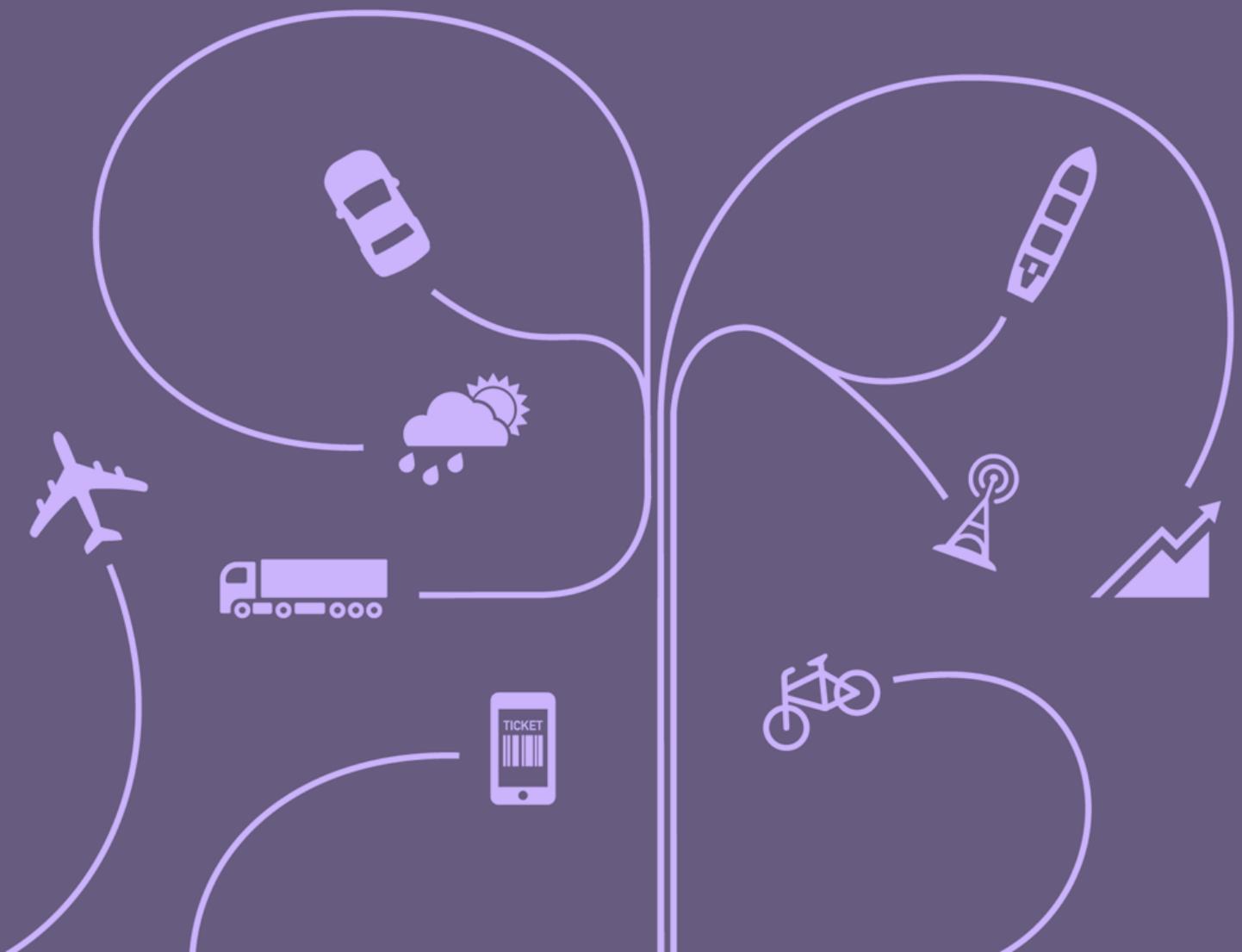


Quantifying Benefits from Consolidation Centres – MGL Carnival and Steve Porters case studies



Document Control

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Document Purpose and Scope

This report has been prepared by Transport Systems Catapult for the sole use of Meachers Global Logistics.

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1 Introduction

This report builds upon an existing document; ‘The Benefit of Consolidation Centres’ produced and facilitated by Meachers Global Logistics (MGL) to Transport Systems Catapult (TSC).

The MGL’s report analyses the economic benefits derived from real-world evidence data from the Carnival and Steve Porters case studies where Meachers is currently running two of its largest Consolidation Centres (CCs).

The analysis undertaken by MGL shows how consolidation reduces considerably the operational costs to all parties involved with the CC (both running fleet cost and penalty fees savings) and are of benefit to the environment through reduced emissions. We believe however, that there are further benefits not quantified that could contribute to make the case for the use of CCs.

In this regard, we enhance the analysis by considering additional operational costs savings across different impact categories as defined below:

- Distance related costs: Consider costs that increase proportionally with the total distance travelled by the logistic suppliers. We consider fuel consumption, tyre wear and fleet repair and maintenance costs.
- Time related costs: Consider costs that increase proportionally to the amount of hours operated by the logistics supplier. We include driver costs within this category
- Fixed costs: Considers costs that that are incurred regardless of the operation level undertaken by the freight transport fleet such as Vehicle finance and overhead costs.

