

# A study of the carbon footprint of car-transport with Irish Ferries.

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## 1 Introduction.

While the aviation industry has come under intense scrutiny for its carbon-footprint and contribution to global warming, little carbon-footprinting data is available from the different ferry companies operating on routes to Ireland. This report attempts to establish standards-based figure for the carbon-footprint of transporting a car on the Irish Ferries fleet. Irish ferries has been chosen as it is the major operator on sea-routes to Ireland.

All Irish Ferries specific data is referenced to sources on the Irish Ferries and ICG web-sites.

The aim of this report is to bring the emissions associated with ferry travel to the attention of both the travelling public and the ferry companies. Once accurate figures are established, travellers who are sensitive to the issue of global-warming can then make an informed choice of their travel options.

It also presents an opportunity to ferry companies to become pro-active on their emissions management programme and present a more a postive image to the public.

## 2 Total fuel consumption for the Irish Ferries fleet.

The total fuel consumption is 101,500 tonnes HFO (Heavy Fuel Oil) and 15,300 tonnes Marine diesel<sup>1</sup>. The 2007 results tell us that the fuel bill for the ferries section was €22 million and the container section had a bill for €14 million. This leaves us with the ferries section using 61% of the total fuel consumption.

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1 [http://www.icg.ie/pdf/Presentation\\_March\\_08\\_FINAL.pdf](http://www.icg.ie/pdf/Presentation_March_08_FINAL.pdf)

Convert this to litres, using 1kg/litre for HFO and 0.9kg/litre for Marine Diesel<sup>2</sup>.  
 This gives 101,500,000\*0.61/1 litres HFO and 15,300,000\*0.61/0.9 litres Marine Diesel

**Result : 61,915,000 liters HFO and 10,370,000 liters Marine diesel**

### 3 Greenhouse Gas emissions for the Irish Ferries Fleet.

The emissions factor for Marine Diesel is 2.63 kgCO<sub>2</sub>e / litre and 2.893 kgCO<sub>2</sub>e/litre for HFO , so total emissions are **61,915,000 \* 2.893 + 10,370,000 \* 2.63**

**Result : Total emissions are 206,393 tonnes CO<sub>2</sub>e**

### 4 The foot-passengers/cars/freight split

Irish ferries indicates that 5% of its revenue comes from foot-passengers, 40% from cars and 41% from freight<sup>1</sup>. If we accept the principle that the emissions are divided up in proportion to the value that they represent, then the cars transported represent 40% of the total emissions.

**Result : Emissions related to cars are 82,557 tonnes CO<sub>2</sub>e.**

### 5 Calculating an emissions/car-km figure.

The emissions/car-km figure will indicate the emissions associated with transporting a car a distance of 1 km. We know that Irish Ferries carried 405,000 cars in 2007<sup>3</sup>. If we look at the 4 ships in the Irish Ferries fleet and their car-carrying capacity we see the following:

Ship name	Cars capacity	Route	Route distance
Ulysses	1342	Dublin-Holyhead	100
Jonathan. Swift	200	Dublin-Holyhead	100
Isle of Inishmore	855	Rosslare-Pembroke	120
Oscar Wilde	580	Rosslare-Roscoff/Cherbourg	535

If we assume that the load factor for all ferries is equal, that breaks down the figure of 405,000 as follows :

Ship name	Cars capacity	Cars Carried
Ulysses	1342	182570
Jonathan Swift	200	27209
Isle of Inishmore	855	116317
Oscar Wilde	580	78905
<b>Total</b>	<b>2977</b>	<b>405000</b>

<sup>2</sup> [http://en.wikipedia.org/wiki/Fuel\\_oil](http://en.wikipedia.org/wiki/Fuel_oil)

<sup>3</sup> [http://www.icg.ie/investor/announcements\\_080310.html](http://www.icg.ie/investor/announcements_080310.html)

We know from Irish Ferries that in 2007 its ferries made 4100 trips between Ireland and the UK and 300 trips between Ireland and France<sup>1</sup>. If we make the assumption that the Ireland-UK trips are split evenly between the three routes, in the absence of more detailed figures, we can calculate the car-km figure, i.e. the amount of cars carried multiplied by the kms travelled.

