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## 1. Overview

QuickTrav invoicing currently only supports the Cleaner Climate method of calculating carbon emissions on air tickets, car hire and accommodation. This method complies with the Greenhouse Gas (GHG) Protocol which is the most widely used international accounting tool for understanding, quantifying and managing greenhouse gas emissions.

Carbon emissions are calculated in tonnes of Co2 by multiplying various emission factors provided by Cleaner Climate against ticket air miles, car days and accommodation nights.

Carbon emissions may optionally be reflected on each invoice and detailed customised reports may be extracted using the standard line item query module.

## 2. Setup

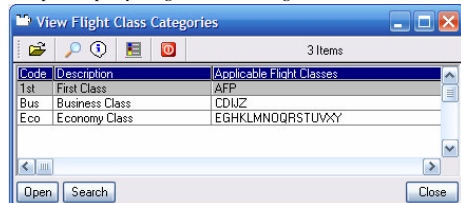
The system comes shipped with preloaded Cleaner Climate emission factors and to activate the carbon footprint functionality, you simply have to select Cleaner Climate as the Carbon footprint calculation method.

Carbon Footprint	
Carbon Footprint Calculation method	Cleaner Climate
Domestic All Class - Emission Factor (CO2 kgs/mile)	0.161219
Short Haul Economy Class - Emission Factor (CO2 kgs/mile)	0.086174
Short Haul Business Class - Emission Factor (CO2 kgs/mile)	0.129214
Short Haul First Class - Emission Factor (CO2 kgs/mile)	0.129214
Short Haul Unknown Class - Emission Factor (CO2 kgs/mile)	0.090404
Long Haul Economy Class - Emission Factor (CO2 kgs/mile)	0.074218
Long Haul Business Class - Emission Factor (CO2 kgs/mile)	0.215204
Long Haul First Class - Emission Factor (CO2 kgs/mile)	0.296871
Long Haul Unknown Class - Emission Factor (CO2 kgs/mile)	0.101716
Car Hire - Emission Factor per day	0.040000
Accommodation - Emission Factor per night	0.031000
Show estimated CO2 emissions on invoices?	X

The base units for air ticket emissions are nautical air miles. You do **not** have to have air miles activated in the branch setup (this setting is provided for the old method of capturing total air miles per ticket).

The system also needs to know the seat classes to identify which emission factor to use so you must ensure that the flight class categories have been correctly setup as follows;

Setup\Company\Flight Class Categories



**⚠** If flight the class categories are not setup, the emissions will be based on the "Unknown" set class factor

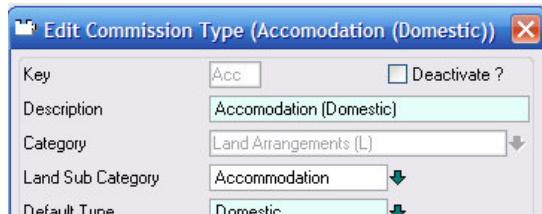
The base units for car and hotel bookings are days and nights respectively. In order for the system to be able to calculate the relevant duration, you need to activate the capture of return dates in the branch ticketing setup (although this switch is under ticketing, it is used for land arrangements as well)

Branch setup\Ticketing

Capture Flight Times ?	✓
Capture Fare Basis ?	✓
Capture Return Dates ?	✓
Capture Tour Codes ?	✓
Capture IATA Numbers ?	✓

**⚠** If no return dates are available, the duration will be set to 1 which will result in understated emissions

The system also needs to know whether a land arrangement is a car hire or accommodation and as many agencies use multiple or custom commission type codes over and above the standard 'Car' and 'Acc', each car and accommodation land commission type must be flagged with the relevant sub category