More importantly, our analysis translates the emission savings presented in the MGL’s report into monetary values following the Transport Appraisal Guidance (WebTAG) methodology outlined by Department for Transport (DfT).

We quantify tonnes of carbon dioxide equivalent (CO₂e) and NO₂ emissions under each case study into monetary values using central estimates. It is important to note that we do not have included PM₁₀ within the environmental appraisal due to lack of data at this stage.

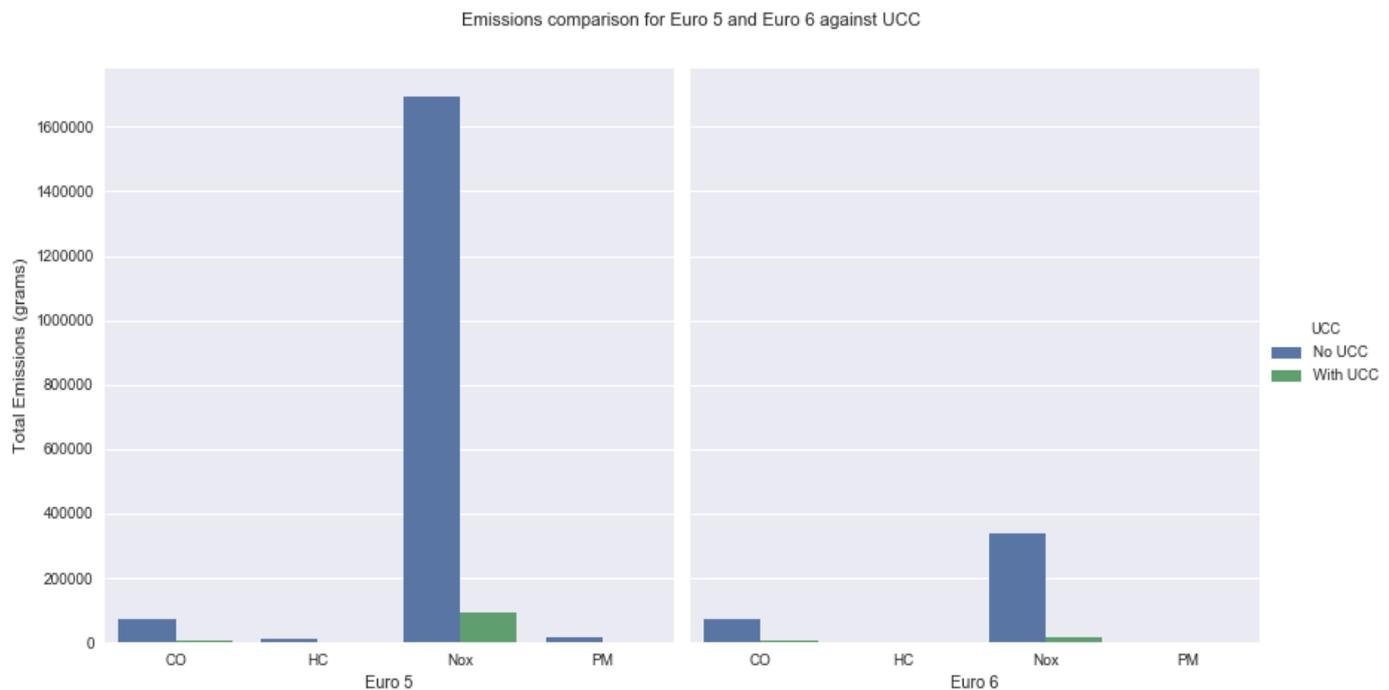
In addition, we acknowledge that there are further economic benefits arising from lower congestion levels and reduced accident rates due to the reduction of freight vehicles from the road that could also be quantified into monetary terms. We do not include them within this analysis due to lack of data at this stage.

While there is a grade of overlap between both the MGL report and the analysis presented here, the aim of the latter is not to be a substitute of the former but rather complement it providing additional insight into the benefits of running a CC.

Data is provided by MGL real world day-to-day operations from January to May 2017. We extrapolate this trend to account for the entire operational year based on a total of 250 operational days for Steve Porters and 284 for Carnival (in line with assumptions in the MGL report).

