Sustainable Airport Solutions

Carbon Calculations at Airports – Scope 3

Toolkit

GSA

TOOLKIT

Carbon Calculation at Airports

Scope 3

The Interreg IVB North Sea Region Programme

Investing in the future by working together for a sustainable and competitive region

GSA

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Carbon Calculation at Airports Scope 3 Toolkit

Green Sustainable Airports (GSA)

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INTRODUCTION

1

TOPIC

The carbon calculation tool (excel based) is developed to calculate the carbon emissions in Scope 3 - 3A and 3B - of small and medium airports. It is a continuation of an existing Excel-Tool for CO_2-Balancing at the City Airport Bremen (BRE) in Scope 1 and 2 from the Inventory in 2010. It is supposed to be a support to Airports, which have already done an inventory of their direct emissions and who would like to take a look at the indirect emissions at the Airport.

This Toolkit describes the use of the calculation tool and gives tips and advices for the proceeding, including best practice examples of Bremen.

MEANING

There are already tools and guidelines for carbon-calculation in existence (see references). But there is a lack of information about the proceeding of *how* to get the necessary data and information for the calculation at airports.

This toolkit shows an example of a simple way to first results in the complex theme of the Scope 3 balancing at airports.

It is matched to small airports, which are at the beginning of their climate protection activities and want to use the carbon calculation for an internal reporting and CO_2-management.

It is not the *one way* for a Scope 3 calculation, but gives advices and guidance for concrete actions. It is meant as a support for the GSA Airports and other interested Airport companies.

DEFINITION OF BOUNDARIES 2

Each Airport is different. For balancing the carbon emissions it is necessary to define a balance year as a reference year and the specific boundaries in which you want to calculate the emissions.

STEP 1

Choose your balance year!

This will be the reference for all following years of your carbon calculation. Therefore it's reasonable to choose a year with regular business, without changes in power supply or big construction activities or the like. Also it's important to know, if you are able to get the data. This is not necessarily the last year, but maybe the next to last year.

WHY?

Following questions are decisive for choosing the boundaries:

- What is the *aim* of the carbon accounting?
- Which *information* do you want to get?
- Who will *read* your balance?

SCOPES

The GHG Protocol [1] and the Technical Guidance Scope 3 [2] give an overview of the three scopes and emissions across the value chain of a company, figure 1.

Scope 1: Emissions owned and controlled by the airport operator, such as electricity generation and airport vehicles.

Scope 2: Emissions from the off-site generation of electricity, purchased by the airport operator.

Scope 3: Indirect emissions not owned or controlled by the airport operator (tenants, airlines, passengers).

Scope 3 includes 15 categories, eight upstream and seven downstream categories.

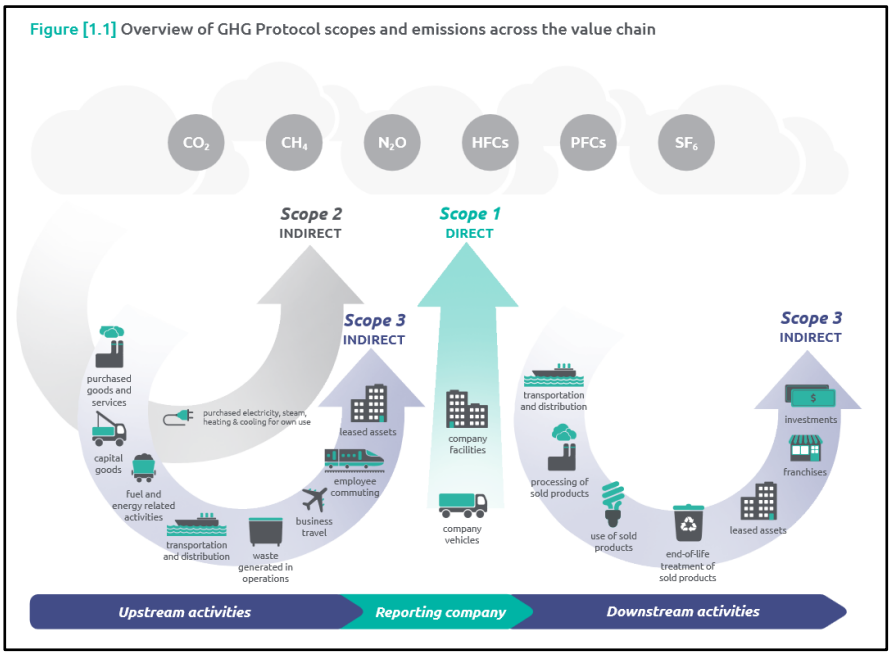


Figure 1: Graphic reference: www.ghgprotocol.org/files/ghgp/public/scopes_diagram.pdf

