LEAP-RE

Research and Innovation Action (RIA)

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http://www.leap-re.eu/

Initial carbon footprint report

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Summary

This Initial carbon footprint report (D1.5) establishes a methodology accounting for LEAP-RE?s meeting-related carbon emissions and provides guidance for further reduction measures. Additionally, recommendations are made on possible choices of carbon offsetting and LEAP-RE?s future deployment of innovations. Estimate of Carbon emissions related to travel This report provides a coherent estimate of the equivalent CO2 emissions emitted as a result of the LEAP-RE project travel. Calculations are based on the journey and, hotel stays of all Consortium members, using various tools including but not limited to the Ademe ?Ecocalculator? (for transports), the Greenview hotel footprint tool (for hotels), tailored excel tables for each type of footprint calculation. Several hypotheses have been made in absence of available data, such as the departure and arrival locations of most train and public transport trips or the presence of layovers within long flights. The total carbon footprint is calculated by emission category (type of transport, hotel). From M1 to M31, the project related travels are responsible for around 365 tonnes of CO2 of which over 99% are caused by flights, and less than 1% by hotel stays. The total carbon emissions of the LEAP-RE programme is roughly equal to 206 Paris - New York return flights. The trips accounted for are: 2 General assemblies, 1 Kick off Meeting, 13 Project Management Boards meetings, 5 work package meetings, LGI train trips, 7 field trips, 5 Nanoe return flights, 1 presentation visit and 1 workshop. These aforementioned trips can have participant and thus traveller counts ranging from 1 to 136 travellers. This report gives recommendations to improve the carbon accounting, the reduction of carbon footprint and the choice of carbon offset or reduction plan. Recommendations to reduce and offset carbon emissions The following guidelines for the LEAP-RE?s travel policy are provided: ? It is important to consider train and public transportation as the primary means of travel. ? When flying is unavoidable, it is preferable to choose direct flights, flights using advanced biofuels or energy-efficient aircrafts, and book economy class. ? The attendance to presential events with other EU projects is encouraged to reduce environmental impacts, share knowledge, and optimise project costs. Offsetting can be done in different ways: - External reforestation and afforestation projects can be considered for cooperative don...

Approval

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LEAP-RE

Long-Term Joint EU-AU Research and Innovation Partnership on Renewable Energy

Research & Innovation Action

August 2023

D1.5 Initial Carbon Footprint Report

Version N°1 - Report on carbon footprint measurement, diagnostic and action

Authors:
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This project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

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Abbreviations and Acronyms

Acronym	Description
CDM	Clean Development mechanism
CER	Offsets or Certified Emission Reductions
EC	European Commission
ICVCM	Integrity Council for the Voluntary Carbon Market
I-REC	International Renewable Energy Certificate Standard
REC	Renewable Energy Certificate
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
WP	Work Package

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Executive Summary

This Initial carbon footprint report (D1.5) establishes a methodology accounting for LEAP-RE's meeting-related carbon emissions and provides guidance for further reduction measures. Additionally, recommendations are made on possible choices of carbon offsetting and LEAP-RE's future deployment of innovations.

Estimate of Carbon emissions related to travel

This report provides a coherent estimate of the equivalent CO_2 emissions emitted as a result of the LEAP-RE project travel. Calculations are based on the journey and, hotel stays of all Consortium members, using various tools including but not limited to the Ademe "Ecocalculator" (for transports), the Greenview hotel footprint tool (for hotels), tailored excel tables for each type of footprint calculation. Several hypotheses have been made in absence of available data, such as the departure and arrival locations of most train and public transport trips or the presence of layovers within long flights. The total carbon footprint is calculated by emission category (type of transport, hotel).

From M1 to M31, the project related travels are responsible for around **365 tonnes of CO_2** of which over 99% are caused by flights, and less than 1% by hotel stays. The total carbon emissions of the LEAP-RE programme is roughly **equal to 206 Paris - New York return flights**.[1]

The trips accounted for are: 2 General assemblies, 1 Kick off Meeting, 13 Project Management Boards meetings, 5 work package meetings, LGI train trips, 7 field trips, 5 Nanoe return flights, 1 presentation visit and 1 workshop. These aforementioned trips can have participant and thus traveller counts ranging from 1 to 136 travellers.

This report gives recommendations to improve the carbon accounting, the reduction of carbon footprint and the choice of carbon offset or reduction plan.

Recommendations to reduce and offset carbon emissions

The following guidelines for the LEAP-RE's travel policy are provided:

- It is important to consider train and public transportation as the primary means of travel.
- When flying is unavoidable, it is preferable to choose direct flights, flights using advanced biofuels or energy-efficient aircrafts, and book economy class.
- The attendance to presential events with other EU projects is encouraged to reduce environmental impacts, share knowledge, and optimise project costs.

Offsetting can be done in different ways:

- External reforestation and afforestation projects can be considered for cooperative donation or partnerships. Projects could be included in LEAP-RE's portfolio.

[1] a Paris-New York return flight emits on average 1.77 tonnes of CO_2 according to Ademe calculator

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- Clean Development Mechanisms are the preferred choice for Certified Emission Reduction credits due to their broader methodology options, third-party verification, and resilience against the methodology issues faced by the private Voluntary Carbon Standards.

Finally, the deployment of renewable energy solutions in the market can be accounted through Renewable Energy Certification.

This report is expected to be updated throughout the duration of LEAP-RE notably at M63.

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Introduction

This deliverable aims at creating a detailed plan and assessment of the implemented measures to reduce the project's carbon footprint. Through the assessment and quantification of said carbon footprint, a methodology applicable to all LEAP-RE meetings is elaborated. This methodology takes into account the means of transportation, distance and hotel stays to calculate the total carbon footprint of the project's travels. The information is provided by WP leaders through attendance sheets and post meeting statements.

All reporting on the project's carbon footprint comes from technical reporting by WP leaders and any missing information is substituted with a corresponding hypothesis.

The resulting information is used in this deliverable for carbon accounting, which up to this date amounts to over 357 TCO_2 of recorded and hypothesises ex-ante emissions. Added to this assessment are recommendations of possible indirect carbon reduction choices. The estimated savings (avoided emissions) by going virtual for all past and future projects would be around 367 TCO_2 eq.

1. Context

1.1. Definitions

Several definitions are worth being reminded of for a better understanding of this report's content:

Carbon footprint: Carbon footprint is the total amount of greenhouse gases (including carbon dioxide and methane) that are generated as a result of the activities of a particular individual, organisation or community (The Nature Conservancy, 2022).