2 Emissions Comparison between logistic models

Carnival case study

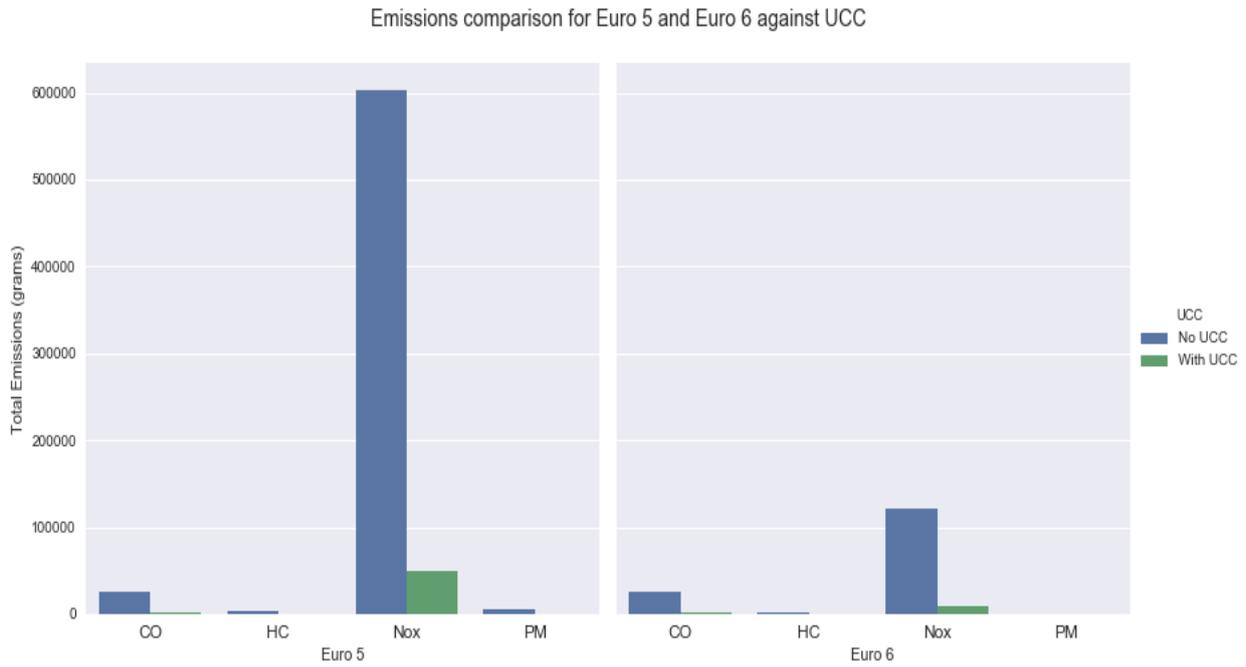


The graph above shows emissions data provided by Meachers Global Logistics (MGL) and extrapolated to account for an entire operational year. It has been split by engine type and compared between logistic models i.e. having a consolidation centre or not.

There is a clear reduction in NOx emissions followed by the implementation of the CC which becomes more significant when it involves reducing Euro5 vehicles from the road.

CO emissions also reduce considerably followed by the implementation of the CC and by the same amount regardless the engine type. HC and PM pollutants become negligible followed the implementation of the CC for both engine types.

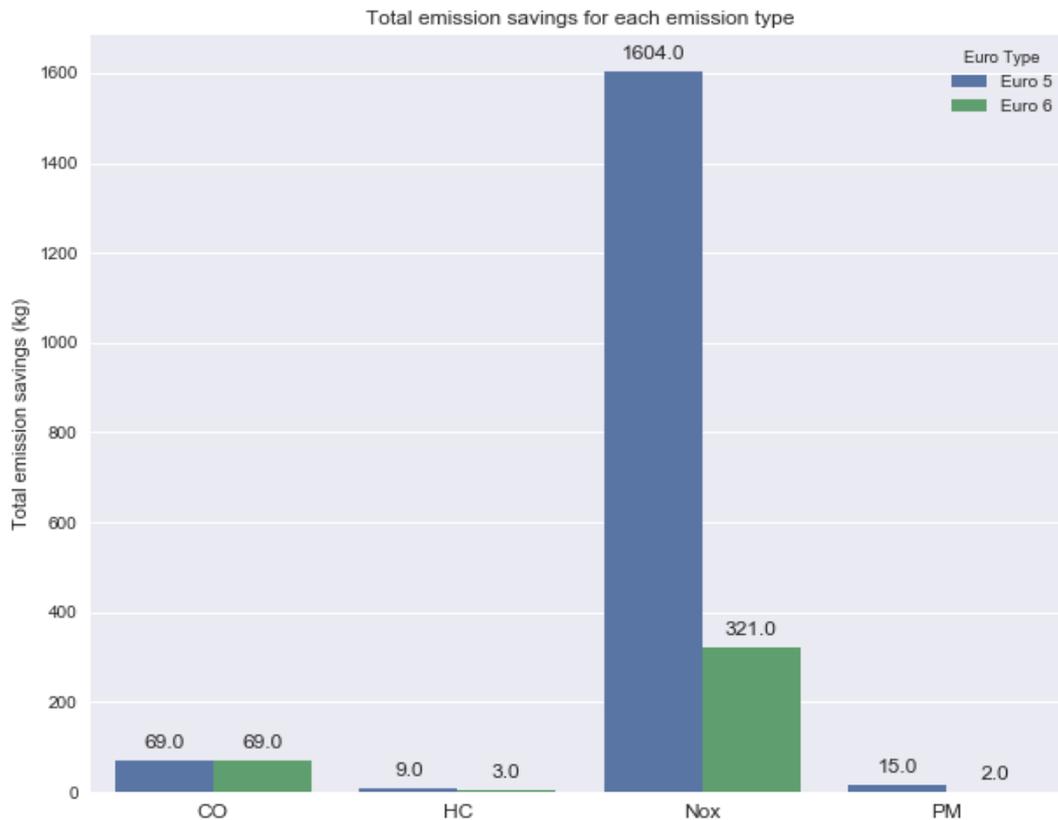
Steve Porters case study



Similar trend (although at a smaller scale of operations) can be observed in the graph above, which is based on Steve Porters case study.