SCOPE 1 + 2

It is reasonable to start with a carbon footprint in Scope 1 and 2. Therefore it's necessary to collect data of all your energy consumption (or production), including e.g. fleet vehicles, GSE, Airport Maintenance etc. and purchased electricity, heating or cooling.
Please check out further information in the ACRP and ACI Guidelines [3], [4].

WHAT?

Which categories do you want to balance?
And which categories are not relevant for your balance?
For example the employee commuting. Do you want to support your employees in more climate friendly travel habits and sustain their possibilities in using public traffic? Or is your focus set on more technical sources as optimization of the LTO-cycle?
Can you set limits? Please estimate the time and effort you will have for specific questions. If you have good connections to the transport association, it will be easy for you to get data of the public traffic capacity. If not, it will be better to make an on-site survey of the passengers' travel to/from airport.

STEP 2

Define your specific boundaries and sources!

It is helpful to draw a scheme of your boundaries and sources by means of the main topics and categories. Also useful is to construct a Mind Map of your targets and long term objectives.

WHAT?

Define your specific boundaries!

Make a brainstorm and analyze these and other questions, which come in mind:

- Where is the boundary of the airport?
- Which categories are controlled by the airport company?
- Which categories/sources are controlled by third parties?
- Who are the third parties?
- What are the main categories at the airport and who/ what are the polluters/sources of the biggest CO_2-emissions?
- Differentiate the Scopes 1, 2 and 3.
- Which categories do you want to balance? Draw them in and exclude the sources you don't want to balance (cross them).
- What is the catchment area of the airport?
- What is the average distance of your passengers to/from the airport? Draw it in your scheme.
- Do you want to balance all public transport or only a part of it? (Railway, Tram, Bus…)
- Which sources are relevant airside?
- Which sources are relevant landside?
- Do you have relevant freight/cargo?
- …