Transport, food, consumption of goods and services, accommodation, etc. are therefore considered in the present carbon footprint calculation.

Carbon offset: Carbon offset is a measure of the reduction or removal of the emissions of carbon dioxide or other greenhouse gases by an individual or an organisation to compensate for emissions made elsewhere (Collins Dictionary, 2022).

Greenhouse Gas: any gas that has the property of absorbing infrared radiation (net heat energy) emitted from Earth's surface and reradiating it back to Earth's surface, thus contributing to the greenhouse effect. Carbon dioxide, methane, and water vapour are the most common greenhouse gases on Earth (Britannica, 2022).

Intergovernmental Panel on Climate Change (IPCC): A committee created in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP). Its objective is to provide scientific information to governments at all levels for them to develop climate policies (IPCC, 2022).

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1.2. Scope

The scope of this study is restricted to travel (journey and accommodation), and potential compensation (offsetting) measures considering it represents a significant share of the programme's scope 3 footprint (as defined under the GHG Protocol).

This deliverable only examines emissions related to the partners' travels and hotel accommodations. Emissions related to food consumption are not taken into account, although the project aims at contracting local producers who provide low-carbon food as much as possible. Aside from carbon accounting and guideline improvements and recommendations for future meetings, compensation (offset and reduction options) will also be reviewed for the implementation of future innovations.

1.3. LEAP-RE expected travels

Although a very high number of meetings within WPs and at consortium level take place online (see D11.2 Project Quality Plan), several trips are expected as part of the work packages mentioned below. **In the following sections, the term "trip" refers here to round-trip travel achieved by one person.**

1.3.1. Meeting details

There are a total of 18 meetings scheduled, with virtual meetings being the norm (4.1). However, mandatory physical meetings take place alternatively in Europe and Africa. The following meetings have been planned:

- Kick-off meeting (M1 or M2) (Online).
- Programme Management Board meetings: quarterly virtual meetings and annual physical meetings (12 online + 1 physical).
- Annual General Assemblies (hybrid annual assemblies)
- Three general workshops at M18, M42 and M58 (hybrid) see WP4 for more precision,
- Individual P1 and P2 project meetings under the coordination of Pillar leaders (5 meetings per pillar, nature unspecified).

All collected information is summarised in Table 1.

Table 1. Overview of recorded meetings and trips

Pillar / WP	Meeting Type	Location	Date
Pillar 3	KoM	Online	02/21
	AG 1	Nairobi Kenya	10/21
	AG2	Pretoria, South Africa	10/22
	12 PMB	Online	03/22
	1 PMB	Paris, France	05/22
	1 PMB Helsinki	Helsinki, Finland	03/23
	WP5 Meeting	Tlemcen, Algeria	To be determined
	Trips Project coordinator	Marseille >Paris 5x	Not precise

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Pillar / WP	Meeting Type	Location	Date
WP11	Field trip (sepco, UL, Geo2D, UBO)	Kenya Homa hills	03/22
	Field trip (sepco, UL, Geo2D, UBO)	Homa Hills Kenya	04/22
	Field trip (SSAA, Geo2D, Unito)	Djibouti	11/22
	Field trip (SSAA, Geo2D, Unito)	Homa Hills Kenya	02/23
	Field trip (SEPCO)	Homa Hills Kenya	10/21
	Preparation for the field trip (UL)	Lille>Chambery return trip	10/21 & 12/21
WP15	Field trip	Burkina Faso	02/22
	Nanoe 5 flights	France / Madagascar	Between 10/20 & 03/22
WP16	Visit of Songhai for Presentation at EUD (ARESS, EPAC)	Benin	02/23
	ESECA Workshop (CT2S, ARESS, EIFER)	Lille	09/22
	KoM WP (Medee)	Benin	10/21

All distance calculations leading to the CO_2eq estimation for travel are made possible thanks to the WP leaders' reports and attendance sheets, which have shared meetings' locations, dates, and an estimate of the attendants.

Any missing information aside from duration-related information is substituted with a hypothesis to account for equivalent emitted CO_2. All meetings without records of duration have their transport accounted for, either through recorded information or applied hypothesis. In contrast, CO_2 related to accommodation (hotel-related) cannot be calculated or hypothesised.

2. Carbon footprint methodology for LEAP-RE

2.1. Data collection methodology

2.1.1. Project meetings

For full consortium meetings, the Project Management Office (PMO) has decided to circulate questionnaires among physical participants to retrieve basic information on the departing city, all transportation modes taken, the number of day on-site, accommodation, to be able to calculate the carbon footprint associated to the meeting.

Up until this point, an attendance sheet is provided onsite to partners and is communicated by WP leaders. In case there were missing elements, hypotheses have been made.

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2.1.2. Other meetings

For meetings and events related to WP3, 5, 12, 13, WP leaders monitoring the related travel provisions are also expected to fill in the carbon footprint table for LGI to be able to calculate the carbon footprint associated with each event.

In practice, each WP leader has a dedicated follow-up table with one sheet per event. This information is supposed to be properly updated after each meeting and event and is only complete at the end of the program. This monitoring will be facilitated during the second interim reporting period and will be a key element of the online Monitoring, Evaluation & Learning platform to be delivered by LGI in the last quarter of 2023.

2.2. Carbon footprint calculation methodology

To make calculations, the resource centre for greenhouse gas accounting from ADEME is the norm. Hypotheses used for calculation of unrecorded information are found in Table 8 and Table 11.

All data needed for calculating the carbon impact per transport per distance can be found in Table 2 for aerial transport, Table 3 for railways, Table 4 for personal cars, Table 5 for Taxis, Table 6 for public transportation, and Table 7 for the CO_2 impact of Hotel stays per night.

All calculations and results are available in the accompanying file LEAP RE Flights (1) of which detailed information on land transport (Appendix 9.3 Calculations details

Table 19) and flight distances (Appendix Table 20) can be found.

When unrecorded, layover and hotel information are calculated following the hypothesis from Table 8 and Table 11. Hypotheses concerning train stations can be found in Table 9. Other transportation choices notably car, taxi and public transport have their distances hypothesised in Table 10 when the departure point, destination or both are missing.

2.2.1. Air transport

The "Ecocalculateur" DGAC (ADEME, 2022) is used for all flight equivalent CO_2 emissions. For all participants, the return flight is estimated to be the same path unless specified otherwise.

When participants notify a layover, two flights are accounted for. For example, if a participant has flown from Warsaw to Frankfurt, and from Frankfurt to Brussels, one trip is accounted as 2 short-haul flights, and a round-trip is accounted as 4 short-haul flights.