Ship name	Cars capacity	Cars Carried	Car-kms
Ulysses	1342	182570	18256970
Jonathan Swift	200	27209	2720860
Isle of Inishmore	855	116317	13958011
Oscar Wilde	580	78905	37874370
<b>Total</b>	<b>2977</b>	<b>405000</b>	<b>72810212</b>

This allows us to derive the emissions/car-km figure, i.e.82,557 tonnes CO<sub>2</sub>e divided by 72,810,212 car-km.

**Result : Each car-km generates 1.13 kg CO<sub>2</sub>e**

## 6 The emissions on the different Irish Ferries routes.

With the emissions/car-km figure above the prospective traveller can now calculate the emissions generated.

Ship name	Route	Route distance	Emissions
Ulysses	Dublin-Holyhead	100	113 kg CO <sub>2</sub> e
Jonathan. Swift	Dublin-Holyhead	100	113 kg CO <sub>2</sub> e
Isle of Inishmore	Rosslare-Pembroke	120	136 kg CO <sub>2</sub> e
Oscar Wilde	Rosslare-Roscoff/Cherbourg	535	605 kg CO <sub>2</sub> e

## 7 Conclusions

This initial study shows that travelling with one's car by ferry has non-negligible associated emissions. A return trip Dublin-Holyhead would result in 226kg CO<sub>2</sub>e. To put this in perspective, the average European car emits 161gCO<sub>2</sub>e/km<sup>4</sup>, i.e. a Dublin-Holyhead return trip is the equivalent of driving 1400km in this average car.

In order to present potential travellers with more accurate figures, more data is needed from the ferry companies.

There is no indicator that Irish Ferries differs in any way from other ferry operators on Irish routes in terms of emissions and emissions management.

## 8 Potential Inaccuracies/Remarks

- For the sake of simplicity it is assumed that all vessels in the fleet have the same emissions profile. This is obviously not the case for the Jonathan Swift which is a high-speed catamaran.

<sup>4</sup> [http://ec.europa.eu/environment/co2/co2\\_home.htm](http://ec.europa.eu/environment/co2/co2_home.htm)

- It is assumed that the two fuel types, HFO and Marine-diesel, are equally used on all routes. This is probably not the case given the different vessel types.
- The distance Rosslare-Roscoff/Cherbourg is based on an average of the distances to Roscoff ( 480 km ) and to Cherbourg ( 580km ). No figures are available to indicate the proportion of trips to these two ports.
- It is assumed that the 4100 Irish sea crossings are split evenly between the three vessels Ulysses / Jonathan Swift / Isle of Inishmore. This is probably not the case but more exact figures are unavailable.
- The revenue split for passengers/cars/freight of 5%/40%/41% is an average for the fleet. Individual vessels will have different revenue splits, particularly the Jonathan Swift.
- The revenue-split-model for apportioning emissions responsibilities is not perfect. The rationale behind the model is that if the revenue for a particular route drops, at some point the number of sailings on that route will drop also with a proportional decrease in fuel-consumption/emissions. This obviously is largely seasonally dependent as prices on Irish Ferries routes increase dramatically during peak summer period.
- The revenue-split-model used also ignores seasonal changes in this split due to unavailable data. This might result in a reduction in the responsibility of freight transport in the winter months when its proportion of revenues is higher than in the peak tourist period of July/August.
- No allowance is made for the difference between a car carrying one passenger and a car carry 5 passengers, nor for the kind of accommodation used on the Ireland-France routes. Again, for the revenue-split model to be accurate these details need to be factored in.
- The above calculations are based solely on the fuel-used by the ferries. This corresponds to partial completion of “Scope 1” as defined in the GHG protocol<sup>5</sup> and “Direct Emissions” as defined in ISO 14064-1<sup>6</sup>. Land-based fuel use has not be accounted for.
- A more thorough carbon-footprint, corresponding to “Scope 3” of the GHG protocol<sup>5</sup> would include an audit of the company's shore-based operations and the footprint related to the vessel's construction.

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5 <http://www.ghgprotocol.org/standards/corporate-standard>

6 [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38381](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38381)