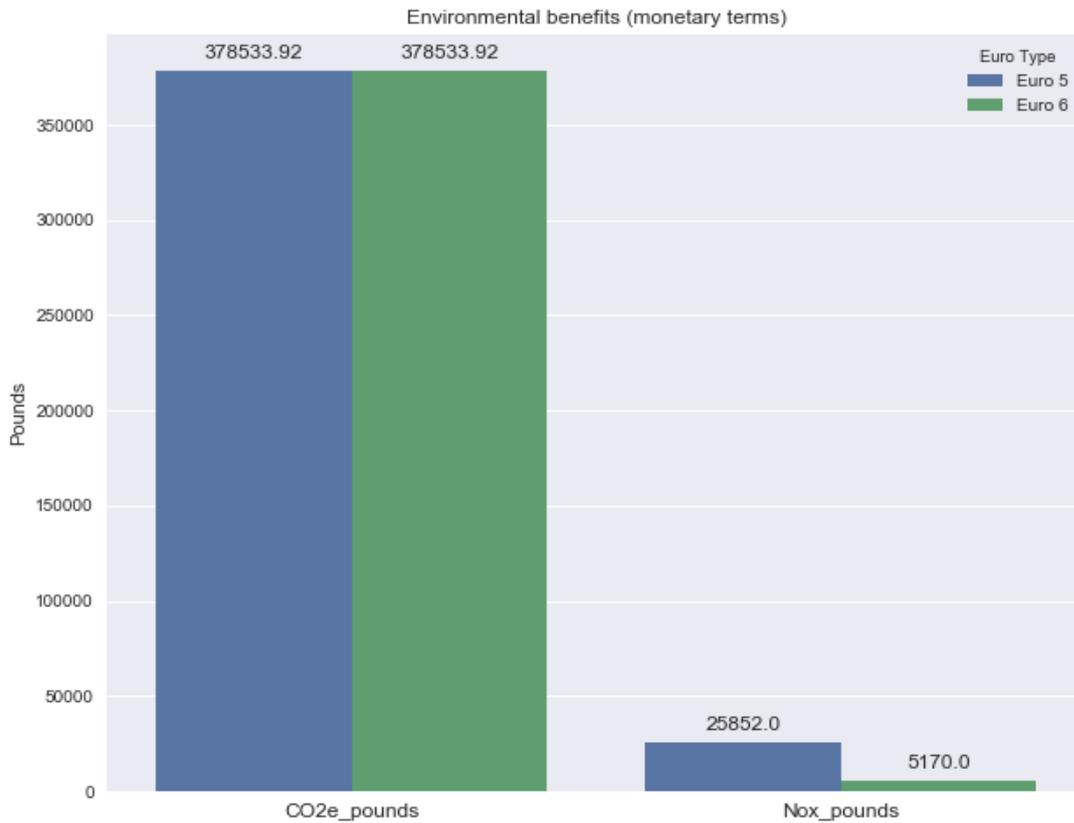
3 Environmental benefits

Carnival case study



The graph above shows total emission savings for each pollutant compared against the two engine types. The largest savings comes from the NOx pollutant, by a total amount of 1,6tn (Euro 5) and 0.32tn (Euro 6).

