# Scenarios representing the physical implementation

## AS IS Scenario: representing real implementation

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| Scenario: LL1 Madrid AS IS Scenario – pilot implementation | |
| CityLogin the logistic service provider in LL1 delivers parcels (30x30x40) into the Low Emissions Zone in Madrid in the city centre of Madrid from the warehouse in San Fernando 30kms far away from the LEZ using Diesel vans (Direct shipments).  This scenario uses the 2Echelon model and the COPERT tool. | |
| INPUT DATA (csv Files) | |
| * Facilities  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Name | Street | Number | Zone | ZipCode | latitude(WGS84) | longitude(WGS84) | handlingTime | StartingTime | EndingTime | | San Fernando | Avenida del Sistema Solar | 27 | San Fernando Henares | 28830 | 40.450472 | -3.494262 | 0 | Not used | Not used |  * Config  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | k | workshift(h) | branchHandlingTime(h) | UCCHandlingTime(h) | stopTimeFirstEchelon(h) | stopTimeSecondEchelon(h) | distanceType | HaversineCalibration | | 0.58 | 8 | 0 | 0 | 0.0833 | 0 | 2 | 1.611111111 |  * Vehicle  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Name\*1 | CapacityUnits | CapacityKgs | - | - | velocity(km/s) | autonomy(km) | stopTime(h) | | Light Commercial Vehicles,Diesel,N1-III,Euro 6 a/b/c | 161 | 1500 | 6.8 | 175 | 45 | 500 | 0.083 |  * Zones  |  |  | | --- | --- | | id | 1 | | Name | LEZ Madrid | | URL Exists | 1 | | URL | https://datos.madrid.es/egob/catalogo/300229-0-trafico-madrid-central.zip | | shapefile\_exists | 0 | | shapefile\_url | /SHAPEFILE/Madrid\_Central.shp | | area(km2) |  | | Centroid\_latitude |  | | Centroid lontgitude |  | | avg\_size | 1 | | total\_services | 223 |  * Services   See documentation. Updated daily with the values of the services delivered into Madrid LEZ | |
| SHAPEFIILE\*2 | |
| Optional folder to save the shapefiles if available. | |
| Template For COPERT | |
| Excel file to copy the results of the two Echelon model and execute the COPERT model. Locally, LL1 Madrid is using a Jupiter notebook.  zlc\_LEAD\_input\_to\_COPERT.xlsx | |
| EXECUTION\*3 | |
| Rscript C:/LEAD\_MODELS/NEW/2echelon-main/00\_One\_Echelon.R C:/LEAD\_MODELS/NEW/2echelon-main/  Rscript C:/LEAD\_MODELS/NEW/2echelon-main/LEAD\_LL1\_connector.R "\_as-is\_zlc\_Diesel\_van"  zlc\_LEAD\_to\_from\_COPERT.ipynb | |
| OUTPUTS \*4 | |
| Type of network: Direct Shipment  Number of vehicles: 3  Total Distance (km): 194.01  EC (MJ): 0.00059; CO2 (g): 0.044; PM2.5(g):4.20E-06; NO2(g):5.75E-05; VoC (g): 4.79E-08 | |
| Type of Vehicle (Echelon 1): Light Commercial Vehicles,Diesel,N1-III,Euro 6 a/b/c  Number of vehicles: 3  Mean Distance (km/vehicle): 64.67  EC (MJ): 0.00059; CO2 (g): 0.044,; PM2.5(g):4.20E-06; NO2(g):5.75E-05; VoC (g): 4.79E-08- | Type of Vehicle (Echelon 2): Not applied  Number of vehicles: Not applied  Total Distance (km): Not applied  EC (MJ): not applied; CO2 (g): not applied; PM2.5(g): not applied; NO2(g): not applied; VoC (g): not applied |