EXAMPLE BRE

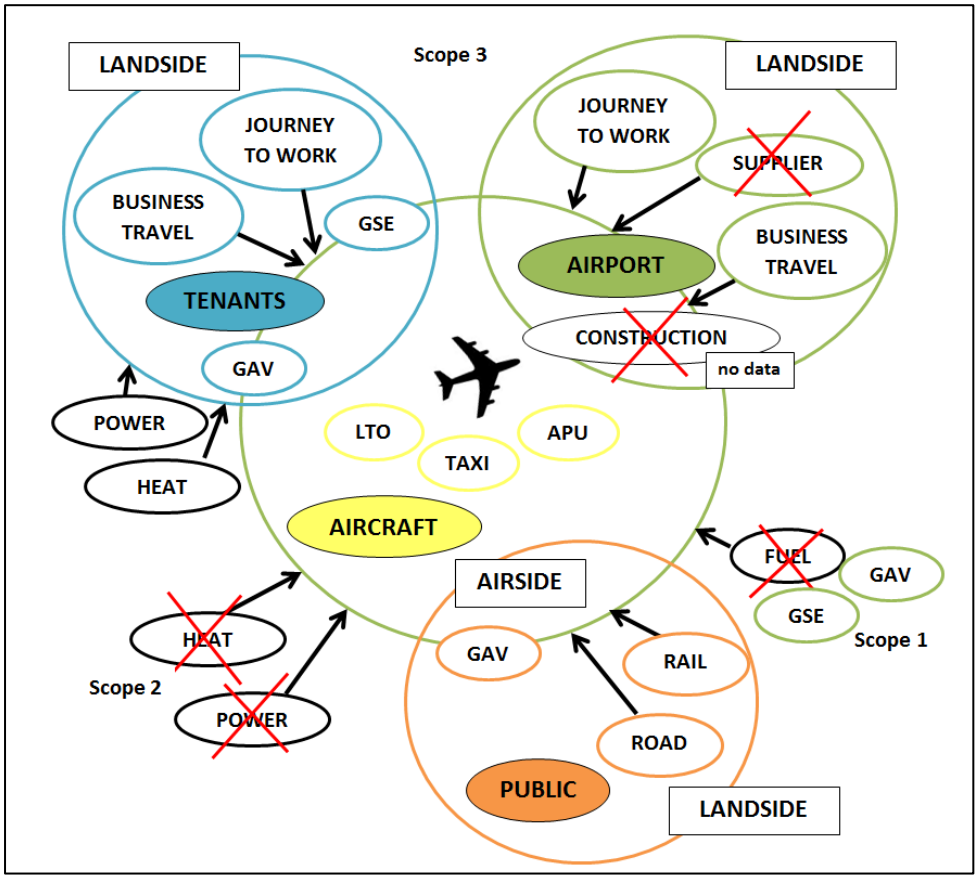


Figure 2: Scheme of the Balance-Boundary at the City Airport Bremen, reporting year 2010

In our case, we only look at the upstream categories of Scope 3 sources and emissions at an airport, as there are:

EMISSION SOURCES:		
AIRCRAFT MAIN ENGINES	Aircraft main engines during taxiing and queuing.	
AIRCRAFT AUXILIARY POWER UNITS (APU)	Aircraft Auxiliary Power Units (APU)	
LANDSIDE ROAD TRAFFIC/ GROUND ACCESS	All landside vehicles not owned by airport operator, operating on airport property.	
AIRSIDE VEHICLE TRAFFIC	All vehicles operated by third parties (tenants, airlines, etc) on airport airside premises.	
CORPORATE TRAVEL	Flights taken on airport company business.	
GROUND SUPPORT EQUIPMENT (GSE)	Tenant or contractor owned GSE for the handling and servicing of aircraft on the ground, if airport could provide alternative	Otherwise Scope 3B.
CONSTRUCTION	All construction activities, usually conducted by contractors.	
AIRCRAFT MAIN ENGINES	Aircraft main engines in the LTO cycle, excluding taxiing.	Landing emissions could be Scope 3A.
	Aircraft emissions during cruise on flights to or from airport.	ACRP recommends that an airport report whole-of flight
GRPUND SUPPORT EQUIPMENT (GSE)	Tenant or contractor owned GSE for the handling and servicing of aircraft on the ground.	Could be Scope 3A if airports provide alternative fuels
LANDSIDE ROAD TRAFFIC/ GROUND ACCESS	All landside vehicles related to the airport, operating off-site and not owned by airport operator, including private cars, hotel and car	Passenger and staff vehicle trip would include whole of
ELECTRICITY AND OTHER EXTERNAL ENERGY	Emissions from generation of electricity, heating and cooling purchased by tenants including airlines.	
AIRCRAFT AND ENGINE MAINTENANCE	Airline or other tenant activities and infrastructure for aircraft maintenance: washing, cleaning, painting, engine run-ups.	
RAIL TRAFFIC	Rail traffic and other ground transport related to the airport.	

The content of this schedule is based on the ACI Guidance Manual "Greenhouse Gas Emissions Management", 2009 [4]

SCOPE 3

SCOPE 3A

Scope 3 emissions from sources that an airport operator can influence.

SCOPE 3B

Scope 3 emissions from sources that an airport operator cannot influence to any reason-able extent.

Collect needed data!
After you have defined the scopes and sources, begin to collect data. Answer the following questions and document all of your data and decisions:

STEP 3

WHO?

Who are the important contact persons?
Which tenants, airlines and other third parties do you have at the airport?
List up all tenants, airlines and third parties:

- Aviation Government Agencies
- Airlines
- Car Rentals
- Travel Agencies
- Cargo/Freight Companies
- Gastronomy
- Hotels
- Other tenants, e.g. Security Services, Flight Training Center, Flight Control, Engineering offices, Post Office, etc.

Establish contact to your tenants.
Do you have an overview about their number of employees? Find them out.

Decide if you are able to provide the carbon footprint in-house or if you need help of an external supplier, e.g. specialized engineering offices. This Toolkit will help you!