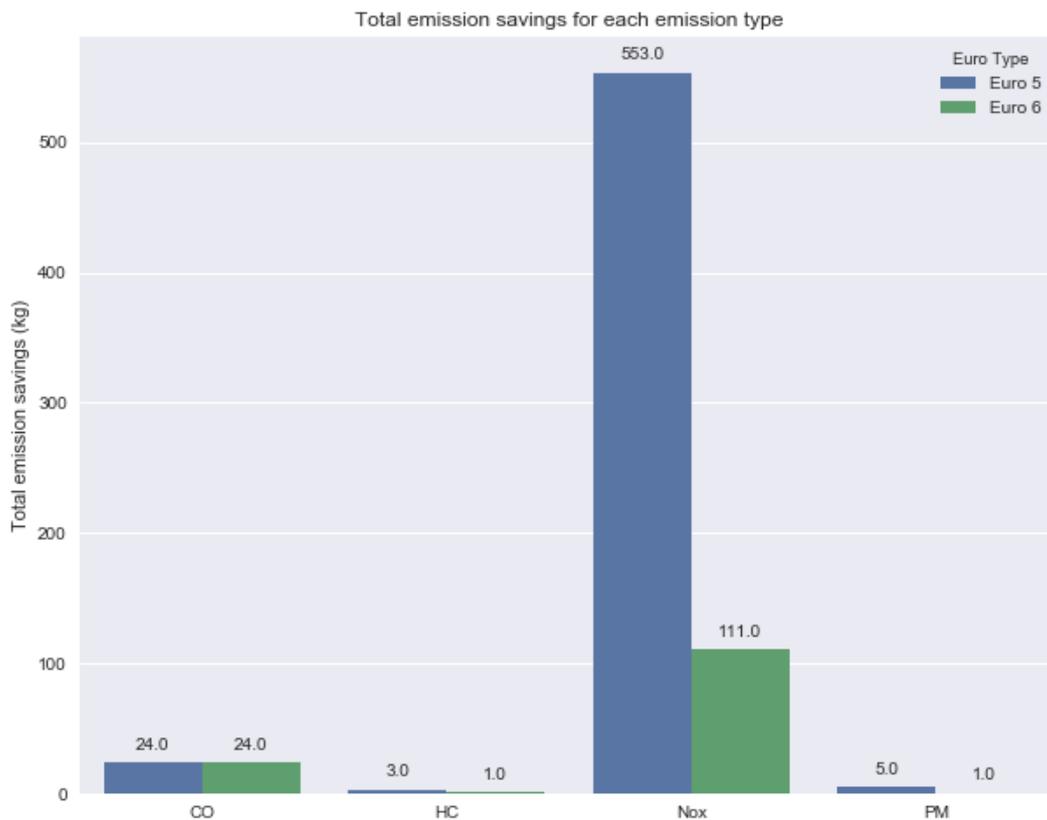
Again, CO₂ emissions savings is similar for both engine types and account by a total of 69kg.



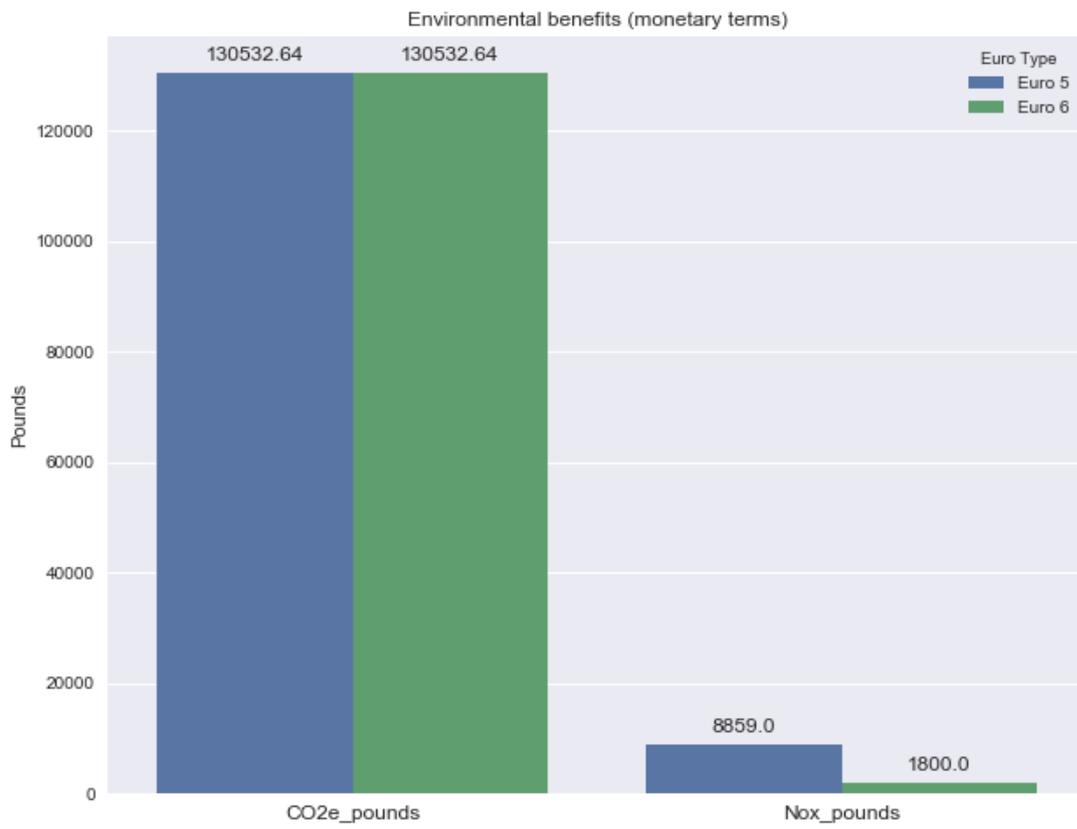
The graph above quantifies in monetary terms the emission savings shown in the previous chart. In this regard, CO₂ savings, for both engines, is quantified to derive a total environmental benefit of £378,533. Besides, NO_x is estimated to derive a total of £25,852 (Euro 5) and £5,170 (Euro 6).

It is important to note that economic benefits brought by the implementation of a CC are higher when it reduces the number of Euro 5 from the road, compared to reducing Euro 6 vehicles. This is due to the higher emissions rate of the former compared to the latter i.e. emission savings are greater.

