INDIA GHG PROGRAM

Promoting profitable, sustainable and competitive businesses.

2015

VERSION 1.0

India Specific Air Transport Emission Factors for Passenger Travel and Material Transport

For Stakeholder Consultation

INDIA
GHG
PROGRAM

Promoting profitable, sustainable
and competitive businesses.

2015

VERSION 1.0

India Specific Air Transport Emission Factors for Passenger Travel and Material Transport

For Stakeholder Consultation

Disclaimer

No part of this publication may be reproduced, stored in retrieval system, or transmitted in any form or by any means electronic, mechanical, photocopying, recording or otherwise, without the prior written permission from India GHG Program.

While every care has been taken in writing the technical paper, India GHG Program and supporting organizations accept no claim for compensation with respect to any wrong, abbreviated, omitted or incorrectly inserted content in the book. The paper is only an attempt to estimate the emission factor.

The technical paper has been compiled based upon the publicly available data.

The paper is open for stakeholder consultation and you are invited to share your views and comments to Mr Chirag Gajjar (cgajjar@wri.org) / Mr Atik Sheikh (atik.sheikh@cii.in).

Published By:
India GHG Program
India GHG Program Secretariat
1st Floor, WRI India
Godrej and Boyce Premises,
Gasworks Lane, Lalbaug,
Parel, Mumbai-400012
Tel: +91 (22) 2471 3565

Table of Contents

Executive Summary

Indian aviation sector has witnessed a remarkable growth in the last decade and is poised to handle 336 million domestic and 85 million international passengers by 2020. This is a significant rise from the 2013-14 levels of 168.92 million domestic passenger and 43 million international passengers, making India the third largest aviation market[1]. Owing to the tremendous growth of air transportation between the years 2005 and 2010, consumption of Aviation Turbine Fuel (ATF) in India has gone up by almost 40%[2]. Large amounts of greenhouse gases (GHGs) are generated due to the combustion of ATF. Given its rapid growth, the aviation sector is the fastest growing source of GHG emissions in the transport sector and the most emission-intensive in the transport industry.

Business commute by air can be one of the major sources of GHG emissions for organizations undertaking GHG Inventory and it falls under Scope 3 (GHG Protocol) category for the reporting company. Companies that are accounting their GHG emissions are expanding the sphere of accounting to include scope 3 emissions and are now including the emissions from business commute by air as a part of their inventory.

The organizations while undertaking the estimation of GHG emission refer to the internationally available emissions factor. International factors that are currently in use may not be representative of the Indian scenario and reporting companies make assumptions for estimation. This brings inconsistency in the approach thereby questioning the reliability of emission figures. In India, emission factors specific to air transport prevailing with Indian conditions is unavailable.

This study aims to determine a methodology to estimate India specific air transport emission factors to aid the Indian corporate strengthen its GHG accounting process.

The methodology has been arrived with detailed consultation from Working Group formed for the *India Specific Air Transport Emission Factors.* The working group comprised of key stakeholders from Indian Aviation Sector. The working group provided their valuable inputs to establish and refine the methodology to arrive at emission factors through various meetings, tele-conferences and discussions.

India GHG Program acknowledges with thanks the co-operation extended and the valuable inputs provided by the working group members.

Working Group Members:

- Jet Airways
- Delhi International Airport Limited
- Airport Authority of India (AAI)
- Indian Oil Corporation Limited (IOCL)
- Spice Jet
- Aramex

Summary of activities by working group:

- Review of the existing international and national methodologies and emission factors
- Identify the methodology to arrive at country specific emission factors
- Identify stakeholder & level of involvement stakeholders

[1] http://www.indiaaviation.in/pages/view/38/an_overview.html
[2] http://www.cseindia.org/userfiles/aviation_paper.pdf

Based on the inputs of working group, the emission factor estimated by using the proposed methodology and currently available data in public domain are shown below

0.121 kg CO_2 / Passenger – km

1.58 kg CO_2 / Ton – km

Limitation:

- This study has been carried out to arrive at emission factors from domestic passenger carriers alone. The Indian geographic boundary has been considered. These factors can be used by any passenger and cargo transport within the country by passenger carriers. The numbers are not applicable for international travel
- Short, medium and long haul, defined internationally are not relevant to the Indian scenario. Thus for India specific emission factors, air travel has not been broken down into different hauls.
- A consensus about the non-inclusion of unscheduled flights was reached in the working group meeting and hence has not been considered. Unscheduled flights account for less than 1% of the total market share.
- Allocation of emissions from business and economy class has not been considered. This is a challenge at this point due to unavailability of breakup in public domain. Also, the scope of this study is only domestic travel within the geographic boundary of India, where most domestic carriers do not have a separate business class.

- 2011-12 data available from Directorate General of Civil Aviation, Government of India (DGCA) has been used in calculation where available. Fuel related data is not available publically, and has been assumed from different international sources for calculation, at this point
- Cargo transported separately, in dedicated cargo flights, has not been included due to unavailability of specific data. Freight carried in passenger airlines is considered. There is only one dedicated cargo carrier (Blue Dart) in India and they will be approached for more data. In case of availability of data, emission factor for cargo transported by dedicated cargo carriers can also be calculated using the same methodology.

The technical paper covers

1) Three methodologies that have been followed internationally to arrive at emission factors.
2) A proposed methodology for determining India specific air transport emission factors. This methodology considers specific steps from each of the different methods. It relies mostly on publicly available data so that it can be re-assessed periodically. It has also taken into consideration the difference in publicly available data. Data requirement, inherent challenges, assumptions, inclusions and exclusions pertinent to this methodology have also been discussed in detail in this paper.

1 Introduction

1.1 GHG Emissions from Airline Travel

Aviation is the fastest growing source of greenhouse gas emissions in the transport sector and the most emission-intensive form of transport. The aviation sector accounts for approximately 1.5 percent of global anthropogen ic greenhouse gas emissions per year. The rapidly growing demand for air travel has almost entirely offset the gains from aircraft efficiency.

Greenhouse gases are generated due to the combustion of jet fuel. However, unlike terrestrial transport, fuel consumed does not scale linearly with distance travelled due to the extra fuel required to lift the plane up to cruising altitude. This is supplemented with the need to carry large quantities of fuel for long distance flights. The emissions from an individual flight will depend on many different factors including distance travelled, weather conditions (head or tail wind), cargo load, passenger load, engine efficiency, fuel used and flight altitude. However, an estimate of amount of fuel consumed in flight can form the basis for calculating the average emissions.

Currently, reporting companies use one of the three IPCC based approaches – Tier I, Tier II & Tier III – to estimate emissions from their air transport.

The calculation of emissions in each of the three approaches is based on the equation:

Emissions = Fuel Consumption X Emission Factor

Tier I Approach: This approach is purely based on an aggregate quantity of fuel consumption data for aviation (Landing and Take Off (LTO) and cruise) multiplied by average emission factors. The GHG emission factors are averaged over all flying phases, based on the assumption that 10% of the fuel is used in the LTO phase of the flight.

Tier II Approach: Operations of aircraft are divided into LTO & cruise phases and emissions for each are calculated separately. The estimated fuel use for cruise is multiplied by aggregate emission factors (average or per aircraft type) in order to estimate the CO_2 emissions. Emissions and fuel used in the LTO phase are estimated from statistics on the number of LTOs (aggregate or per aircraft type) and default emission factors or fuel use factors per LTO cycle (average or per aircraft type). This approach requires data on the number of LTOs by aircraft type.

Tier III Approach: This is based on actual flight movement data. Inventories are modeled using average fuel consumption and emissions data for the LTO phase and various cruise phase lengths, for an array of representative aircraft categories. A more sophisticated model for inventorisation can also be used in case of availability of more accurate data. This calculation requires data related to fuel burnt and emissions throughout the full trajectory of each flight segment, using aircraft and engine-specific aerodynamic performance information. Average, representative emission factors published in IPCC can be used for this approach as well.