CACULATION-TOOL 3

STRUCTURE

The Calculation-Tool consists of 13 registers with coloured tabs:

MANUAL	Instructions for use of the Carbon Calculation TOOL	INFO
TOOL-KIT	General instructions, advices, method and proceeding of balancing the CO_2-Emissions of an	INFO
GENERAL INPUT	General Input data of the airport	INPUT
CO2-EQUIVALENTS	Carbon emission factors of the necessary inputs.	INPUT
AIRPORT	All airport owned but indirectly controlled/influenceable emission-sources.	INPUT
AIRCRAFT	All aviation emissions during LTO, APU Operation and engine-run-ups.	INPUT
TENANTS	All tenant-owned emission sources, e.g. aircraft handling.	INPUT
PUBLIC	All emissions made by the passengers on their journey to/from the airport.	INPUT
RESULTS	Schedule with the results of the balance including diagrams.	OUTPUT
SUMMARY	Summarization of all CO_2-emissions of Scopes 1 + 2 + 3 for Airports with an existing inventory of their direct emissions.	OUTPUT
SCOPES	Schedule of the Scope Categories 1, 2 and 3A and 3B at Airports	INFO
ABB	List of abbreviations	INFO
APP	Appendix: General Information about the TOOLKIT	INFO

GROUPS

The Calculation-Tool is grouped into the four main polluters you find at an airport:
Airport Operator, Aircraft, Tenants and the Public (Passengers). Each polluter has an own register with a coloured tab.

AIRPORT

AIRCRAFT

TENANTS

PUBLIC

Within these groups you find the emission sources of Scope 3 emissions. This provides an easy handling and a differentiation of the target groups of planned measures.

INPUT

The usage of the Calculation-Tool is self-explanatory. In the "Input-Tabs" you have to fill in all needed data. Hints and remarks are given in red coloured cells. All remarks and documentation you can fill in an extra column.

CALCULATION

The Calculation of the CO_2-emissions requires the use of two types of data [2]:

activity data & **CO_2-emission factors**

By multiplying the activity data with the specific emission factor, you get the CO_2-emissions. For example:

distance travelled by passengers per year with car
[passenger km_{car}/ a]
*
car specific emission factor
[kg CO_2/passenger km_{car}]
=
kg CO_2/a
from passenger commuting

It is essential to describe and report each type and source of activity data and emission factors you use for the calculation.

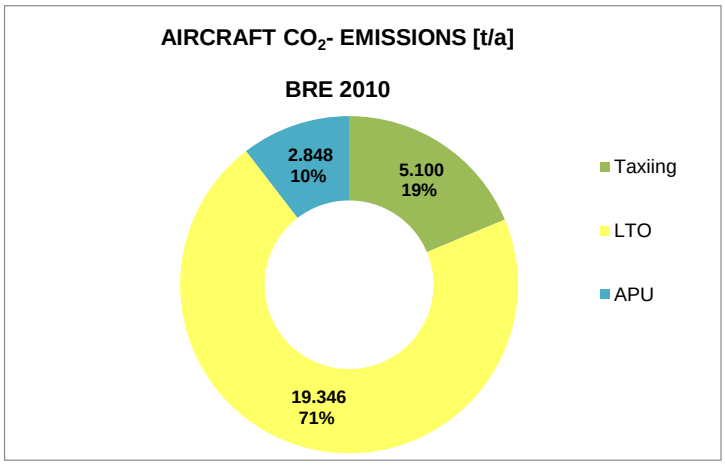
OUTPUT

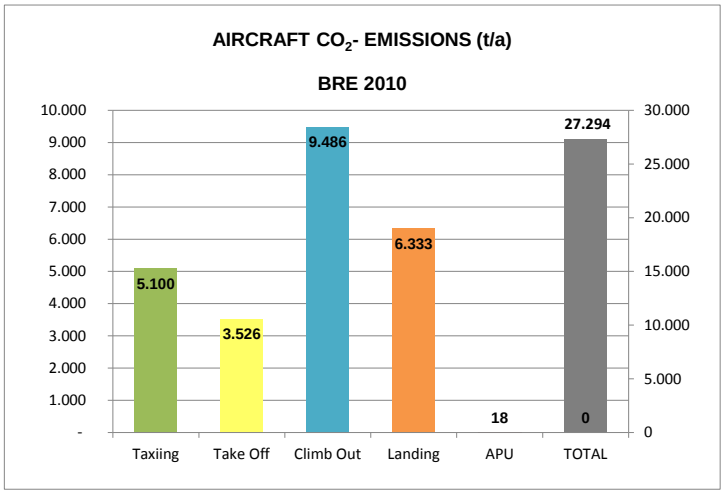
The output you get in the Calculation-Tool are the CO_2-emissions in tonnes per year. It is possible to define specific factors, for example CO_2/public vehicle per year or CO_2/LTO per year. This enables you to compare data of following years, providing that you balance in the same boundaries.