Table 2 describes all references used for equivalent kg CO_2 emission per km of flight and is the basis for all flight-related emission deductions. The coefficients considers contrails in their calculation.

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Table 2. Passenger transport - Plane

Mode of transportation	Kg CO_2e/passager.km	Source
Short haul flight (0-1000km)	0.23	Ecocalculateur DGAC (Base Ademe)
Medium-haul flight (1000-3500km)	0.18	Ecocalculateur DGAC (Base Ademe)
Long-haul flight (>3500km)	0.15	Ecocalculateur DGAC (Base Ademe)

2.2.2. Train

Table 3 covers all equivalent CO_2 emissions made through train transport within Europe. When travelling through multiple countries, the coefficient utilised is based on the country where the majority of the distance is covered.

Table 3. Passenger transport - Train

Country	KgCO_2e/passager.km	Source
Germany	0.067	Base Ademe (calculation made by using the GWP of the 5th IPCC report from 2013 and GT Transport Base Carbone for France)
Sweden	0.013	
Italy	0.032	
Netherlands	0.076	
Spain	0.051	
Austria	0.024	
UK	0.075	
France	0.00236 for high-speed trains	
Belgium	0.0484	

2.2.3 Travel by private car

Table 4 covers the average emission quantity per km of a personal car used in France and is extrapolated to all cars in Europe.

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Table 4. Passenger transport - Car

Car	$KgCO_2e$/passager.km	Source	Date
Average car	0.0218	Base ADEME via HBEFA, Comptes des transports	2020

2.2.4. Taxi

Following the hypothesis that taxis carry a minimum of 2 people, Table 5 covers the equivalent CO_2 emissions of the km travelled by taxi. It is noteworthy that unless precised otherwise, the taxi will be counted as a round trip between the meeting area and the accommodation.

Table 5. Passenger transport - Taxi

Taxi	$KgCO_2eq$/ passager.km	Source	Date
Taxi	0.0218 / 2 = 0.0109	The hypothesis made from LGI based on the average car from Base ADEME via HBEFA, Comptes des transports	2020

2.2.5. Public transportation

Table 6 summarises the equivalent CO_2 emissions of public transport, this data, valid in France, is extrapolated to all European public transport.

Table 6. Passenger transport - Public transportation (France)

Transportation mode	$KgCO_2e$/passenger. km	Source	Date
Walk or Bike	0	Base ADEME via GT Transport Base Carbone	2023
Subway	0.00274	Base ADEME via GT Transport Base Carbone	2023
Bus (urban area > 250 000 inhabitants)	0.113	Base ADEME via GT Transport Base Carbone	2023
Tram (reference: Ile de France)	0.00268	Base ADEME via GT Transport Base Carbone	2023

2.2.6. Hotel room (world)

One night stay at a hotel generates CO_2 emissions due to facilities (i.e. reception, restaurant, meeting room, laundry…), the consumption of energy and water,

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furniture, textiles, and electronic equipment. All CO_2 footprint calculations for hotels were done with the Hotel footprint tool (Greenview, 2022).

Table 7 highlights the estimated carbon footprint per night for a three-star hotel. This information is applied to any recorded hotel stay with a defined duration.

Table 7. Hotel carbon footprint

One night, 3 Stars hotel	Kg CO_2e/person	Source	Date
Belgium	9.4	Hotel footprinting tool	2023
France	3.2	Hotel footprinting tool	2023
South Africa	45	Hotel footprinting tool	2023
Kenya	12.9	Hotel footprinting tool	2023
Djibouti	15.1	Hotel footprinting tool	2023
Algeria	33.3	Hotel footprinting tool	2023
Finland	3.9	Hotel footprinting tool	2023
Benin	21.4	Hotel footprinting tool	2023

2.3. Methodology limitations

Although the proposed methodology allows for standardisation and quantification of all recorded travel information for assessment and improvements, it includes the following limitations:

- Flight lengths are calculated with approximations in terms of CO_2 emissions
- This approximation concerns shorter flights and transits when present
- CO_2 emissions approximation for travels by train when a border is crossed
- This is due to the fact that the quantity of $KgCO_2e$/passenger chosen for calculation corresponds to the country with the most distance travelled.
- Approximation for cars as the reference used is that of an average car due to a lack of detailing on transports and not representative of electric vehicles, larger cars.

When the information concerning a participant's departure or arrival airport is incomplete or lacking, global hypotheses are made for distance and $eqCO_2kg$ calculations (Table 8). Each application of a global hypothesis depends on the flight it is applied to.

Table 8. Hypotheses for missing information on airports

Global hypothesis	Flight distance	Description	Example
Departure city	Airport based	If the city where the participant or participant's organisation is located does not have an	The closest international airport to Aachen is located in Maastricht. Where the airport

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Global hypothesis	Flight distance	Description	Example
	Source: Google Maps	international airport, the flight is considered to start from the closes t international airport.	departure is stated to be Aachen, the flight is considered to depart from Maastricht.
Arrival City	Distance -based Source: Google Maps	The destination is the location of the event. If no international airport is presen, the closest international airport is the designated point of arrival.	Field trips to Homa Hills Kenya where Kisumu international airport is taken as the departure airport.

Other lacks of precision regarding location, distance, and stay duration are remediated through various hypotheses described in Table 9, Table 10, and Table 11.

Table 9 describes how the allocation of train stations is made when there is any lack of information or multiple train stations to choose from.

Table 9. Global hypotheses for missing information on train stations and distances

Global hypothesis	Train distance calculation	Description	Distance sources
Departure City	Information based	If the only given information about the departure point is the country, the capital city is selected as the departure point	• www.travelmath.com; • https://www.rome2rio.com; • maps.google.com; • omio.fr
Arrival City	Information based	The train destination is the main station of the city or when explicitly communicated another station	• www.travelmath.com; • https://www.rome2rio.com; • maps.google.com; • omio.fr

Table 10 details all recorded instances of the use of public transportation. This information is only available in the case of the Paris PMB, held at LGI headquarters, no other hypothesis or deductions can be made nor used without a large margin of error.

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Table 10. Global hypotheses used for public transportation distances in Paris

Global hypotheses	Distance	Description	Distance sources
Recorded	From or To LGI	The distance between the airport or train station and LGI is used	www.travelmath.com https://www.rome2rio.com maps.google.com omio.fr
Presumed	From or To LGI	When there is no departure given, the average commute is applied (6.5km)	https://www.apur.org/en/our-works/half-employees-working-employment-hubs-ile-france-travel-less-10km-get-work

Table 11 details the hypotheses taken in light of the flight distances when no information about layover or hotel is given. This also affects the duration of hotel stays as long-haul flights may imply staying over for one or more nights due to low availability.