**⚠** *If land commission type are not categorised, they will be ignored by the carbon calculations*

### 3. Calculations

#### 3.1 Air Tickets

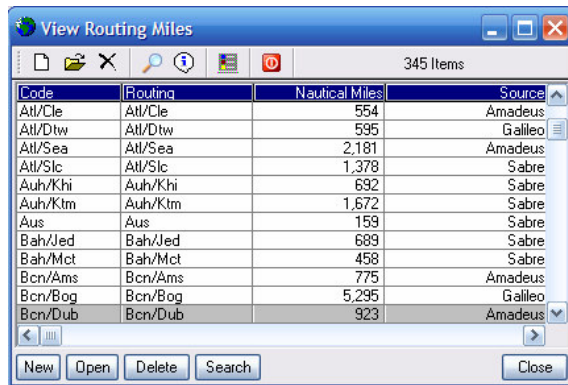
The carbon emission is calculated on all air tickets and refunds by multiplying each leg's air miles by the emission factor matching the route type (domestic, short haul or long haul) and class (economy, business and first).

Note: An international leg is deemed short haul if the leg distance is less than 3122 nm otherwise it is deemed long haul.

QuickTrav invoicing v1.6q+ automatically imports a standard set of routings and related air miles into the routing nautical air miles table (included in the genmast.def shipped with the upgrade) and automatically updates the table from the GDS booking whenever a ticket is imported. This table can also be manually edited for routes that have not been imported or for older routes before upgrading.

1 nm (nautical mile)	1.15 m (statutory mile)	1.852 km (kilometre)
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Setup\Company\Routing Miles



#### 3.2 Car Hire

The carbon emission is calculated on those land arrangements with commission / service types flagged as Car Hire by multiplying the car days by the single car hire emission factor. Car days are calculated as the number of days from the travel to the return date (inclusive).

#### 3.3 Accommodation

The carbon emission is calculated on those land arrangements with commission / service types flagged as Accommodation by multiplying the room nights by the single accommodation emission factor. Accommodation nights are calculated as the number of nights between the travel and return dates.

## 4. Queries

All carbon emission queries must be extracted from the line item query module and ticket emissions may optionally be shown by each segment on the ticket.

### 4.1 By Line

In order to build a CO2 emission report by line item, you must remember not to include any segment query fields (including any one of these will cause the query module to repeat the line for each segment on air tickets)

The following fields are related to the CO2 emission calculations

Query Field	Description	Example
<b>Air Tickets</b>		
Routing Details	Ticket routing (max 4 legs/segments)	Dbn/Jnb/Fra/Jnb/Dbn
Miles (Route)	Nautical miles calculated by looking up the distance for each leg on a ticket in the route miles table <i>If the system cannot find any leg in the miles table, the total miles will be set to zero. You can use this fact to build an exception report to highlight any missing leg miles by setting the miles filter to 'Blank'</i>	13,614
<b>Land</b>		
Travel Date	Starting date used for land duration calculations	15/09/2010
Return Date	Ending Date used for land duration calculations	24/09/2010
Duration	No of car days or hotel nights for commission types flagged as such in the commission type setup	9
<b>CO2</b>		
CO2 Tonnes	Carbon emission in tonnes calculated by multiplying air miles / land duration by the relevant coefficients in the carbon footprint setup.	1.7254 0.2790

It is advisable to filter the source to only show air tickets and land arrangements (1,2,6) and to group the output by Source as different methods are used for air tickets and land.

