

# Dynamic congestion toll pricing strategies to evaluate the potential of route-demand diversion on toll facilities

Dimitrios Triantafyllos<sup>1\*</sup>, Carles Illera<sup>1</sup>, Tamara Djukic<sup>1</sup>, Jordi Casas<sup>1</sup>  
<sup>1</sup>Aimsun SL

In many of the EU's largest cities, the statutory European guideline of 40µg/m<sup>3</sup> for nitrogen dioxide (NO<sub>2</sub>) in the urban area is exceeded.

Congestion pricing is considered an effective management policy that aims to limit the access of traffic towards heavily congested areas.

Dynamic zone-based congestion pricing system in networks with heterogeneous users, where the variable fares are calculated based on traffic congestion and environmental emission indicators calculated by the London Emission Model (LEM) to ensure reduction of emissions in the network.

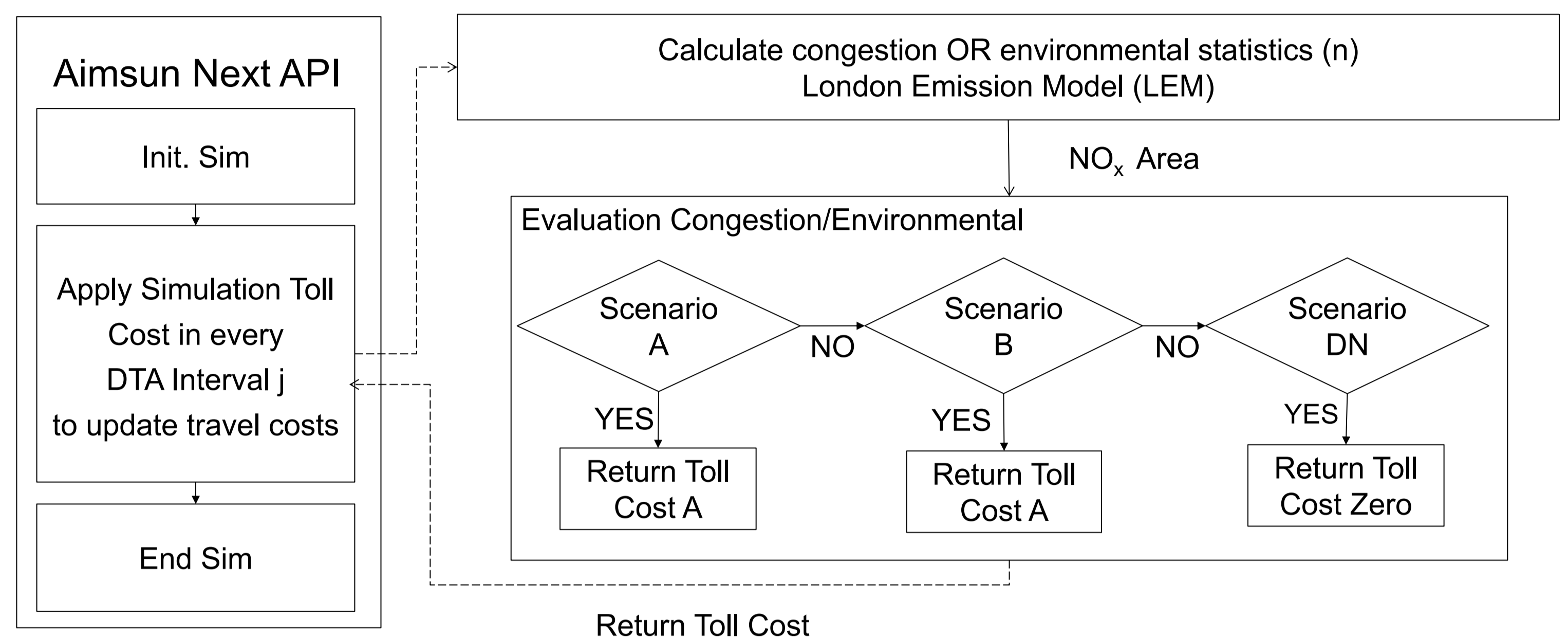


Figure 1. Dynamic congestion pricing methodology

Adaptivity of the users to toll system has been modelled within the DTA framework to reflect that drivers with a destination inside the cordon area can change their destination to avoid paying the toll.