Table 11. Applied hypotheses for flights and hotel stays

Applied hypothesis	Flight	Description	Hotel	Description
1	Short-medium haul	The participant took a direct short-medium haul flight following LEAP-RE travel policy	Fewer nights	The participant managed to find transportation allowing them to save one hotel night
2	Long Haul <6h	The participant took a direct long-haul flight overstaying LEAP-RE travel policy	Extra night	The participant stayed an extra night for any transportation or organisational problem
3	Long Haul >6h	The participant took a direct or non-direct long-haul flight overstaying LEAP-RE travel policy	Extra nights	The participant stayed extra nights for any transportation or organisational reason
4	Long haul / in line	The participant took a direct long-haul flight following the LEAP-RE travel policy	The right amount of nights	The participant managed to find transportation allowing them to stay the recommended amount of nights

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Applied hypothesis	Flight	Description	Hotel	Description
5	Verified	The information has been verified with the organiser and is not a hypothesis	Verified	The information has been verified with the organiser and is not a hypothesis

3. Carbon footprint calculation & analysis

3.1. Air travel

About **354 tonnes of CO_2eq were emitted by air travel for all meetings**. In comparison, a Paris-New York flight (two ways) emits on average 1.77 tonnes of CO_2 (Ademe calculator). The total emission through flights of the LEAP-RE programme to date can be considered roughly **equal to 200 Paris - New York return flights for one person**.

Calculated using the references from Table 2, Table 8, and Table 11, the total recorded and estimated CO_2 emissions by plane can be seen in Table 12.

This average CO_2 per passenger and total CO_2 emissions per WP (Table 12) take into account the CO_2 linked to the production of the transport itself (Table 2).

Table 12. Recapitulative table of flight distances and CO_2 emissions

WP	Total TCO_2eq
WP5	21.2
WP11	21.1
WP15	15.5
WP16	4.6
LRSF October 3rd-6th 2022	140.8
PMB March 31st 2022 Paris	9.3
LRAG1 November 23rd-24th 2021	133.3
Helsinki	8.368

A detailed view including all flight distances is available in the appendix (Table 20).

It is noteworthy that for flights, unless indicated otherwise or exceeding the distance covered by known direct flight options, all flights are considered to be direct flights (no layover). This information can affect the precision of the equivalent emission calculation and does not have a remediation tool to date.

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3.2. Train

With the various applied hypotheses, about **214 Kg of CO_2eq** was emitted by other transports for all the meetings. This is the **equivalent of 0.12 Paris - New York return flights.** A detailed view of all land-related transports is available in the appendix (9.3 Calculations details

Table 19). Throughout the various meetings, recorded land travels can be calculated with references from Table 3, Table 4, Table 5, Table 6 and the hypotheses from Table 9, Table 10 when locations are not precise. These calculations lead to the summarised distance and equivalent CO_2 emissions per transport type in Table 13.

Table 13. Recapitulative table of land transports and their KgCO_2eq emissions

Transport type	Distance Km	KgCO_2eq	Total kgCO2eq
Train Germany	2369	79.1	158.3
Train Italy	1491	47.3	47.3
Subway	73.9	0.02	0.2
Train France	2552	1.205	6
Taxi	213.6	0.3	2.3

3.3. Hotels

Total equivalent CO_2 emissions of hotel stays amounted up to **11 TCO_2eq or just over 6 Paris New York return flights**.

The calculations are possible for the stated meetings as they have precise dates of start and end. Unlike flight calculations, field trips and other trips with little to no details on the duration of the stay cannot be correctly without further information. Hotel stays' equivalent carbon emissions can be quantified through the use of references from Table 7 and complemented with the hypothesis from Table 11 when required.

Table 14. Total kgCO_2eq of meeting-related hotel stays

Meeting location	Meeting Name	Meeting total kgCO_2eq
Pretoria	LEAP-RE Stakeholder Forum (LRSF) October 3rd-6th 2022	8010
Nairobi	LEAP-RE General Assembly 1 (LRAG1) 23rd-24th November 2021	2760.6
Paris	Project Management Board (PMB) March 31st 2022	70.4

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Meeting location	Meeting Name	Meeting total $kgCO_2eq$
Helsinki	Project Management Board (PMB) May 2023	54.6

3.4. The impacts of virtual meetings

Virtual meetings are advised to be the norm (as per the travel policy available in 4.1) and can help reduce the carbon footprint.

To correctly assess the footprint difference between an in-person meeting and its virtual counterpart, two meetings with the same participants need to be held, one virtual and one in person. The comparison is thus done on a hypothetical basis.

To estimate this impact, a comparison of a physical meeting and its hypothetical virtual counterpart will be done. This subtractive method is chosen as the estimation of a hypothetical physical meeting that took place instead of an online meeting would contain many hypotheses and imprecisions.

The impacts of virtual meetings can be hypothesised using the Ademe ”Ecocalculateur” (ADEME, 2022). The impact tool published by Ademe (ADEME, n.d.) allows the estimation of the carbon footprint per person weekly and yearly. The calculated estimation of LEAP-RE’s virtual carbon footprint is the following:

- Stakeholder forums and meetings with **200 participants spanning 4 attendance days with 6 hours of content emit on average 40kg of CO_2** over their course.
- Smaller meetings with 10 to 15 participants lasting one day with 4 hours of content such as the Helsinki PMB (15 participants) emit on average 0.45kg of CO_2 over its course.

As a comparison, the LEAP-RE Stakeholder Forum (LRSF) was responsible for the emission of 141.6 TCO_2eq. This demonstrates that virtual meetings can help decrease drastic amounts of CO_2 emitted despite the presence of a small footprint.

3.5. Estimate of the project carbon footprint at M63

At the time of writing this deliverable (**M31**), the total estimated carbon emissions of transports related to LEAP-RE is estimated at **354 TCO_2eq** rounded down. Added to this is the total recorded carbon emissions related to hotel stays at **11 TCO_2eq**. A total of **nearly 365 TCO_2eq** has been recorded across all emissions.

To correctly estimate the total carbon footprint of the project at M63, more information concerning the duration of field trips and transportation is needed.

As the time of writing this deliverable, the predicted total number of meetings at M63 for LEAP-RE is yet to be determined.

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The only confirmed and unaccounted meeting is that of the Kigali meeting bound to take place in October 2023. It is predicted that this meeting would require the presence of 200 participants on site and online.