### Example



Date	Type	Doc No	Line	Com Yp	Route Details	Class	Miles (Route)	Tvl Date	Ret Date	Duration	CO2 Tons
<b>Air Tickets</b>											
31/07/2008	Cm	Qui.00A0165	001	Dom	Jnb/Cpt/Jnb	YY	(1,556)	10/06/2008	12/06/2008	0	(0.2509)
31/07/2008	Cm	Qui.00A0166	001	Int	Jnb/Lon/Jnb	XX	(12,900)	11/08/2008	16/08/2008	0	(1.5186)
31/07/2008	Cm	Qui.00A0167	001	Dom	Dbn/Jnb/Dbn	YY	(686)	20/08/2008	22/08/2008	0	(0.1106)
31/07/2008	Inv	Qui.00aa898	001	Int	Jnb/Lon/Jnb	XX	12,900	11/08/2008	16/08/2008	0	1.5186
31/07/2008	Inv	Qui.00aa899	001	Dom	Plz/Dur	H	289	13/09/2009	13/09/2009	0	0.0466
31/07/2008	Inv	Qui.00aa900	001	Dom	Dbn/Jnb/Dbn	YY	686	20/08/2008	22/08/2008	0	0.1106
31/07/2008	Inv	Qui.00aa901	001	Dom	Dbn/Jnb/Dbn	YY	686	20/08/2008	22/08/2008	0	0.1106
31/07/2008	Inv	Qui.00aa902	001	Dom	Jnb/Dbn	Z	343	18/08/2008	18/08/2008	0	0.0553
31/07/2008	Inv	Qui.00aa903	001	Int	Jnb/Lon/Jnb	XX	12,900	11/08/2008	16/08/2008	0	1.5186
31/07/2008	Inv	Qui.00aa906	001	Dom	Jnb/Dbn	Y	343	11/08/2008	11/08/2008	0	0.0553
31/07/2008	Inv	Qui.00aa911	001	Dom	Dbn/Jnb/Fra/Jnb/Dbn	AAAY	13,957	10/11/2008	21/11/2008	0	1.7807
31/07/2008	Inv	Qui.00aa912	001	Int	Jnb/Lon/Fra/Jnb	AA	11,831	11/11/2008	26/11/2008	0	1.5236
							38,793			0	4.8398
<b>Land Arrangements</b>											
31/07/2008	Cm	Qui.00A0168	001	Tou	Beachcomber Tours		0	30/09/2010	15/10/2010	(16)	0.0000
31/07/2008	Inv	Qui.00aa904	001	Tou	Beachcomber Tours		0	31/08/2010	31/08/2010	1	0.0000
31/07/2008	Inv	Qui.00aa905	001	Tou	Beachcomber Tours		0	31/08/2010	31/08/2010	1	0.0000
31/07/2008	Inv	Qui.00aa908	001	Tou	Beachcomber Tours		0	30/09/2010	15/10/2010	16	0.0000
31/07/2008	Inv	Qui.00aa909	001	Acc	City Lodge Jhb		0	15/09/2010	24/09/2010	9	0.2790
31/07/2008	Inv	Qui.00aa910	001	Car	Avis Car Hire Durba		0	23/09/2010	23/09/2010	1	0.0400
							0			12	0.3190
							38,793			12	5.1588

## 4.2 By Segment

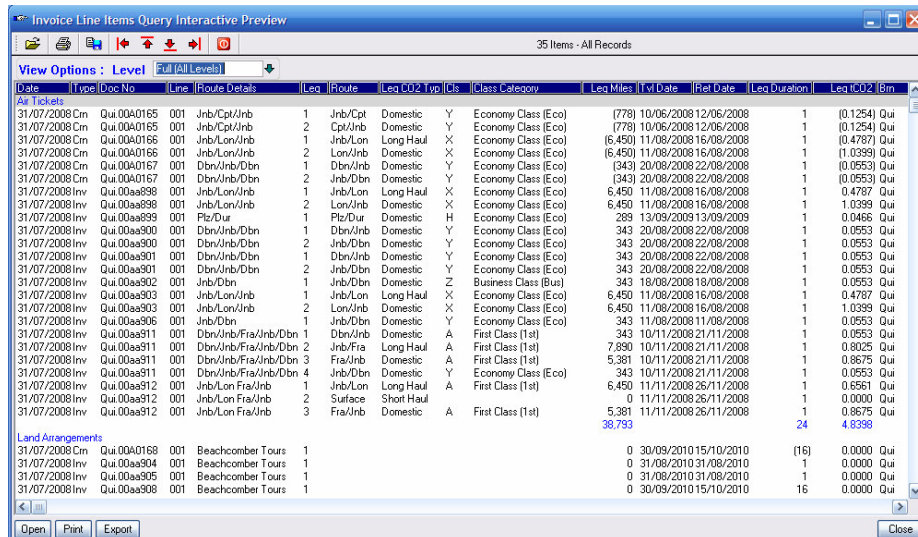
In order to build a CO2 emission report by ticket segment/leg you must remember to include any segment query fields (including any one of these will cause the query module to repeat the line for each segment on air tickets)