Steve Porters case study

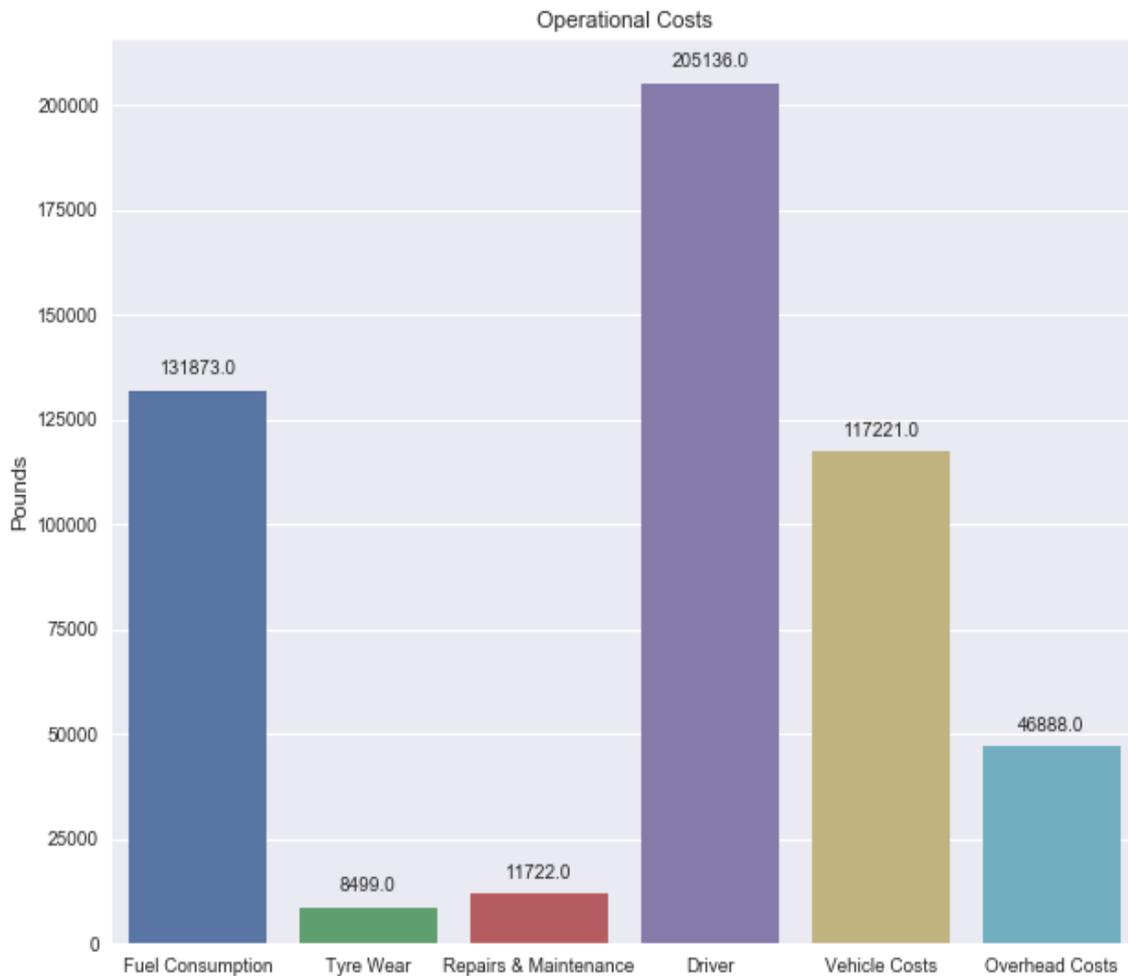


Once again similar trend in the emission savings for Steve Porters is observed. CO₂ emissions savings is estimated to derived a benefit of about £130,500 regardless the engine type. Besides, NO₂ savings could potentially bring a further benefit of about £8,859 (Euro 5) or £1,800 (Euro 6).