Congestion pricing policies scenarios:

- a. Base scenario with Do-Nothing (DN)
- b. Base scenario with fixed toll (FT)
- c. Base scenario with dynamic toll policy based on NO<sub>x</sub> emissions (DT)

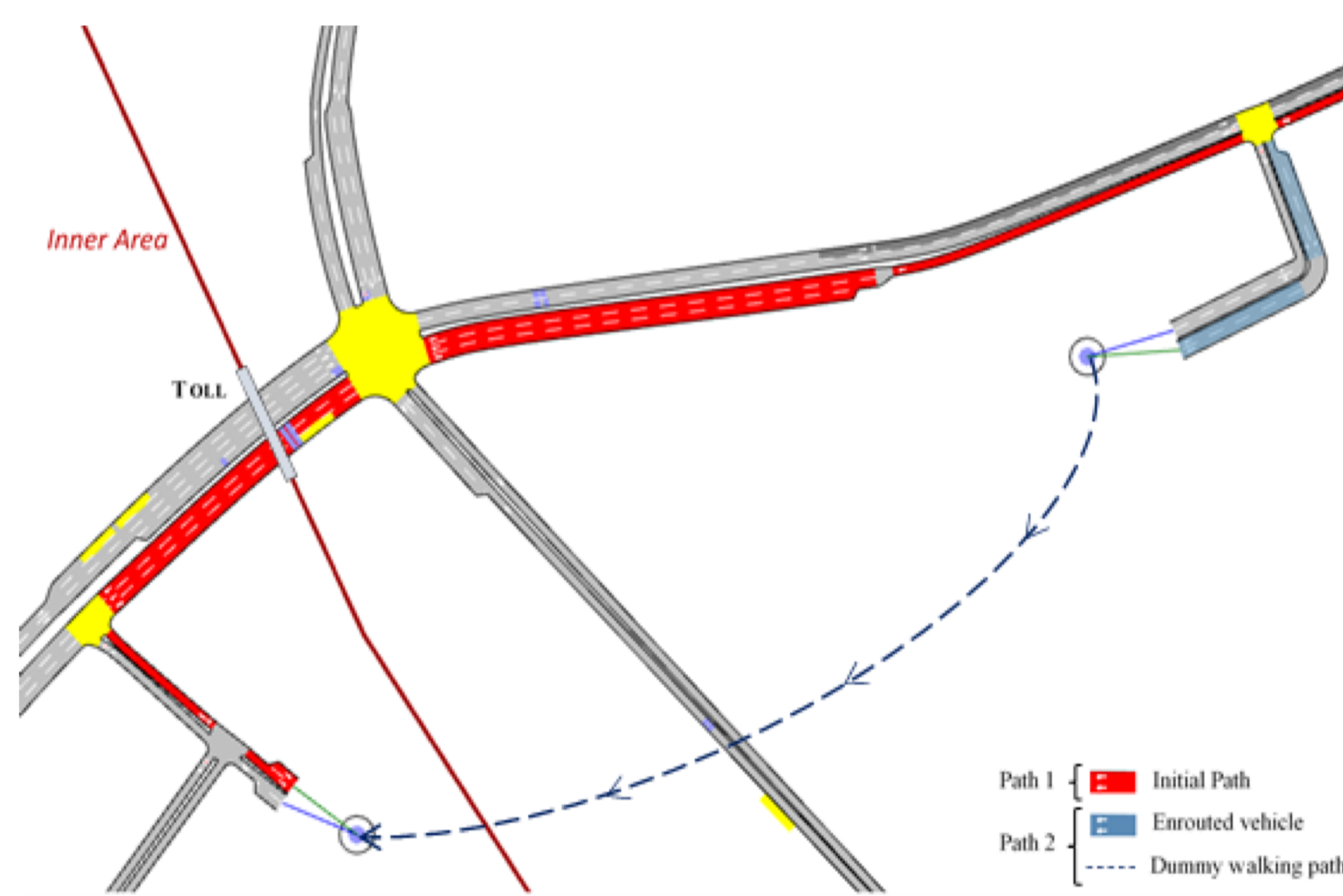


Figure 2. 3 walking links as alternative destinations

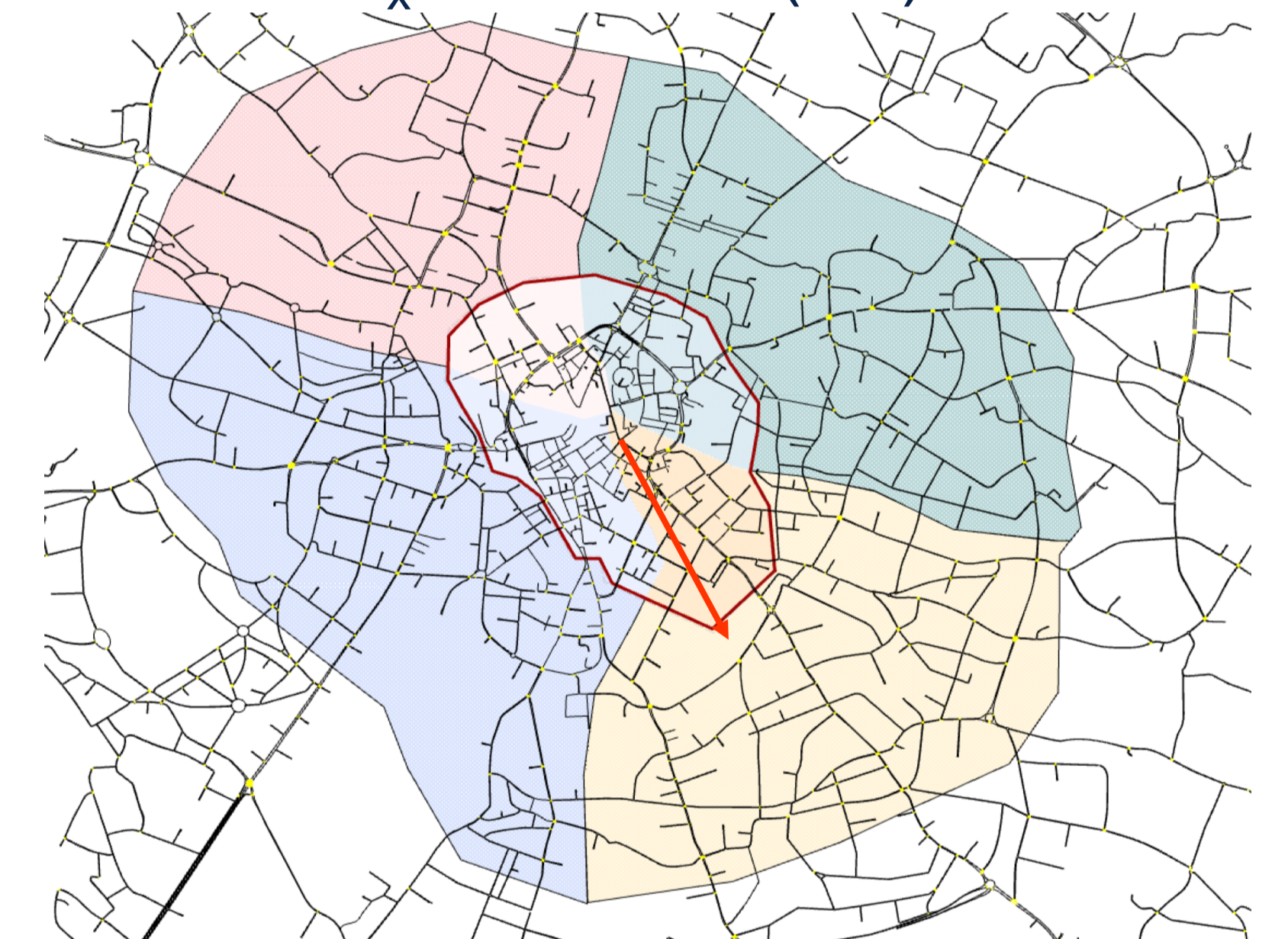


Figure 3. 4 zones where NO<sub>x</sub> data are estimated and used to compute a dynamic tolls

Dynamic congestion pricing methods needs to consider:

1. enable drivers to shift to alternative routes, mode or destination;
2. use of predict traffic conditions from historical and real data;
3. use of real emission data obtained from environmental stations.

Table 2. Summary of the performance indicators per simulation scenario

Scenarios	Delay time cordon(min)	Delay time boundary (min)	NO <sub>x</sub> - cordon (g/km)	NO <sub>x</sub> - boundary (g/km)
DN	3.58	3.55	26.01	20.21
FT	3.40 (-5.03%)	5.03 (+41.69%)	21.73 (-16.46%)	21.72 (+7.47%)
DT	3.37 (-5.87%)	9.45 (+166.20%)	19.37 (-25.53%)	22.32 (+10.44%)