The attending participants of the two confirmed meetings will be considered the same as that of similarly sized past meetings. For the Helsinki PMB, the Paris PMB is used as a reference and for the Kigali meeting, the reference is the October 2022 stakeholder forum.

The theoretical total footprint at M63 will be calculated according to 2 hypothetical scenarios.

The first scenario accounts for the physical presence of all participants for both meetings. **The total footprint** for the **Kigali** meeting would be approximately **21.89 tonnes** of emitted CO_2.

Out of the 200 participants expected at the former stakeholder forum of October 2022 (South Africa), only 136 participants left any physical evidence of physical attendance, the rest supposedly attended virtually.

Since the stakeholder forum had 136 physical participants and not 200, the theoretical footprint of the Kigali meeting is a proportional multiple of its reference.

In the case of the stakeholder forum of 136 participants, the **average emission per participant** for transport and hotel stay throughout the event is **1094.5 kg** of CO_2. Through the use of this average, a predictive calculation of the carbon footprint of the Kigali meeting can be done by multiplying the average participant emission with the number of participants.

4. Strategy for carbon footprint reduction

4.1. Travel policy

First, LEAP-RE endeavours to limit its GHG emissions related to travel as much as possible, using the following principles for its travel policy:

- **Virtual meetings are the norm**. Even though the project recognises the need for significant interactions between consortium partners, face-to-face meetings are to be organised only when strictly necessary.
- **Train and public transportation are preferred** over other means of transport.
- When flying is unavoidable, **no-connection air travel is recommended**. In addition, biofuel flights or flights with energy-efficient aircraft are preferred whenever possible. For flights, economic class at the best available rate is the general rule.
- Combining presential event organisation with other EU projects, which could not only reduce the environmental impacts but also facilitate knowledge sharing and rationalisation of all project costs.

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4.2. Other Carbon footprint reduction and avoidance recommendations

To further reduce the carbon emissions associated with the project, the following recommendations can be added to the travel policy and project management guidelines:

- **Catering:** It would be important to include in the travel policy the recommendation is to eat vegetarian meals. If no available vegetarian option is available, eating chicken (1.35 $kgCO_2$/meal) (ADEME, 2022) rather than beef (6.29 $kgCO_2$/meal) (ADEME, 2022) is recommended.
- **Videoconference:** Microsoft Teams is recommended as it is practical and at the top 3 of the less-emitting videoconference tools. When appropriate, switching off cameras could help decrease data consumption by 92% (Kamiya, 2020).
- **Data management:** Emails without attached documents (and a Sharepoint in Teams) are preferred, as an email with an attached document is emitting 0.035 $kgCO_2$, as opposed to 0.004 $kgCO_2$ for an email without an attachment (ADEME, 2022).

5. Carbon offset mechanisms

The carbon emissions generated by the LEAP-RE project (travels and videoconferencing), when they cannot be avoided nor reduced, can be offset by different mechanisms.

In some cases, the LEAP-RE innovations enable to save carbon emissions compared to the current technology and can be treated as offsets.

5.1. Offset choices for LEAP-RE

To offset the emissions related to the travel within the LEAP-RE project, there are two mechanisms: direct and indirect carbon offsets.

- In the case of **direct carbon offsets** (shown in Figure 1), the amount of carbon annually saved by the deployment of the LEAP-RE innovations could be accounted for as an offset strategy. This requires LEAP-RE to set up a calculation scheme or employ an existing one. The process of acquiring direct carbon offsets is shown in Figure 1.

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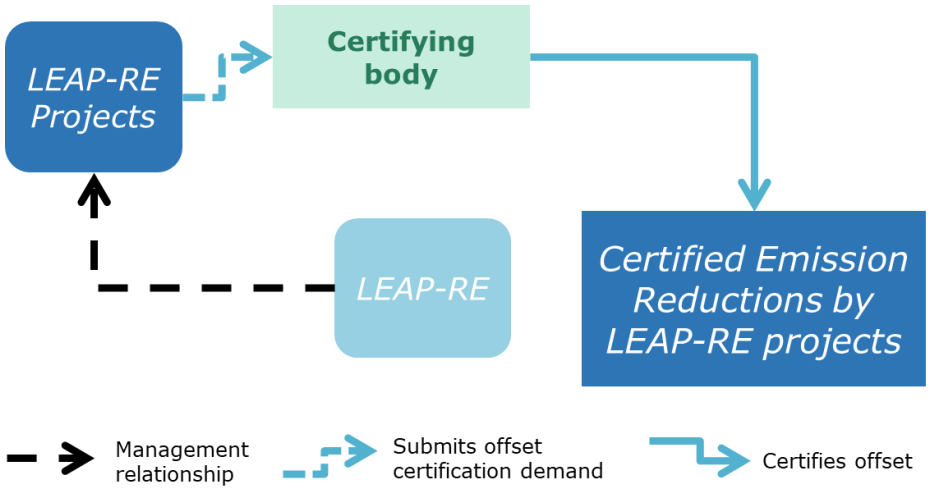

Figure 1. Direct offsetting process for LEAP-RE

- In the case of **indirect carbon offsets,** carbon credits are bought on the **voluntary market (VCM)**. These carbon credits are tangible proof of the claims of the carbon project. LEAP-RE will not own the compensation projects, only contribute financially to claim the impact of the offset. The process is shown in Figure 2.

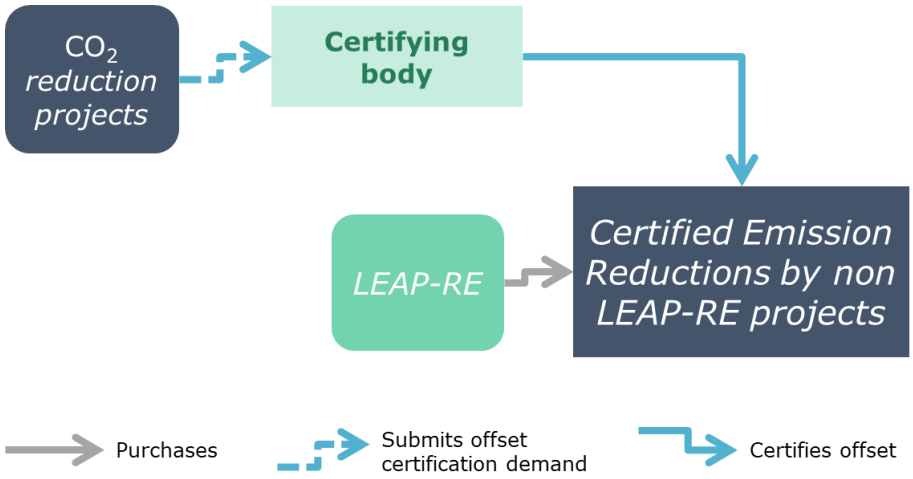

Figure 2. Indirect offsetting process for LEAP-RE

The two organisation types from which LEAP-RE can seek emission reduction certification or positive environmental impact certifications are the following ones:

1. **Carbon Credits or Certified Emission Reductions** remove a quantified amount of carbon from the atmosphere either through carbon sinks or emission avoidances. They are certified by the standards of the UNFCCC or REDD programme.
2. **Certified Carbon Reduction projects** that have quantified emission reductions, even though they are not certified as a Certified Emission Reduction.