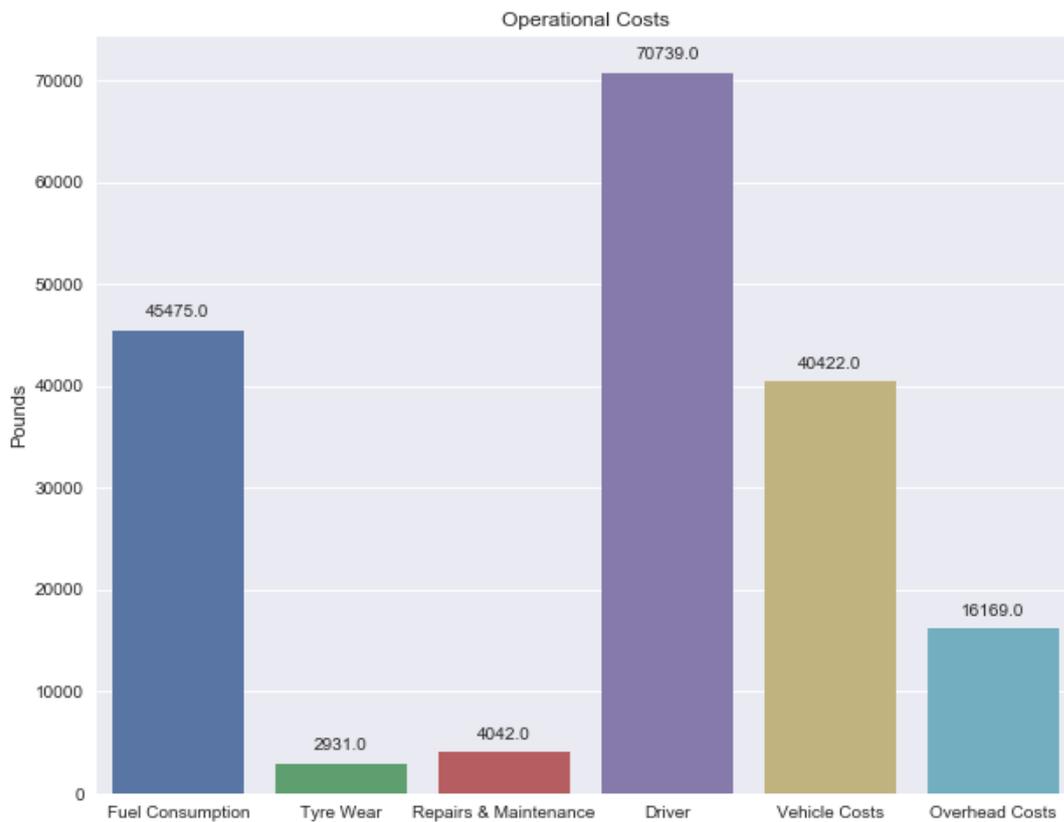
4 Operational costs

Carnival case study



The operational costs analysis shows that the largest amount of savings comes from driver time, which it is estimated at about £205,136.36 for the entire operational year and the Carnival case study. The second largest saving comes from the reduced fuel consumption by about £131,873.37. Vehicle costs savings are in third place by about £117,220.78.

Steve Porters case study



Again, same trend with the Carnival case study, driver cost savings are higher, followed by fuel consumption, vehicle costs and the rest.

5 Total savings

Carnival case study

The pie charts below show the breakdown of the total annual economic benefit derived by the implementation of the Consolidation Centre in Carnival case study. It considers economic benefits derived across the three following categories:

- Operational costs savings from running the fleet
- Penalty fee charges reduction (Only for Euro 5 and below)
- Monetised environmental benefits from reduced emissions

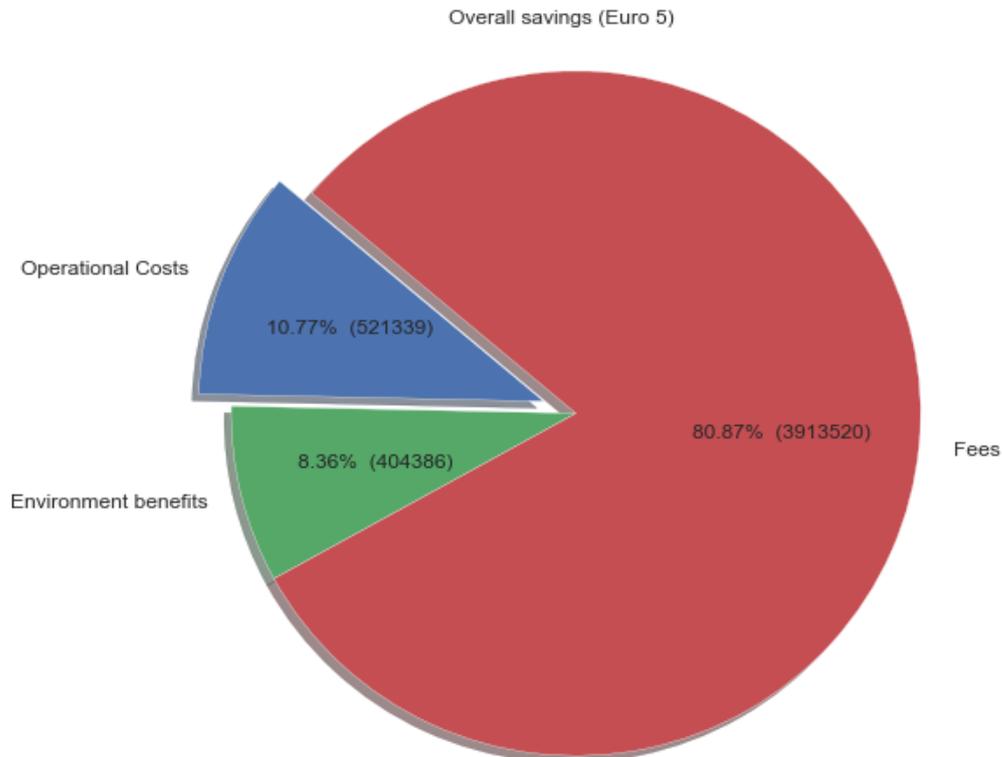
Additionally, the analysis distinguishes between Euro5 and Euro6.