## TO BE Scenario: representing real implementation

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| Scenario: LL1 Madrid TO BE Scenario – pilot implementation | |
| CityLogin the logistic service provider in LL1 delivers parcels (30x30x40) into the Low Emissions Zone in Madrid in the city centre of Madrid from the warehouse in San Fernando 30kms far away from the LEZ into two echelons. Echelon-1 supplies the UCC in Plaza Mayor with Hybrid vans. Echelon-2 delivers the parcels to the consumers using Three-wheeler vehicles. | |
| INPUT DATA (csv Files) | |
| * Facilities  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Name | Street | Number | Zone | ZipCode | latitude(WGS84) | longitude(WGS84) | handlingTime | StartingTime | EndingTime | | San Fernando | Avenida del Sistema Solar | 27 | San Fernando Henares | 28830 | 40.450472 | -3.494262 | 0 | Not used | Not used | | UCC Departure | San Felipe Neri | 1 | Madrid | 28013 | 40.4161737 | -3.7087409 | 0.33 | 9:00 | 17:30 |  * Config  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | k | workshift(h) | branchHandlingTime(h) | UCCHandlingTime(h) | stopTimeFirstEchelo(h) | stopTimeSecondEchelon(h) | distanceType | HaversineCalibration | | 0.58 | 8 | 0 | 0 | 0.0833 | 0 | 2 | 1.611111111 |  * Vehicle  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Name\*1 | CapacityUnits | CapacityKgs | - | - | velocity(km/s) | autonomy(km) | stopTime(h) | | Light Commercial Vehicles,Hybrid,N1-III,Euro 6 a/b/c | 161 | 1500 | 6.8 | 175 | 45 | 500 | 0.083 | | Three wheeler,Electric, Cargo, Vehicle | 34 | 250 | 1.4 | 140 | 35 | 100 | 0.083 |  * Zones  |  |  | | --- | --- | | id | 1 | | Name | LEZ Madrid | | urlExists | 1 | | URL | https://datos.madrid.es/egob/catalogo/300229-0-trafico-madrid-central.zip | | shapefile\_exists | 0 | | shapefile\_url | /SHAPEFILE/Madrid\_Central.shp | | area(km2) |  | | Centroid\_latitude |  | | Centroid lontgitude |  | | avg\_size | 1 | | total\_services | 223 |  * Services   See documentation. Updated daily with the values of the services delivered into Madrid LEZ | |
| SHAPEFIILE\*2 | |
| Optional folder to save the shapefiles if available. | |
| Template For COPERT | |
| Excel files to copy the results of the two Echelon model and execute the COPERT model for the first leg and the EVCO2 model for the second leg. Locally, LL1 Madrid is using two Jupiter notebooks (likely to be changed).  zlc\_LEAD\_input\_to\_COPERT.xlsx  zlc\_LEAD\_input\_to\_EVCO2\_1\_factors.xlsx  zlc\_LEAD\_input\_to\_EVCO2\_2\_energy\_consumption.xlsx | |
| EXECUTION\*3 | |
| Rscript C:/LEAD\_MODELS/NEW/2echelon-main/00\_Two\_Echelon.R C:/LEAD\_MODELS/NEW/2echelon-main/  Rscript C:/LEAD\_MODELS/NEW/2echelon-main/LEAD\_LL1\_connector.R "\_to-be\_zlc\_hybrid\_van \_electric\_scooter"  zlc\_LEAD\_to\_from\_COPERT.ipynb  zlc\_LEAD\_to\_from\_EVCO2.ipynb | |
| OUTPUTS \*4 | |
| Type of network: 2Echelon Shipment  Number of vehicles: 2+7  Total Distance (km): 146.96  EC (MJ): 0.0004+X; CO2 (g): 0.029+X; PM2.5(g):2.59E-06; NO2(g):1.25E-06; VoC (g): 3.04E-08 | |
| Type of Vehicle (Echelon 1): Light Commercial Vehicles, Hybrid, N1-III,Euro 6 a/b/c  Number of vehicles: 2  Mean Distance (km/vehicle): 59.83  EC (MJ): 0.0004; CO2 (g): 0.029; PM2.5(g):2.59E-06; NO2(g):1.25E-06; VoC (g): 3.04E-08 | Type of Vehicle (Echelon 2): Three wheeler,Electric, Cargo,Vehicle  Number of vehicles: 7  Total Distance (km/vehicle): 3.9  EC (MJ): X\*5; CO2 (g): X\*5; PM2.5(g): 0; NO2(g): 0; VoC (g):0 |