1.2 Limitations in adopting existing emission factors in the Indian sc enario

Emission factor forms the basis of carbon inventorisation studies. It is that representative value that relates the quantity of greenhouse gas emissions to the quantity of fuel used. Emission factors are generally derived from measurements made on a number of sources representative of a particular emission source. The more representative this emission factor is with respect to the geographic location & operations, the more accurate the resultant emissions inventory.

A number of internationally accepted emission factor databases like the IPCC, DEFRA, EPA, etc. are available for public use. The Climate Registry also provide emission factors which are compiled from various sources. These factors are derived based on a weighted average of aviation operations all over the world (IPCC) or specific countries like Europe (DEFRA) or USA (EPA). The major drawback with using these factors is that they are not specific to Indian operations. Operating conditions of Indian aviation vary fr om other countries in terms of loading capacities, average distance traveled (hauls), types & efficiency of airbuses and climatic conditions. Clearly, there is a need for emission factors that accounts for India specific condi tions for accurate emission accounting.

1.3 Objective of the Study

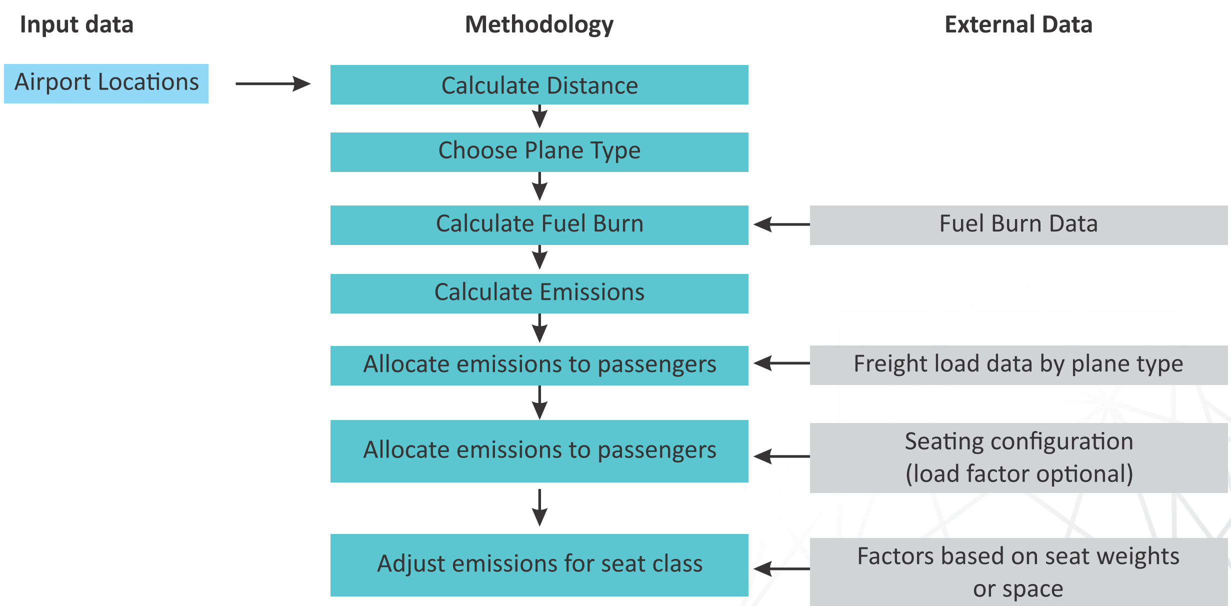
With air travel on the rise, there is a general trend of increasing awareness among corporates towards identifying and reducing their emissions. The sphere of accounting for reporting companies in India has been expanding to include emissions from their business travel and material tra nsport by air. A number of organizations are strengthening their GHG accounting by including scope 3, since it contributes a large share to their overall emissions. The challenge however, is to find India specific emission factors. Presently only internati onal factors are available. India specific air transport emission factors do not exist. Against this background, this study aims to arrive at India specific air transport emission factors to aid the Indian corporate strengthen its GHG accounting process.