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Both solutions are possible choices for projects and organisations wishing to offset their emissions. These options are opted to quantify and certify the impact of certain actions done by the organisation.

5.2. Certified Emission Reduction

The Certified Emission Reduction can be of interest in the LEAP-RE project. The following part highlights the context and the potential providers for the LEAP-RE project.

5.2.1. Contextual elements & their implications

Offsetting for a net zero target is an option taken by many companies and has been around for some time (Naik & Whieldon, 2021). However, the act of offsetting should be done with caution and transparency (Naik & Whieldon, 2021)

In early 2023 Die Zeit, The Guardian and an investigative platform published articles **heavily criticising the usage of carbon avoidance** to justify the creation and sale of Certified Emission Reductions.

Targeting Verra and all similar Certified Emission Reduction certifiers, this journal argued against the use of carbon avoidance projects to justify carbon credits of which over 94% are judged "worthless" (Greenfield, 2023). This affects both LEAP-RE's choices to buy credits and to certify projects for Certified Emission Reductions.

As of this moment, all Certified Emission Reduction applications are reviewed by the criticised private certifiers or by the UN through the UNFCCC's portal (goclimateneutralnow@unfccc.int).

5.2.2. Governing bodies in the carbon credit market

Since the 2023 carbon offset methodology scandal (Greenfield, Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows, 2023), the integrity of certification-issuing bodies remains questioned by public opinion (The Guardian, 2023) and many organisations (Institute for Agriculture & Trade Policy, 2023).

A governance body concerning Integrity is set in place for the aforementioned certifying bodies. **The Integrity Council for the Voluntary Carbon Market (ICVCM)** is a council made to monitor the integrity of the voluntary carbon market following the methodology scandal.

The mentioned council (ICVCM) is also under the governance of larger entities namely **The European Commission (EC)** and the **United Nations Framework Convention on Climate Change (UNFCCC).**

5.2.3. Certified Emission Reduction providers

The Voluntary Carbon Market (VCM) allows for the trade of **Certified Emission Reductions (CER)** or carbon credits. These credits can be produced and retired through purchase and must come from a certified accreditation body.

There are currently two main categories of accreditation bodies, Voluntary Carbon Standards and Clean Development Mechanisms.

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- **Voluntary Carbon Standards (VCS)** are private carbon offset accreditations that can include a specific registry or require trade through another registry. They are described as a means "to provide a robust, global standard and program for approval of credible voluntary offsets" (UN-REDD Programme, n.d.). Their process is detailed in Figure 3, and occurs in 5 different steps, which include the verification of emission reduction.

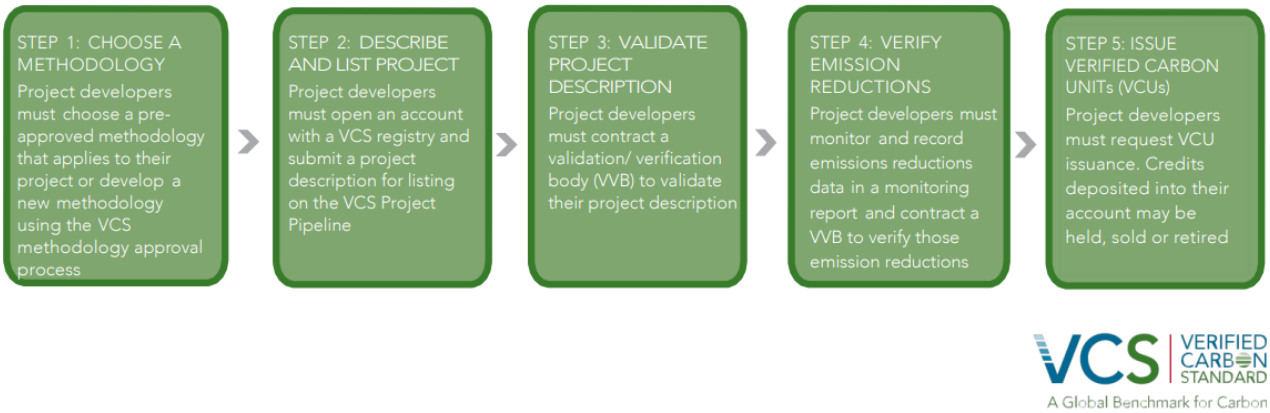

Figure 3. Example of Voluntary Carbon Standard offsetting process by Verra (Verra, 2013)

- **Clean Development Mechanisms** are nationally or UN-regulated carbon offset accreditations. They function similarly to Voluntary Carbon Standards but often take more time and do not have a standard pricing system. Their process is detailed in Figure 4, and include a monitoring and verification of the emissions reduction.

Figure 4. Clean Development Mechanism offsetting process by the UNFCCC (UNFCCC, n.d.)

Both Voluntary Carbon Standards and Clean Development Mechanisms are meant to produce offsets or Certified Emission Reductions (CER) measured in Metric tons of CO_2 equivalent removed through a certified activity. This certified activity can

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be nearly any carbon-reducing activity, the main difference in certification quality is the information and verification requirements (Figure 5).

As the main selling argument of Certified Emission Reductions is the assurance of the reduction of a measured CO_2 while avoiding all social and environmental harms, the main way of assessing the quality of Certified Emission Reductions is the information the project provides for certification.

The information required by the certifying bodies are tokens of validity and justifications for the price of the offset. This information is thus important to LEAP-RE when it comes to Certified Emission Reduction choices.