The following fields are related to the CO2 emission calculations

Query Field	Description	Example
<b>Air Tickets</b>		
Segment Route	Leg routing	Jnb/Fra
Segment CO2 Type	The applicable route type to be used to match the segment to the carbon coefficients	Long Haul
Segment Class	The segment class letter	A
Segment Class Category	The class category applicable to the segment class	First Class
Segment Miles	The leg distance in nautical miles ( <i>as above, you can use this field to generate an exception report for legs without table miles by setting the filter to 'Blank'</i> )	7,890
<b>Land</b>		
Travel Date	Starting date used for land duration calculations	15/09/2010
Return Date	Ending date used for land duration calculations	24/09/2010
Leg Duration	No of car days or hotel nights for commission types flagged as such in the commission type setup	9
<b>CO2</b>		
Segment CO2	Carbon emission in tonnes calculated by multiplying air miles / land duration by the relevant coefficients in the carbon footprint setup.	0.8025 0.2790

It is advisable to filter the source to only show air tickets and land arrangements (1,2,6) and to group the output by Source as different methods are used for air tickets and land.

## Example



Date	Type	Doc No	Line	Route Details	Lea	Route	Lea CO2 Typ	Cls	Class Category	Lea Miles	vl Date	Ret Date	Lea Duration	Lea CO2 (8m)
<b>Air Tickets</b>														
31/07/2008	Cm	Qui.0040165	001	Jnb/Cpt/Jnb	1	Jnb/Cpt	Domestic	Y	Economy Class (Eco)	(778)	10/06/2008	12/06/2008	1	(0.1254) Qui
31/07/2008	Cm	Qui.0040165	001	Jnb/Cpt/Jnb	2	Cpt/Jnb	Domestic	Y	Economy Class (Eco)	(778)	10/06/2008	12/06/2008	1	(0.1254) Qui
31/07/2008	Cm	Qui.0040165	001	Jnb/Lon/Jnb	1	Jnb/Lon	Long Haul	X	Economy Class (Eco)	(6,450)	11/08/2008	16/08/2008	1	(0.4787) Qui
31/07/2008	Cm	Qui.0040165	001	Jnb/Lon/Jnb	2	Lon/Jnb	Domestic	X	Economy Class (Eco)	(6,450)	11/08/2008	16/08/2008	1	(1.0399) Qui
31/07/2008	Cm	Qui.0040167	001	Dbn/Jnb/Dbn	1	Dbn/Jnb	Domestic	Y	Economy Class (Eco)	(343)	20/08/2008	22/08/2008	1	(0.0553) Qui
31/07/2008	Cm	Qui.0040167	001	Dbn/Jnb/Dbn	2	Jnb/Dbn	Domestic	Y	Economy Class (Eco)	(343)	20/08/2008	22/08/2008	1	(0.0553) Qui
31/07/2008	Inv	Qui.00a998	001	Jnb/Lon/Jnb	1	Jnb/Lon	Long Haul	X	Economy Class (Eco)	6,450	11/08/2008	16/08/2008	1	0.4787 Qui
31/07/2008	Inv	Qui.00a998	001	Jnb/Lon/Jnb	2	Lon/Jnb	Domestic	X	Economy Class (Eco)	6,450	11/08/2008	16/08/2008	1	1.0399 Qui
31/07/2008	Inv	Qui.00a999	001	Flz/Dur	1	Flz/Dur	Domestic	H	Economy Class (Eco)	289	13/09/2009	13/09/2009	1	0.0466 Qui