At the end of this investigation, emissions factors, specific to the Indian environment, as described below will be determined.

- Domestic Passenger carriers
  - **CO_2 eq. Emissions / Passenger - km**
- Cargo carried in domestic passenger carriers
  - **CO_2 eq. Emissions / Ton – km**

2 Methodologies commonly used to determine Air emission factors

The following section introduces how a conventional aviation emissions factor calculator is constructed.
All emissions factor calculators utilize broadly the same methodology, illustrated in the figure (Figure 1) below: [3]



[3] http://www.eci.ox.ac.uk/research/energy/downloads/jardine-carboninflights.pdf

In some methodologies the distance between point of origin and destination is calculated using a "great circle" calculation from a database of airport longitude and latitudes to a high degree of accuracy. Some methodologies adjust this distance by a factor, to account for deviations from a perfect route (e.g. to avoid inclement weather conditions) and stacking around the destination airport.

This is then converted into the amount of fuel burnt for that flight. This is usually considered by making an assumption about what that particular type of plane would typically consume in terms of fuel, to undertake a flight of such distance. Emissions are highly sensitive to the chosen plane model and the distance travelled as shown in the figure (Figure 2) below; values between the long haul and short hauls are almost double.

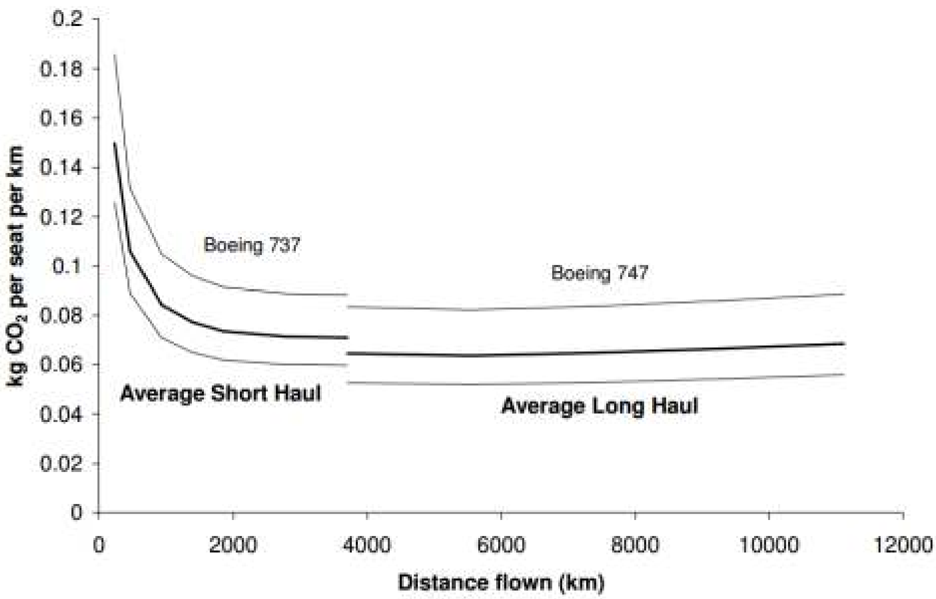


Figure 2

(Source: Calculating Carbon Dioxide Emission of Flights, University of Oxford, Environment Change Institute)

Fuel consumption data is publicly available for many models, but these datasets are firstly international and secondly do not include modern plane models (such as Boeing 737-800 or Airbus A380). This may lead to an overestimation in emissions as newer, more efficient planes are employed. Also, domestic planes used in India may not be represented when using international data.