RESULTS

EXAMPLE BRE

The Calculation-Tool provides diagrams of the calculated CO_2-emissions in each category/source, for example:





DATA 4

AIRPORT

In our case (BRE) we balanced the landside traffic caused by the airport company. This includes the business travel activities and the employees' journey to and from work. We applied the distance based method. If you have data about construction activities, this would be an additional component.

WHO?

Get in contact to at least the following departments in-house:
Human Resources, engineering, controlling

Also involve the staff association!
They can assist you in collecting data without getting problems in the data privacy of the employees. Check out this point!

BUSINESS TRAVEL

WHAT?

Needed activity data:

- Number of employees in the reporting year
- Number and types of used vehicles:
  - Aircraft
  - Rail
  - Bus
  - Car
  - …
- Travelled kilometers with each vehicle type and number of employees in the reporting year

Needed emission factors:

The local public transport organizations provide emission factors of their transportation vehicles (bus, tram, train,…). Look at their environment or sustainability reports or better get into personal contact. You also can use average means you find on official governmental websites.
The emission factors of cars and aircrafts/flights are deposited in the calculation-tool.

ADVICE

If you don't have data of the employees' business travel activities, perform a survey (annual) among your staff. You can extrapolate the total business travel from a representative sample of employees (ca. 10%).

EMPLOYEE COMMUTING

WHAT?

Needed activity data:

- Number of employees in the reporting year
- Number and types of used vehicles:
  - Aircraft
  - Rail
  - Bus
  - Car
  - …
- Travelled kilometers with each vehicle type and number of employees in the reporting year

or (*average data method*):

- Average daily commuting distance between home and work of typical employees

Needed emission factors:

specific emission factor of each type of transport vehicle

The data procurement is the same as in the activity "business travel".

HOW?

EXAMPLE BRE

Example BRE:

BRE 2010 business travel	number of uses	km
rental car	4	1492
private car	23	2113
business car	4	2417
aircraft	51	--------*
Train (DB)	32	--------*
* no data available	**75 single uses**	

Unfortunately there is no kilometer information of aircraft and railway travel available, so we estimated an average distance:

Aircraft: short and mid distance (average distance ca. 1.500 km)

Train: 500 km (round trip)

For the business travel of the employees with car, we took the average fuel mix (70% gasoline, 30% diesel) and assumed that the employees traveled alone (worst case).

AIRCRAFT

The calculation of the Aircraft emissions is based upon the definition of the Landing-Take Off cycle (LTO) of the International Civil Aviation Organization (ICAO). The ACRP recommends the calculation of all Aircraft emissions during cruise and flight. At this state the calculation-tool doesn't include these emissions.

The calculation is proved with the new available calculation tool of the ACI, the "ACERT" (Airports Carbon and Emission Reporting Tool) [5].

WHO?

Get in contact with the ***controlling department***.
They provide data of the annual movements and types of aircrafts. Maybe you also have to contact airlines to request detailed information about engine run-ups or APU/GPU usage.

LTO-CYCLE, APU-USAGE, TAXIING

WHAT?

Needed activity data:

- Total movements in the reporting year
- Movements for each type of aircraft in the reporting year
- APU usage time
- Average Taxi (and Queing) Time
- Number of GPU usages (Attention!
  These are Scope 1 emissions, don't count twice!)
- Number of annual engine run-ups

Needed emission factors:

The emission factors provided in the calculation-tool are transferred from a previous calculation with the "LASPORT-Program". LASPORT is a tool for the assessment of local air quality at airports. It was developed in 2002 by Janicke Consulting [7].