31/07/2008	Inv	Qui.00a900	001	Dbn/Jnb/Dbn	1	Dbn/Jnb	Domestic	Y	Economy Class (Eco)	343	20/08/2008	22/08/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a900	001	Dbn/Jnb/Dbn	2	Jnb/Dbn	Domestic	Y	Economy Class (Eco)	343	20/08/2008	22/08/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a901	001	Dbn/Jnb/Dbn	1	Dbn/Jnb	Domestic	Y	Economy Class (Eco)	343	20/08/2008	22/08/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a901	001	Dbn/Jnb/Dbn	2	Jnb/Dbn	Domestic	Y	Economy Class (Eco)	343	20/08/2008	22/08/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a902	001	Jnb/Dbn	1	Jnb/Dbn	Domestic	Z	Business Class (Bus)	343	18/08/2008	18/08/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a903	001	Jnb/Lon/Jnb	1	Jnb/Lon	Long Haul	X	Economy Class (Eco)	6,450	11/08/2008	16/08/2008	1	0.4787 Qui
31/07/2008	Inv	Qui.00a903	001	Jnb/Lon/Jnb	2	Lon/Jnb	Domestic	X	Economy Class (Eco)	6,450	11/08/2008	16/08/2008	1	1.0399 Qui
31/07/2008	Inv	Qui.00a906	001	Jnb/Dbn	1	Jnb/Dbn	Domestic	Y	Economy Class (Eco)	343	11/08/2008	11/08/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a911	001	Dbn/Jnb/Fra/Jnb/Dbn	1	Dbn/Jnb	Domestic	A	First Class (1st)	343	10/11/2008	21/11/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a911	001	Dbn/Jnb/Fra/Jnb/Dbn	2	Jnb/Fra	Long Haul	A	First Class (1st)	7,890	10/11/2008	21/11/2008	1	0.8025 Qui
31/07/2008	Inv	Qui.00a911	001	Dbn/Jnb/Fra/Jnb/Dbn	3	Fra/Jnb	Domestic	A	First Class (1st)	5,381	10/11/2008	21/11/2008	1	0.8675 Qui
31/07/2008	Inv	Qui.00a911	001	Dbn/Jnb/Fra/Jnb/Dbn	4	Jnb/Dbn	Domestic	Y	Economy Class (Eco)	343	10/11/2008	21/11/2008	1	0.0553 Qui
31/07/2008	Inv	Qui.00a912	001	Jnb/Lon/Fra/Jnb	1	Jnb/Lon	Long Haul	A	First Class (1st)	6,450	11/11/2008	26/11/2008	1	0.6561 Qui
31/07/2008	Inv	Qui.00a912	001	Jnb/Lon/Fra/Jnb	2	Surface	Short Haul	A	First Class (1st)	0	11/11/2008	26/11/2008	1	0.0000 Qui
31/07/2008	Inv	Qui.00a912	001	Jnb/Lon/Fra/Jnb	3	Fra/Jnb	Domestic	A	First Class (1st)	5,381	11/11/2008	26/11/2008	1	0.8675 Qui
										<b>38,793</b>			<b>24</b>	<b>4.8398</b>
<b>Land Arrangements</b>														
31/07/2008	Cm	Qui.0040169	001	Beachcomber Tours	1					0	30/09/2010	15/10/2010	(15)	0.0000 Qui
31/07/2008	Inv	Qui.00a904	001	Beachcomber Tours	1					0	31/08/2010	31/08/2010	1	0.0000 Qui
31/07/2008	Inv	Qui.00a905	001	Beachcomber Tours	1					0	31/08/2010	31/08/2010	1	0.0000 Qui
31/07/2008	Inv	Qui.00a908	001	Beachcomber Tours	1					0	30/09/2010	15/10/2010	16	0.0000 Qui