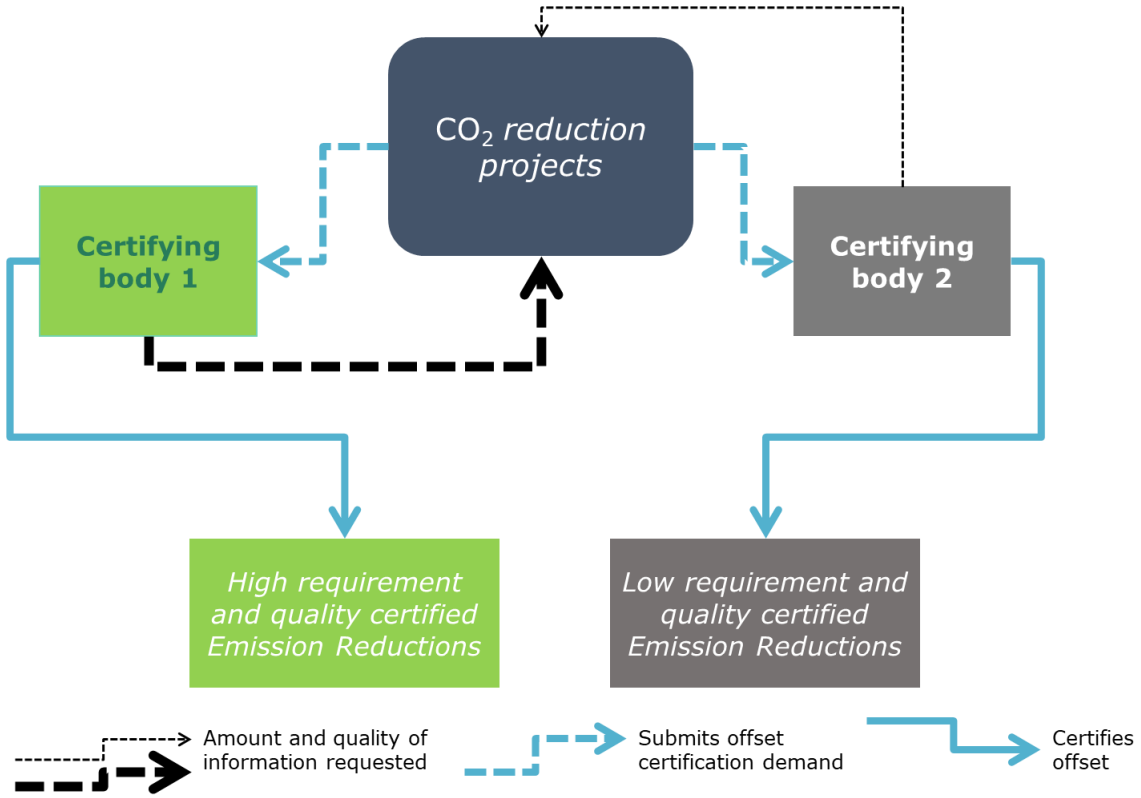

Figure 5. Overview of Certified Emission Reduction quality assessment

For all **Certified Emission Reductions**, a combination of variations of carbon reduction projects, and a UNFCCC pledge should be considered if LEAP-RE is to apply to the Certified Emission Reductions market.

Following the wave of articles that resulted in a methodology scandal, the courses of action have been compared regarding their benefits, potential risks, benefits (Table 15 p30), priority and place within LEAP-RE (Table 16 p34).

Another element to be evaluated is the lengthy and variable approach of Voluntary Carbon standards to certification of carbon credits (their certified emission reductions). It is recommended to thoroughly review the budget of LEAP-RE before pursuing their services. A table containing the cost of various steps per issuing Voluntary Carbon Standard can be consulted (Table 17 p38). For example, Clean Development Mechanism certifications charge less per credit issued but do on average require a longer duration to issue credits when compared to their voluntary counterparts.

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The United Nations online platform for voluntary cancellation of Certified Emission Reductions (CERs) (climateneutralnow.org) is where Clean Development Mechanism-issued offsets can be submitted for sale. If LEAP-RE projects allow any form of certifiable emission cancellation or carbon reduction, they could then choose a verification method to generate Certified Emission Reductions claiming reduced carbon quantities (and thus directly offsetting).

The platform also offers answers to certain questions concerning how to apply for Certified Emission Reductions and which Certified Emission Reductions are eligible for sale.

Renowned Clean Development Mechanisms such as Gold Standard should be the preferred option (when pursuing Certified Emission Reductions) as they are still adopted by the United Nations and comply with national regulations. This option may be more time taking than Voluntary Carbon Standards but provides with more credibility and ties to trustworthy organisations (e.g. Gold Standard being founded by WWF).

5.3. Alternatives offset to Certified Emissions Reduction

There are distinct choices that can be taken depending on the time and resources available and depend on whether LEAP-RE chooses to offset carbon and if so, which certification body LEAP-RE will choose for its carbon offset.

5.3.1. Carbon Removal Projects

In the event that offsetting through Certified Emission Reductions is not suitable, **certain organisations** and **certified projects** can also provide direct offset options.

These projects will be referred to as carbon removal projects (or carbon sinks) (Climate Adapt, 2019; Collins dictionary, 2023) as they offer a variety of methodologies of atmospheric carbon capturing and storing. Their services and partnerships can be to indirectly offset emissions or certify LEAP-RE's projects making them direct offsets.

This course of action does not eliminate the risk of a mediatic or opinion backlash as all offset options are currently. It is an alternative to Voluntary Carbon Standards and Clean Development Mechanisms whilst building a profile fit for most certification applications (Label bas Carbone, Gold standard…).

5.3.2. Project holders and potential partners

Afforestation and reforestation are the two most visible, available options in terms of image and impact. If they are considered for deployment, it should be done alongside other carbon offsetting plans (blue carbon for instance).

Partnership options vary between services and projects. Unlike Voluntary Carbon Standards, entities such as Clean Development Mechanisms and Certified Emission Reductions certifying bodies do not have standard pricing for all projects. They have very project-dependent certifying steps, some are free to start and may cost to push further, while others can be free of charge.

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The outcome remains the same as a certification allowing LEAP-RE projects to prove and quantify their carbon reductions. This choice can also in certain cases allow for monetisation.

Afforestation is the process of establishing forests where there was none and reforestation refers to the establishment of a forest in a recently deforested area (Collins dictionary, 2023; Climate Adapt, 2019).

Other projects include "**blue carbon**" projects (UNESCO, 2022; The Blue Carbon Initiative, 2019). These projects protect and restore ecosystems that can sequester (store) carbon and are often done in specific environments (mangroves, salt marshes and seagrass) (The Blue Carbon Initiative, 2019).

Overall, there is a high diversity of project types and project certifications LEAP-RE can choose from to collaborate or certify projects.