AIRCRAFT TYPES

Considered ***Aircraft types*** are:

Jet:	Large	2-aisle, long-haul
	Medium	2-aisle, medium-haul
	Small	1-aisle, small/medium haul
	Regional	1-aisle, short-haul
	Business	2-eng biz jets
	Turboprop and	all engines
	Propeller	all engines

HOW?

By filling in the needed data, the calculation-tool will provide you the results by calculating the CO_2-emissions with given factors.

TENANTS

The calculation of the CO_2-emissions by the tenants is ambitious. You need to have good connections to the relevant companies, airlines and other important stakeholders. The third parties are not obliged to give you any data about their energy consumptions or business travel activities etc. You have to convince them of the benefit, for example the good public relations.

If you step forward in your public relations on climate protection, maybe it's easier to come upon encouragement.

WHO?

Get in contact with the ***tenants, airlines, governmental agencies, subcontractors etc.***
Request information about their fuel– and energy-related activities, if these are not included in Scope 1 and 2 (for example if they purchase electricity directly from another energy supplier).
Furthermore you can request data of their business travel and employee commuting. Please note that this is a data protection area and you have to handle all information confidential!

EMPLOYEE COMMUTING

WHAT?

Needed activity data:

- Number of all tenant employees in the reporting year
- Number and types of used vehicles:
  - Car
  - Public Transport (Tram, Bus, Train)
- Fuel Mix (optional)
- Travelled kilometers with each vehicle type (estimate or request the average distance between home and worksite)

Needed emission factors:

specific emission factor of each type of transport vehicle

HOW?

For each tenant you have to determine the needed data mentioned above. Therefore it is useful to develop a questionnaire, for example in excel. Send the request to each of your tenants and ask them to answer the questions as detailed as possible. Otherwise they should estimate the data.

Example Bremen

EXAMPLE BRE

ANGABEN ZUM FUHRPARK (alle Angaben bitte mit Stand 31.12.2010!)

	Bitte mit einem X ankreuzen:			
Können Sie Angaben über Ihre Fahrzeugflotte machen?		ja		nein
Haben Sie ein Flotten-/Fuhrparkmanagement?		ja		nein
Hat Ihr Personal bereits an einem "Eco-Drive-Training" teilgenommen?		ja		nein

	Anzahl	
Anzahl der Mitarbeiter:		Personen
Anzahl der Firmenfahrzeuge:		Fahrzeuge gesamt
gesamt gefahrene Kilometer:		km

Wie viele Kilometer haben Sie davon in Zusammenhang mit dem Flughafen zurückgelegt? Bitte ankreuzen (X):

	100%		75%		50%		25%		0%

Fahrzeuge:	Gesamt		davon: Benziner	Diesel	Erdgas/ Autogas	Elektro/ Hybrid	damit gefahrene **Kilometer**
PKW Kleinwagen		Stück					
PKW Mittelklasse		Stück					
PKW Oberklasse		Stück					
Transporter 3 t		Stück					
LkW < 7,5 t		Stück					
LKW > 7,5 t		Stück					
LkW > 12 t		Stück					
Sattelzug < 18 t		Stück					

Verbrauch an Treibstoffen:

Benzin		Liter
Diesel		Liter
Erdgas		Liter
Autogas		Liter
"getankter" Strom		kWh

Sonstige freiwillige Angaben

Haben Sie bereits eine Umstellung Ihrer Fahrzeugflotte auf umweltfreundliche KfZ/Treibstoffe vorgenommen?
Bitte mit einem X ankreuzen: ja nein

Haben Sie **sonstige Bemerkungen/Anmerkungen/Fragen/Wünsche** zum Fuhrpark oder Fuhrparkmanagement Ihres Unternehmens?
Dann tragen Sie diese bitte in das folgende Feld ein:

To analyze the data, you have to sum the single tenant data to a total. Probably you don't get the data of all of your tenants. Then you have to extrapolate the data to the total number of tenants/employees. This sum you need to sign in the calculation tool, which calculates the total CO_2-emissions.

PUBLIC

The calculation of the CO_2-emissions by the public is an interesting part of the Scope 3 balancing and results generally a high percentage of the total emissions. Usually the journeys to and from the balanced location with automobiles, particularly cars, produce a great amount of CO_2-emissions.