2.1 Method A: Using fuel consumption & distance travelled per flight

This is one way to calculate CO_2 emissions for passenger travel (not considering freight) from fuel consumption per flight. It involves collecting the following data for each individual flight of a different model:

- Distance travelled (km)
- Fuel consumed including fuel consumed during each phase - taxi, take-off, cruising and landing (kL)
- Seating capacity (number)
- Load factor (%)
- Cruising speed (km/hr)
- Calorific value of fuel used (TJ/MT)
- Density of fuel (MT/kL)
- Emission factor of fuel used (MT CO_2/ TJ)

Step 1: Derive fuel use per passenger kilometer

$$\text{Fuel used/pass-km} = \frac{\text{Total fuel consumption}}{\text{Seating capacity X Load Factor X Distance travelled}}$$

Step 2: Calculate Emission factor - CO_2 emissions per passenger km

$$\frac{\text{MT } CO_2 \text{ Emissions}}{\text{Passenger-km}} = \text{(Fuel used/pass-km) X Calorific value X Density X Emission factor of fuel}$$

(Or)

Step 2: Calculate Emission factor - CO_2 emissions per hour

$$\frac{\text{MT } CO_2}{\text{Hr}} = \frac{\text{Fuel consumed}}{\text{Distance travelled}} \text{ X Cruising Speed}$$

2.2 Method B: Using fuel consumption, distance travelled & weight carried per flight

This methodology is an extension of the previous one. While following a similar methodology, it additionally allocates total emissions to passenger & freight transport for each flight when arriving at an emission factor. It involves collecting the following data for each flight:

- Distance travelled (km)
- Fuel consumed including taxiing, take-off, cruising and landing (kL)
- Seating capacity (no.)
- Load factor (%)
- Cruising speed (km/hr)
- Calorific value of fuel used (TJ/MT)
- Density of fuel (MT/kL)
- Emission factor of fuel used (MT CO_2/ TJ)
- Weight load factor
- Total ton km travelled
- Ton km of passengers carried
- Freight ton - km performed[5]
- Passenger km travelled

The total CO_2 emission from the flight's operation for the distance travelled is calculated by the product of fuel consumed, its calorific value, density and its emission factor as in the previous case. These emissions are then allocated to passengers & freight carried by the flight using an appropriate factor.

Step 1: Arrive at the distribution factor

$$\frac{\text{Ton-km of passenger carried}}{\text{Total ton km travelled}} = A\%$$

$$\frac{\text{Ton-km of freight carried}}{\text{Freight ton-km performed}} = B\%$$

'A': percentage of total emissions from the fuel consumed to be allocated to passenger travel
'B': percentage of total emissions from the fuel consumed to be allocated to freight carried

Step 2: Calculate total emissions from fuel consumption

Total Emissions ('Y' MT CO_2) = Total fuel ('M' kL) X Calorific Value X emission factor X Density

Step 3: Calculate emissions from passengers and freight

A% of Y = emission from passengers

B% of Y = emission from freight

Step 4: Calculate emission factors - CO_2 emissions per passenger-km & CO_2 emissions per ton-km freight

$$\frac{\text{MT } CO_2 \text{ emissions}}{\text{Passenger-km}} = \frac{\text{A\% of Y}}{\text{Passenger-km performed}}$$

$$\frac{\text{MT } CO_2 \text{ emissions}}{\text{Freight ton-km}} = \frac{\text{A\% of Y}}{\text{Freight ton-km performed}}$$

Accurate emission factors are calculated for different models of airbuses using Method 1 and 2 to build a strong database, in case of availability of such data. However, under circumstances when such individual flight level data is unavailable, Method 3 is used.

2.3 Method C: Using the countries total fuel consumption

This is a simple and macro level methodology that uses the countries' total aviation fuel consumption for arriving at emission factors in contrast to the previous two methods that look at individual flight level data for different models of airbuses. This involves collecting the following data:

- Sale of aviation fuel of the country
- Calorific value of aviation fuel
- Emission factor of aviation fuel
- Passenger-km performed
- Freight ton-km performed
- Ton-km passenger performed
- Total flight hours performed
- Average time of travel

Step 1: Calculate total emissions from country's aviation fuel consumption

Total CO_2 emissions (Y) = Total fuel sales X Calorific value X Density X Emission factor

Step 2: Arrive at the distribution factor

$$\frac{\text{Ton-km of passenger carried}}{\text{Total ton-km travelled}} = \text{A\%}$$

$$\frac{\text{Ton-km of freight carried}}{\text{Freight ton-km performed}} = \text{B\%}$$

