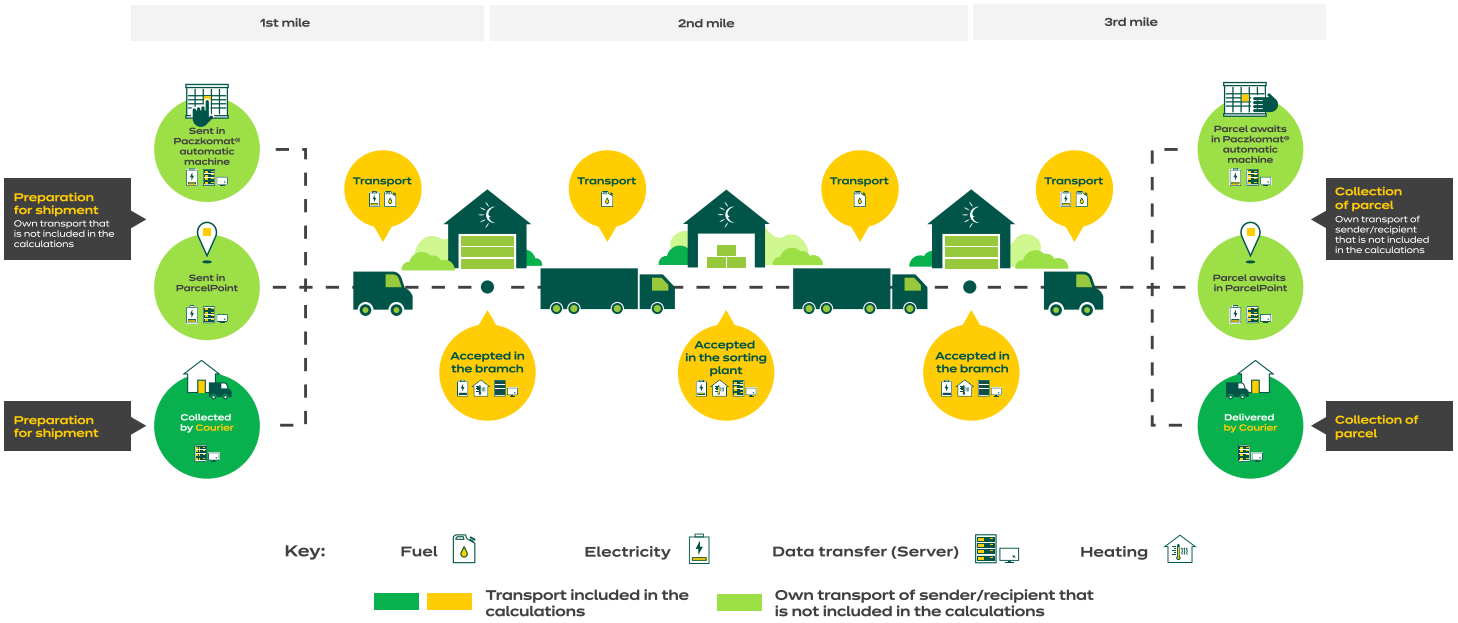
Assumptions of the parcel carbon footprint calculator

The parcel carbon footprint calculator is a proprietary tool developed by InPost S.A. The calculator uses data from InPost logistics systems as well as operational and financial activities (electricity, heating, data transfer).

Deloitte Advisory sp. z o.o. sp. k. conducted an independent audit of the compliance of the methodology and assumptions adopted by InPost with the GHG Protocol guidelines.

We developed the carbon footprint calculator based on the following logistic model:



Calculation framework:

1. The carbon footprint of the shipment takes into account both emissions from the transport itself (from the moment of dispatch to the receipt of the shipment – i.e. emissions from the first, middle and last mile), as well as resulting from heating and electricity consumption in the facilities where the parcel is stored (Paczkomat parcel locker/ branches/ sorting plants) and related to the transfer of data necessary to handle and track the parcel.

2. Dispatches and collections of parcels both by courier and in Paczkomat devices, Parcel points, Branches and Sorting plants (only shipments for dedicated commercial parcels) were also included.

3. The calculation framework refers to the so-called ideal parcel transport process – from the moment of sending to the moment of receipt in accordance with the delivery method selected by the customer. The additional parcel path resulting, for example, from the storage/re-routing process is already indirectly taken into account in the calculations (the carbon footprint results are corrected upwards for emissions that may be the result of additional logistics processes on the last mile).