At this airport report, the passengers journeys to and from the airport have a major effect on the whole Scope 3 balancing. On the one hand with their travel behavior from home to airport and back, and on the other hand of course with their flights.

WHO?

To analyze the traffic situation at an airport you need to collect data for both travel possibilities:

- ***automobiles*** and
- ***public transport***.

For the automobile traffic you have to get in contact with your ***controlling or personal department***.
They can give you information about the parking situation and maybe about the taxi/shuttle services around the airport.

For the public transport get into contact with your ***local transport organisations***.
Request information about the degree of capacity utilization of the relevant routes (bus, train, tram,…) to the airport.

For more detailed results it's advised to make a survey among ***the passengers***. Make a survey during the main traffic/holiday season. Ask the passengers with which vehicle they arrive at the airport and which distance they covered. If they arrived with car, request the car occupants and optional the type of car and its motor fuel.

JOURNEY TO/FROM AIRPORT

WHAT?

Needed activity data:

- Total Number of passengers in the reporting year
- Mobility mix and the number and types of used vehicles:
  - Aircraft
  - Rail
  - Bus
  - Car
  - …
- Catchment area of the Airport
- Number of Transit Passengers in the reporting year

Needed emission factors:

specific emission factor of each type of transport vehicle (see group “AIRPORT”)

HOW?

For balancing the public emissions it’s necessary to develop a ***traffic model***.

EXAMPLE BRE

In Bremen we analyzed the main routes of public traffic possibilities: tram, train and buses. The main public service vehicle in Bremen to the airport is the tram, line 6. This line connects the central city station, the city centre and the airport. We requested the degree of capacity of line 6 and estimated the percentage of passengers using the tram. For a first step calculation this is a good reference.
Furthermore we collected the following data:

- Parking Places at the airport (parking decks, parking areas)
- Degree of capacity of the parking places
- Number of parking positions rented by staff/tenants

EXAMPLE BRE

Example Bremen:

We assumed the catchment area and estimated the average distance for car and railway traffic of the passengers to/from the airport.

neighbour towns:	distance to airport:	
Hamburg	120	km
Hannover	120	km
Osnabrück	120	km
Cuxhaven	100	km
Bremerhaven	65	km
Oldenburg	50	km
average	***96***	***km***

Additionally we estimated a frequency distribution of the covered distances (used for road and rail travel):

distance [km]	percen-tage [%]	km
100	20%	20
75	30%	22,5
50	25%	12,5
25	15%	3,75
10	10%	1
average	100%	**59,75**

Of course this is only an approximation. But for a first step calculation it's a sufficient basis.

After defining the catchment area of the airport and the average distance of the passengers, we estimated the percentages of the travel modes: car and public transport. In Bremen we have an approximated ratio of 46% car travel to 54% public transport.

This data results in the activity data we needed for the calculation of the CO_2-emissions.

INTERPRETATION /BENCHMARK

5

INTENTION

The intention of a Carbon Footprint is not to compare itself with others. In fact it is not really possible, because of the wide range of different pre- and site-specific conditions.

INTERNAL REPORT

Primarily it is an internal reporting method and gives an airport operator the chance to identify the main sources, activities and operations with the greatest carbon emissions. In the next step it is necessary to launch an effective carbon management with definition of quantitative targets and development and conversion of specific measures in e.g. energy-efficiency to avoid or reduce these emissions.

ACA

The participation of the Airport Carbon Accreditation Programme (ACA) is one possibility to approach a system of benchmarking, by using the same framework, tools and support.

Each airport is responsible to choose the best way for itself. Every decision towards a climate friendly future is worthwhile!

!

CONTROLLING 6

WHY?

A first step into the right direction is done: the results of the Calculation of the emissions in Scope 3 are available. The next step is to develop a strategy to reduce the emissions. Therefore it is necessary to set a high value on the big consumers and to communicate the efforts: on an internal and external communication channel. To achieve a success within the airport it is highly recommended to integrate the members of staff, as well as resident companies into climate protection activities. Measures need to be exposed, the sense of responsibility must be encouraged, therefore the awareness for climate activities needs to be raised. The highest success can only be achieved as a collective.