Euro 5

Operational Cost Savings: £521,339

Penalty fees: £3,913,520

Environmental Benefits: £404,386

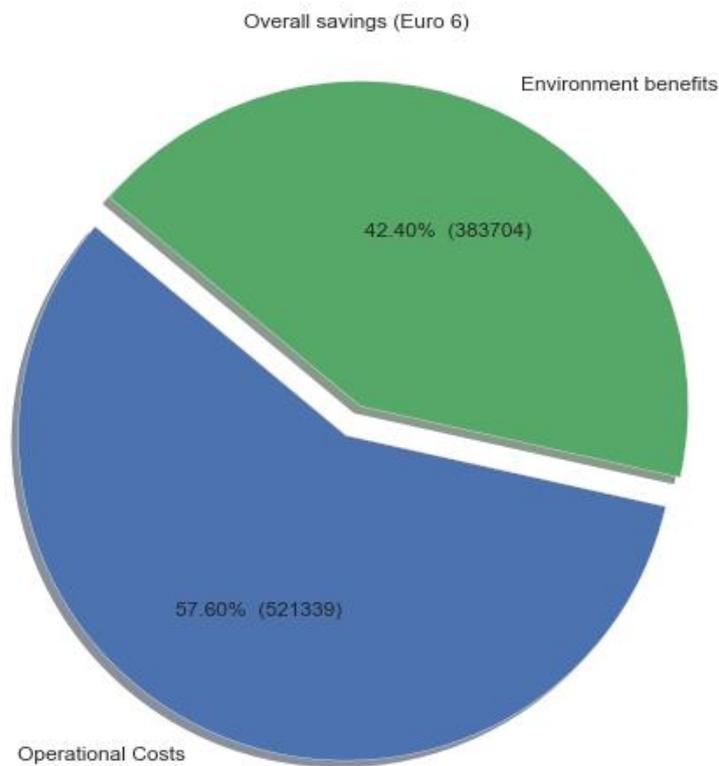


Euro 6

Operational Cost Savings: £521,339

Penalty fees: £0

Environmental Benefits: £383,704



When the implementation of consolidation centre effectively reduces Euro 5 vehicles from entering the Clean Air Zone, it can be observed that largest economic benefits involves the reduction if penalty fee charges that account by about £3.9m

Steve Porters case study

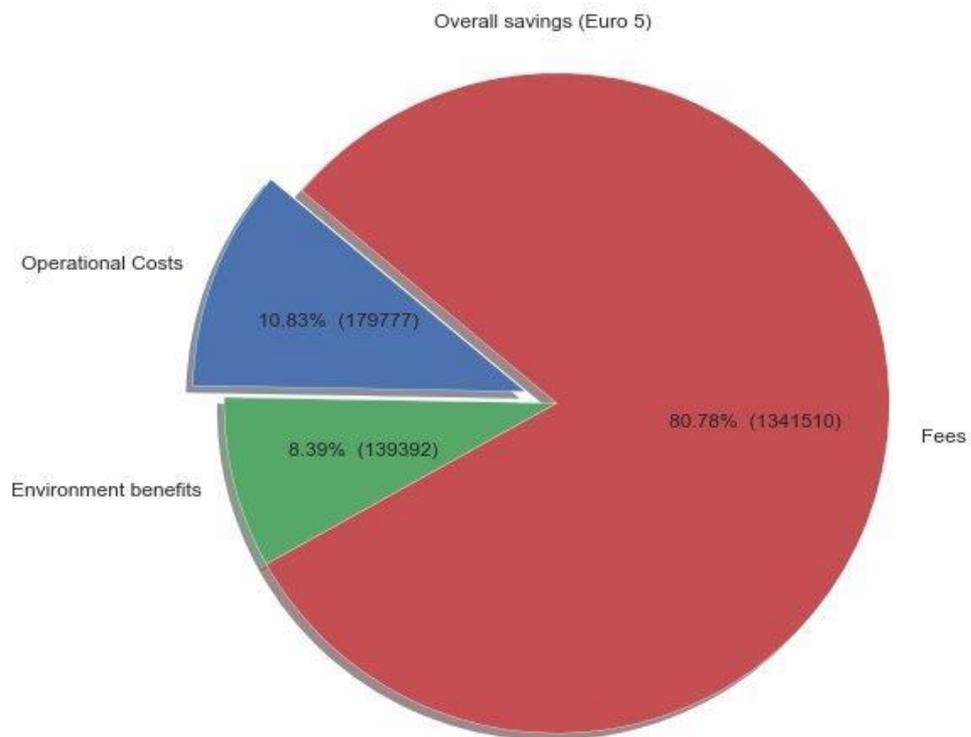
Similarly, for the Steve Porters case study:

Euro 5

Operational Cost Savings: £179,777

Penalty fees: £1,341,510

Environmental Benefits: £139,392



Euro 6

Operational Cost Savings: £179,777

Penalty fees: £0

Environmental Benefits: £132,333