# Simulated scenarios

## Modifying the AS IS Scenario: changing the vehicle -electric van

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| Scenario: LL1 Madrid AS IS Scenario – simulated scenario | |
| Considering the AS IS scenario, this scenario uses and electric van for delivering. The parameters to update are the name of the vehicle, the speed and the capacity. | |
| INPUT DATA (csv Files) | |
| * Facilities (the same)  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Name | Street | Number | Zone | ZipCode | latitude(WGS84) | longitude(WGS84) | handlingTime | StartingTime | EndingTime | | San Fernando | Avenida del Sistema Solar | 27 | San Fernando Henares | 28830 | 40.450472 | -3.494262 | 0 | Not used | Not used |  * Config (the same)  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | k | workshift(h) | branchHandlingTime(h) | UCCHandlingTIme(h) | stopTimeFirstEchelo(h) | stopTimeSecondEchelon(h) | distanceType | HaversineCalibration | | 0.58 | 8 | 0 | 0 | 0.0833 | 0 | 2 | 1.611111111 |  * Vehicle (changes – parameters by the command line)  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Name\*1 | CapacityUnits | CapacityKgs | - | - | velocity(km/s) | autonomy(km) | stopTime(h) | | "Transit,Electric,Cargo,Vehicle" | 161 | 1500 | 6.8 | 175 | 45 | 500 | 0.083 |  * Zones (same)  |  |  | | --- | --- | | id | 1 | | Name | LEZ Madrid | | uirlExists | 1 | | URL | https://datos.madrid.es/egob/catalogo/300229-0-trafico-madrid-central.zip | | shapefile\_exists | 0 | | shapefile\_url | /SHAPEFILE/Madrid\_Central.shp | | area(km2) |  | | Centroid\_latitude |  | | Centroid lontgitude |  | | avg\_size | 1 | | total\_services | 223 |  * Services   See documentation. Updated daily with the values of the services delivered into Madrid LEZ | |
| SHAPEFIILE\*2 | |
| Optional folder to save the shapefiles if available. | |
| Template For COPERT | |
| As is an electric van, this case will use the EVCO2 model and needs the templates for this model-  Excel files to copy the results of the two Echelon model and execute the EVCO2 model. Locally, LL1 Madrid is using a Jupiter notebook.  zlc\_LEAD\_input\_to\_EVCO2\_1\_factors.xlsx  zlc\_LEAD\_input\_to\_EVCO2\_2\_energy\_consumption.xlsx | |
| EXECUTION\*3 | |
| Rscript C:/LEAD\_MODELS/NEW/2echelon-main/01\_One\_Echelon\_vehicle.R C:/LEAD\_MODELS/NEW/2echelon-main/ " Transit,Electric,Cargo,Vehicle" 161 45  Rscript C:/LEAD\_MODELS/NEW/2echelon-main/LEAD\_LL1\_connector.R "\_as-is\_zlc\_electric\_van "  zlc\_LEAD\_to\_from\_EVCO2.ipynb | |
| OUTPUTS \*4 | |
| Type of network: Direct Shipment  Number of vehicles: 3  Total Distance (km): 194.01  EC (MJ): X\*5; CO2 (g): X\*5; PM2.5(g):0; NO2(g):0; VoC (g): 0 | |
| Type of Vehicle (Echelon 1): Transit,Electric,Cargo,Vehicle  Number of vehicles: 3  Mean Distance (km/vehicle): 64.67  EC (MJ): X\*5; CO2 (g): X\*5; PM2.5(g):0; NO2(g):0; VoC (g): 0 | Type of Vehicle (Echelon 2): Not applied  Number of vehicles: Not applied  Total Distance (km): Not applied  EC (MJ): not applied; CO2 (g): not applied; PM2.5(g): not applied; NO2(g): not applied; VoC (g): not applied |

*\*1: Name of the vehicles used according to the COPERT model data base for the Diesel and Hybrid vehicles. For the electric vehicles, the name convection defined by LL1.*

*\*2: Optional, if the shapefile or the URL are not available, then the area, the latitude and longitude of the delivery zone has to be included manually in the zones table.*

*\*3 It contains the steps used by LL1 locally to run the pilot’s implementation real scenarios and facilitate the integration in the DT. Below, 2 simulated scenarios by changing specific input parameters.*

*\*4: Preliminary outputs to be presented to the business users through the dashboard. Still under definition.*

*\*5: To be calculated. Still under definition*

## Modifying the AS IS Scenario: changing the vehicle – Hybrid van

## Modifying the TO BE Scenario: changing the 1st leg vehicle with an electric van

## Modifying the TO BE Scenario: changing the location for the UCC