STRATEGY

WHAT?

To further reduce the emissions an energy controlling on a regularly basis is recommended. Therefore all the indirect emissions within the business area of the airport should be taken into focus, such as hotel business, arrival and departure of passengers and staff and the whole field of consumption. This field includes for example climate friendly paper, cleaning agents or food consumption.

LONG-TERM OBJECTIVES

HOW?

One way to look at the savings in emissions is to monitor the consumption in all parts concerning the scope 3 emissions. The basis is a continuous metrological compilation of the consumption. Another way to look at the savings can be done from the bottom. Therefore all Measures that lead to energy efficiency should be analyzed. Hence one can find out that not all measurements lead to high savings in the first place, but need a certain period until results are noticeable. For Example the involvement of members of staff can lead to savings in addition. This needs to develop a broad integration of all employees at the airport.

MEASURES IN ENERGY EFFICIENCY

BEST

AVOID

The best way is to avoid carbon emissions. For example in the field of arrival and departure of passengers the demand of using their own vehicle can be avoided, when good infrastructure for public transport is established. The timing device of public transport and shuttle buses to near located towns needs to be improved or taxis with electrical engines can be applied. Same avoidings can be achieved in the field of business travels of the employees. The provision of carpools or the offering of job-tickets for public transport can lead to the avoidance of emission intensive vehicles.

AVOID CARBON EMISSIONS

GOOD

REDUCE

To reduce the carbon footprint, for example landing and take-off emissions should be kept to a minimum, for that an efficiency strategy needs to be developed. The arrival management can be enhanced in a way that gates are available immediately after landing. The reduction of the ground moving needs to be reduced to a minimal waiting queue. An infrastructure to fuel and power low-emission vehicles needs to be provided, including charging stations for electrical vehicles.

REDUCE CARBON EMISSIONS

AT LEAST

SET OFF

If emissions can be no further avoided or reduced compensation through emission trading can be realized. One way to compensate residual emissions is to use a service provider such as “Atmosfair”. Another possibility is to support certain climate projects. Passengers can also be encouraged to compensate their rip emissions through an onsite emission calculator.

COMPENSATE CARBON EMISSIONS

REFERENCES 6

REFERENCES

The carbon calculation tool is based on the ACI Guidance Manual on Airport Greenhouse Gas Emissions Management (2009) and the ACI's Airports Carbon and Emissions Reporting Tool (ACERT), version 2.0.
The toolkit is based upon the above named references and on the GHG Technical Guidance for Calculating Scope 3 Emissions, version 1.0.
For detailed information please study all relevant documents as listed below:

- GHG Protocol
- GHG Calculation Guidance Scope 3
- ACI Guidance Manual
- ACERT Tool

LINKS

www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf

pdf.wri.org/Scope_3_Calculation_Guidance.pdf

www.aci.aero/About-ACI/Priorities/Environment/ACERT

www.aci.aero/Media/aci/file/Publications/2009/ACI%20Guidance%20Manual%20Airport%20Greenhouse%20Gas%20Emissions%20Management.pdf

www.aci.aero/Media/aci/file/ACI_Priorities/Environment/2011/ACI_FAQ_for_GHG_Manual_Jan_2011.pdf

www.teamplay-project.eu/wp-content/uploads/TP_Tool_description_LASPORT.pdf

LIST

[1] The Greenhouse Gas Protocol (GHG)
Revised Edition, WRI, 2004

[2] Greenhouse Gas Protocol
Technical Guidance for Calculating Scope 3 Emissions (version 1.0), 2013

[3] ACRP: Airport Cooperative Research Program, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories, Report11, 2009

[4] ACI: Airports Council International
Guidance Manual on Airport Greenhouse Gas Emissions Management, 2009

[5] ACERT: Airports Carbon and Emissions Reporting Tool (version 2.0), ACI, 2013

[6] ICAO: International Civil Aviation Organization

[7] LASPORT: www.janicke.de/de/lasport.html

[8] Energie- und Klimaschutzkonzept City Airport Bremen,
BEKS Energieeffizienz GmbH, 2011

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EN BREMEN
Tram
A

provincie Drenthe

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Investing in the future by working together for a sustainable and competitive region

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