Step 3: Calculate emissions from passengers and freight

A% of Y = emission from passengers

B% of Y = emission from freight

[5] Product of amount of freight carried and distance travelled in kilometers

Step 4: Calculate emission factors - CO_2 emissions per passenger-km & CO_2 emissions per ton-km freight

$$\frac{\text{MT } CO_2 \text{ emissions}}{\text{Passenger-km}} = \frac{\text{A\% of Y}}{\text{passenger-km performed}}$$

$$\frac{\text{MT } CO_2 \text{ emissions}}{\text{Freight ton-km}} = \frac{\text{A\% of Y}}{\text{freight ton-km performed}}$$

Methods A and B can be used in cases where individual flight data is readily available. These methodologies have been used to arrive at emission factors for individual airbus model level as well as considering business & economy class. Method 3 however, using more macro level data has been used to arrive at overall emission factors of passenger and freight transport.

There are several complexities in calculating emission factors for air transport. The major one is the variation in passenger occupancy rates of aircraft. While some are fully laden others fly with less than half the seats occupied.

Those flying in partly empty aircraft should perhaps allow a higher rate of CO_2 emissions. Similarly those flying Business Class or First Class are responsible for a higher share of CO_2 emissions as the area occupied by Business class seats are more as compared to economy and resulting in higher share of emission for passenger travelling in business class. However at this stage, this paper does not consider allocation of emission based on class of travel.

3 Proposed method for Estimating India specific Air Emission Factor

3.1 Methodology

The focus of this investigation is to determine the most suitable methodology to calculate emission factors using data available in public domain in India. The proposed methodology relies mostly on publically available data, so that it can be reassessed periodically. The proposed methodology has taken into consideration the difference in publically available data in India and internationally. It combines aspects from each of the three methods described earlier. This method uses country level flight annual data like passenger kilometers, freight kilometers and load factor to arrive at emission factors. Average fuel consumption data has been used for calculations that are available in public domain similar to method 3. The method of allocation of emissions to passenger and freight travel has been adopted from method 2.

This methodology will determine emission factors for domestic travel in India:

Passenger Travel

$$\frac{\text{Kg CO2}}{\text{Passenger-km}}$$

Material Transport

$$\frac{\text{Kg CO2}}{\text{Ton-km}}$$

Step 1: Calculate total aviation fuel consumption during the year

Total fuel combustion = Average fuel consumed for a typical flight X Total aircraft flown hours

Step 2: Calculate CO_2 emissions from aviation fuel combustion during the year

Total CO_2 emissions = Total fuel combustion X calorific value X density of fuel X emission factor

Step 3: Arrive at the distribution factor

$$\text{Passenger share (\%)} = \frac{\text{Passenger Ton-Km travelled}}{\text{Total Ton-Km travelled}} = A\%$$

$$\text{Freight share (\%)} = \frac{\text{Freight Ton-Km travelled}}{\text{Total Ton-Km travelled}} = B\%$$

Step 4: Calculate emissions from passengers and freight

A% of Total emissions from aviation fuel combustion = Emission from passengers
B% of Total emissions from aviation fuel combustion = Emission from freight

Step 5: Determine Passenger-km travelled and Ton-km performed during the year

Passenger-km = Passengers carried X Ton-km performed (excluding freight)

(Or)

Passenger-km= Passengers carried X Average weight per passenger (incl. baggage) X distance

Ton-km freight = total freight carried X km performed

Step 6: Calculate emission factors

Passenger travel

$$\frac{\text{Total Emissions from Passenger travel}}{\text{Passenger kilometers performed}} = \frac{\text{A \% of Total emissions from aviation fuel combustion}}{\text{Passenger kms performed}}$$

Freight transport

$$\frac{\text{Total Emissions from freight travel}}{\text{Freight kilometers performed}} = \frac{\text{B \% of Total emissions from aviation fuel combustion}}{\text{Freight kilometers performed}}$$