4. 2022 benchmarks used:

FUEL CONSUMPTION

Type of vehicle accepted for calculation	Unit	[per 100km]	per 1km]	Benchmark per km
Mercedes Sprinter WTW	Litres	9,2	0,092	0,303 kg CO_2e / km
Mercedes Sprinter WTW	Litres	9,2	0,092	0,247 kg CO_2e / km
Voltia E-NV200 WTW	kWh	25,9	0,259	0,220 kg CO_2e / km
Voltia E-NV200 TTW	kWh	25,9	0,259	0,220 kg CO_2e / km
Diesel tractor unit WTW	Litres	-	-	1,151kg CO_2e / km
Diesel WTW tractor unit	Litres	-	-	0.930kg CO_2e/km
LNG tractor unit WTW	Litres	-	-	0,828 kg CO_2e/km
LNG tractor unit TTW	Litres	-	-	0,615 kg CO_2e/km
10 Pallet Van WTW	Litres	-	-	0,614 kg CO_2e/km
10 Pallet Van TTW	Litres	-	-	0,498 kg CO_2e/km
8 Pallet Van WTW	Litres	-	-	0,614 kg CO_2e/km
8 Pallet Van TTW	Litres	-	-	0,498 kg CO_2e/km
Midi Truck 5 Pallets WTW	Litres	-	-	1,035 kg CO_2e/km
Midi Truck 15 Pallets TTW	Litres	-	-	0,841 kg CO_2e/km
Midi Truck 18 Pallets WTW	Litres	-	-	1,035 kg CO_2e/km
Midi Truck 18 Pallets TTW	Litres	-	-	0,841 kg CO_2e/km

Fuel Type	CO_2e	Unit	Source
WTW Diesel oil	3,30	kg CO_2/l	
WTT Diesel oil	0,61	kg CO_2/l	DEFRA 2022, v2 - WTT Fuels - diesel-average blend
TTW Diesel oil	2,69	kg CO_2/l	Kobize 2022, density -> DEFRA 2022 v2
WTW natural gas	2,36	kg CO_2/m3	
WTT natural gas	0,34	kg CO_2/m3	DEFRA 2022, v2 - WTT - fuels --> Natural Gas (cubic metres)
TTW natural gas	2,02	kg CO_2/m3	KOBIZE 2022 Table 15 - high-methane natural gas
TTW electricity	0,85	kg CO_2/ kWh	residual mix CO2: https://www.aib-net.org/sites/default/files/assets/facts/residual-mix/2021/AIB_2021_Residual_Mix_Results_1_1.pdf
Data Transfer	0,00845	kg CO_2e/PLN	FRENCH FE ADAME (assuming an average annual rate of 4.57 PLN/€)
LNG WTW	3,44	kg CO_2e/kg	-
LNG WTT	0,89	kg CO_2e/kg	DEFRA 2022, v2 - WTT Fuels - LNG
LNG TTW	2,56	kg CO_2e/kg	DEFRA 2022, v2 -Fuels - LNG

5. Conversion rates used:
   a. energy – 1 GJ = 3.6 MWh;

6. The carbon footprint resulting from the delivery of the parcel to the place of dispatch and collection has not been included in these calculations.

Methodological assumptions

1. The CO2 benchmarks for the first and last mile have been calculated per 1 kilometer of parcel transport based on data for the last calendar year and are updated on a monthly basis. For each of the InPost branches, 4 individual CO_2 benchmarks were calculated, taking into account: stage (sending or delivery) and type (Paczkomat parcel locker or courier) of parcel transport.

2. Carbon footprint benchmarks for the middle mile were calculated per 1 kilometre of parcel transport based on actual data. The carbon footprint for the middle mile is calculated in real time thanks to the integration of the calculator with the InPost operating systems on this section of the route.

The benchmarks were calculated on the basis of the following data:

- Number of parcels delivered to individual branches divided into dispatches/deliveries taking into account different forms of transport (parcel locker/courier),
- Number of parcels delivered by EVs broken down by branches,
- Taking into account the number of delivered/received parcels per one drive to the place of sending/collecting by the courier, divided into different dispatch/delivery methods,
- Distance (km) between branches, sub-sorting plants and sorting plants,
- Combustion of fuel of representative vehicles of the fleet (for first and last mile, and freight)
- Electricity consumed for the maintenance of Paczkomat devices,
- Heating in branches/sub-sorting plants/sorting plants,
- Data transfer for the needs of branches, sub-sorting plants, sorting plants, Paczkomat devices and mobile application.

The benchmarks are subject to periodic updates in accordance with the latest InPost data, as well as in accordance with the updates of the benchmark databases.

Main assumptions regarding logistics data and processes - stages

- Parcels are counted per STOP per category: C2D/APM and type of service: dispatch/delivery - the C2D pallet, and SMART services were excluded
- For the calculation, the actual numbers of parcels sent/received in C2D and APM are taken – these are the base data for calculating monthly stops and directions
- The average number of kilometres is based on courier stops
  - Data source: ILS logistics system
  - The algorithm takes into account: The distance between the geographical coordinates recorded at the time of delivery/receipt of the ordered parcel (Average, excluding Saturdays)
- The calculation of the share of STOPS is based on the efficiency of STOPS and the number of parcels per category
- Calculation based on the shares of the average number of kilometres per parcel for each category
- Conversion of the average number of kilometres per parcel to CO_2 value