3.2 Data Requirements and Data Collection

The following data is required to arrive at air transport emission factors for passenger and freight transport based on the proposed methodology:

- Number of passengers carried
- Scheduled departures
- Flying hours
- Flying kilometers
- Passenger load factor
- Total freight carried
- Weight load factor
- Passenger kilometers travelled
- Passenger Ton kilometers travelled
- Cargo Ton kilometers travelled
- Total Ton kilometers travelled
- Fuel consumption
- Density of fuel
- Calorific value of fuel
- Emission factor of fuel

Of this data requirement, the following detailed comprehensive data is available with Directorate General of Civil Aviation, Government of India in the public domain for the past 10 years:

- Passengers carried
- Passenger - kilometers performed
- Seat - kilometers available
- Passenger load factor
- Freight carried
- Mail carried
- Passenger ton- kilometers
- Freight ton- kilometers
- Mail ton- kilometers
- Ton - kilometers
- Ton - kilometers available
- Weight load factor
- Scheduled domestic cargo carried

3.2 Data Requirements and Data Collection

The following data is required to arrive at air transport emission factors for passenger and freight transport based on the proposed methodology:

- Number of passengers carried
- Scheduled departures
- Flying hours
- Flying kilometers
- Passenger load factor
- Total freight carried
- Weight load factor
- Passenger kilometers travelled
- Passenger Ton kilometers travelled
- Cargo Ton kilometers travelled
- Total Ton kilometers travelled
- Fuel consumption
- Density of fuel
- Calorific value of fuel
- Emission factor of fuel

Of this data requirement, the following detailed comprehensive data is available with Directorate General of Civil Aviation, Government of India in the public domain for the past 10 years:

- Passengers carried
- Passenger - kilometers performed
- Seat - kilometers available
- Passenger load factor
- Freight carried
- Mail carried
- Passenger ton- kilometers
- Freight ton- kilometers
- Mail ton- kilometers
- Ton - kilometers
- Ton - kilometers available
- Weight load factor
- Scheduled domestic cargo carried

4 Calculation using proposed methodology

This proposed methodology to calculate Indian specific passenger and material transport emission factors has been elaborated below using a simple example.

Data collected from publically available source (DGCAI)[6]:

Number of scheduled Aircraft Departures per day = 1,645

Total aircraft flown hours = 987,925

Passengers carried = 60,837,000

Passenger kilometers performed = 59,084,000,000

Seat kilometers available = 78,639,000,000

Passenger load factor $= \dfrac{\text{Passenger kilometers performed}}{\text{Seat kilometers available}} = \dfrac{59{,}084{,}000{,}000}{78{,}639{,}000{,}000}$

= 75%

Passenger Ton-Km travelled = 5,066,000,000

Freight + Mail Ton-Km travelled = 393,000,000

Total Ton-Km travelled = 5,459,000,000

Ton-Kilometers available = Passenger Ton-Km travelled + Freight Ton-Km travelled
= 8,032,600,000

Weight load factor $= \dfrac{\text{Total Ton-Km travelled}}{\text{Ton-Kilometres Available}} = \dfrac{5{,}459{,}000{,}000}{8{,}032{,}600{,}000}$

Average weight of passenger[7] $= \dfrac{\text{Passenger Ton-Km travelled}}{\text{Passenger kilometers performed}}$

$= \dfrac{5{,}066{,}000{,}000}{59{,}084{,}000{,}000}$ = 85.75 kgs

[6] http://www.dgca.nic.in/reports/reind.htm
[7] including cabin luggage

Fuel related

Average fuel consumed for a typical flight = 2,500 kg/h[8]
Calorific value of fuel consumed = 70000 kg CO_2/TJ
Density of fuel consumed = 45 MJ/kg

Total fuel combustion = Average fuel consumed for a typical flight X Total aircraft flown hours
= 2500 kg/h X 987925 hrs
= 2,469,812,500kg

Total emissions from aviation fuel combustion = Total fuel combustion X calorific value X emission factor
= 2,469,812,500kg X 45 MJ/kg X 70000 kg CO_2/TJ
= 7,779,909 Tons CO_2

Distribution of emissions from fuel combustion between passenger & freight:

Passenger share $= \frac{\text{Passenger Ton-Km travelled}}{\text{Total Ton-Km travelled}} = 92\%$

Freight share $= \frac{\text{Freight Ton-Km travelled}}{\text{Total Ton-Km travelled}} = 8\%$

Total Emissions from Passenger travel = 92% of 7,779,909 Tons CO_2
= 7,157,516 Tons CO_2

Total Emissions from freight travel = 8% of 7,779,909 Tons CO_2
= 622,393 Tons CO_2

Emission factors:

Passenger travel

$$\frac{\text{Total Emissions from Passenger travel}}{\text{Passenger kilometers performed}} = \frac{7{,}157{,}516 \text{ Tons } CO_2}{59{,}084{,}000{,}000 \text{ Passenger-kms}}$$

0.121 kg CO_2 / Passenger - km

Freight travel

$$\frac{\text{Total Emissions from freight travel}}{\text{Freight kilometers performed}} = \frac{622{,}393 \text{ Tons } CO_2}{393{,}000{,}000 \text{ Ton – kms}}$$

1.58 kg CO_2 / Ton – km

[8] Typical design specification of Airbus A320 -200: http://www.airberlin.com/site/seatplan.php?seatTyp=A320_200

INDIA GHG PROGRAM

Promoting profitable, sustainable and competitive businesses.

India GHG Program:

The India GHG Program acts as a 'Center of Excellence' by disseminating regional, sectoral and global best practices to create a culture of inventorisation and benchmarking of GHG emissions in India. To accomplish this, the primary objective of the India GHG Program will be to build institutional capabilities in Indian businesses and organizations. The India GHG Program brings together internationally recognized GHG accounting and measurement tools and methodologies that serve to create a key platform that facilitates national level benchmarking of GHG emissions and incentivises and rewards sustainable business initiatives. India GHG Program seeks a multi-stakeholder approach through effective representation of stakeholders (such as other industry associations, sector associations, ministries and government agencies, civil society organisations, and experts) in promoting a standardised approach to GHG accounting.

Indian businesses recognise the incentives of sustainable business practices but are challenged by a lack of uniformity in GHG measurement guidelines and a national benchmarking system. The lack of clear policy and regulatory directives, limited access to clean technology, absence of methods for footprinting data and inadequate institutional capacity act as constraints on the ability of middle managerial level business leaders to manage and measure GHG emissions. The India GHG Program will address the needs and expectations of industry in building capacity to mitigate economic, social and environmental risks while helping businesses remain profitable, competitive and sustainable.

The program offers a unique threefold proposition – expertise and recognition from three renowned organisations - WRI India, TERI and CII. It is a voluntary and flexible program influenced by and aligned to business expectations as compared to others that have a clearly defined agenda and methodology. It offers a value proposition to businesses in incorporating mitigation of carbon related risks into the overall business strategy – starting with capacity building, measurement and management of GHG Emissions, reporting and target setting, identifying reduction opportunities and ending with exploration of further avenues in carbon neutrality. The India GHG Program offers businesses public visibility and specialised incentives through improved efficiency and profitability. The India GHG Program also offers businesses opportunities to engage with industry, sectorial and regional peers on a single platform and access to policy makers and civil society to initiate dialog on actions businesses take and challenges they face in reducing GHG emissions.

For more details and membership :
India GHG Program Secretariat
1st Floor, WRI India, Godrej and Boyce Premises, Gasworks Lane, Lalbaug,
Parel, Mumbai-400012. Tel: +91 (22) 2471 3565 / indiaghgpsecretariat@wri-india.org

http://indiaghgp.org

Partners

teri

CII

WRI INDIA

Supported by

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

SHAKTI SUSTAINABLE ENERGY FOUNDATION

PIROJSHA GODREJ FOUNDATION