5.4. Recommendations for carbon reduction and offsetting

Overall, the recommendation's aims are to suggest offset options through new partnerships as further steps to the already present measures taken to reduce the project's carbon emissions. Through these activities, potential new partnerships can also be pursued.

5.4.1. Detailed descriptive summary of accreditation & service providers

Due to the presence of subdivision of offset choices the different functioning and specific requirements of each type of service provider as well as their alignment with LEAP-RE's scope and need to be assessed.

For this reason, an in-depth analysis of the main service providers is needed to determine recommended courses of action and a ranking of choices.

The carbon offset and reduction choices and their differences are the following:

- **Voluntary carbon credit certifiers or providers:** Examples of organisations implementing this scheme include Plan Vivo, Verra, 8 billion trees, and UCR. Certifiers or providers can certify LEAP-RE Projects if they fit the provider's requirements. However, this is expected to cost time and resources due to the various steps needed to acquire the certification and the cost of each step (Table 17). They can also provide certified indirect offsetting options such as credit purchase and resellers recommendations for an estimated cost of 20 euros per tonne of removed CO_2. They represent the less time-consuming option of Certified Emission Reductions and they have a more flexible set of requirements which involves the drafting and validation of a candidature followed by several instances of checking and auditing before any possibility of credit production.
- **Clean Development Mechanisms:** They are implemented by stakeholders such as Gold Standard, governments, UN programs, and Label bas Carbone. These organisations can certify LEAP-RE projects if the projects fit their respective criteria. The cost per project and step depends on the issuer and the project's nature (which according to S&P Global grew above 3.5€ per metric tonne of CO_2). They can also provide certified indirect offsetting options through

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their registry and offset sale platforms such as CTX global platform (a Clean development sales platform). Prices are negotiated between the buyers and sellers, however, they represent the rather secure accreditation choice with more requirements and time needed for project registration and more limited choices in Certified Emission Reduction purchases.

- **Reforestation and Afforestation Projects (as defined in 5.3.2):** These projects are implemented by organisations such as EDEN forest restoration, Reforest'action, and Reforestafrica. Reforestation and afforestation projects can include LEAP-RE projects in their portfolio if they fit their requirements. They can also provide certified and non-certified indirect offsetting options through the integration of LEAP-RE projects or a potential partnership with LEAP-RE.
- **Communities and cooperatives for afforestation reforestation** and other carbon removal projects (Nature-Based Solutions or cooperative initiatives such as blue carbon projects): These community and cooperative-based projects can be certified as LEAP-RE projects or partner with LEAP-RE for support. Most projects have little to no offset information yet. They can also provide non-certified indirect offsetting options.

Table 15 illustrates the advantages and disadvantages of each service choice.

Table 15. Pros and Cons of each choice

Service choice	Advantages	Inconveniences
Collaboration with Voluntary carbon credit certifiers	• Can certify LEAP-RE projects • Can help with Certified Emission Reduction purchasing • Can offer cheaper carbon credit choices when compared to Clean Development Mechanisms	• May damage the image of LEAP-RE since certifiers are directly hit by carbon avoidance scandal since they had lots of avoidance projects • Has a long process of certification despite being shorter than that of Clean development mechanisms
Collaboration with Clean development mechanisms	• Can certify LEAP-RE projects • Can certify and sell projects while retiring credits • Is often accredited by governments • Offers methodology choices • Has case-specific cost structures, can sometimes be free (verification excluded)	• Indirectly hit by methodology scandal • May damage the image of LEAP-RE • Can have a rather long process (UNFCCC) • Can require external certifications (Biocarbon)

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Service choice	Advantages	Inconveniences
Collaboration with Reforestation and Afforestation Projects	• Are spared from the scandal as they do not certify Certified Emission Reductions and do not deal in carbon avoidance • Have certified reduction plans and can certify reduction plans • Are cheaper and easier to implement	• Are not carbon offsetting plans • Cannot certify LEAP-RE projects as Certified Emission Reductions • Are mostly donation/partnership based • Cannot always include or be included in LEAP-RE
Collaboration with Communities, cooperatives and independent projects	• Can be a novel carbon-removal project • Are spared from the scandal as they do not certify nor sell Certified Emission Reductions and do not deal in carbon avoidance • Are generally certified and in partnership with renowned organisations • Are easier to implement	• Are not certified/calculated carbon offsetting plans • Cannot certify LEAP-RE projects as Certified Emission Reductions • Are mostly donation and partnership-based • Sometimes cannot include or be included in LEAP-RE

5.4.2. Action recommendations for a sustainable course of action

With the 2023 methodology scandal rendering Voluntary Carbon Standards (VCS) less reliable, some actions are recommended regardless of the choice of service:

- **Consult the integrity council for the voluntary carbon market (ICVCM)** for information on the evolution of integrity requirements of carbon offsetting before choosing any credit or standard. Having the backup of this organisation can give LEAP-RE a lessened backlash for any offsetting attempt. This action is needed if the choice of LEAP-RE is to pursue any offset accreditation or purchase.
- **Verify transparency of chosen service and have multiple choices if possible** to ensure efficiency and avoid scrutiny. Voluntary Carbon Standards and Clean Development Mechanisms methodologies have recently been

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revealed to be ineffective, and lacking transparency, caution is thus advised while choosing an offset option.

  - Certified Emission Reductions are means of generating monetary value, thus LEAP-RE should also invest or partner with non-profit organisations or projects.
  - Due to the fact that the offset measurement methodology and the offset's origins are not always available for review and the fact that offset methodologies are heavily criticised, it is strongly advised that LEAP-RE ensures the communication of all parties.

- **Partner with carbon removal, forest-based initiatives and projects**. Cooperatives and donation-based reforestation projects are generally more accepted by public opinion as their impacts are beneficial to the communities and local environment (e.g. carbon removal, economic and life quality improvements). Examples of organisations are the following ones:
  - Global Reforestation Projects such as Eden Reforestation Projects (edenprojects.org) offer a wide variety of projects combining both agricultural practices and reforestation with some being quantified carbon reduction projects.
  - Agroforestry projects such as Reforest'Action (reforestaction.com) with a scope which could include LEAP-RE projects.
- **Use the UN's marketplace for Certified Emission Reductions for** purchases and reference
- **Apply for the Climate Neutral Now | UNFCCC pledge** to give LEAP-RE and its projects a first level of certification. A Climate neutral now (Climate Neutral Now | UNFCCC) pledge should be done regardless of carbon offset or reduction plan as it can provide a base for carbon offsetting and reduction plans.

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The recommendations can be found in **Figure 6**. The different resulting offset certifications, records or accreditations are also mentioned at the end of each course of action.

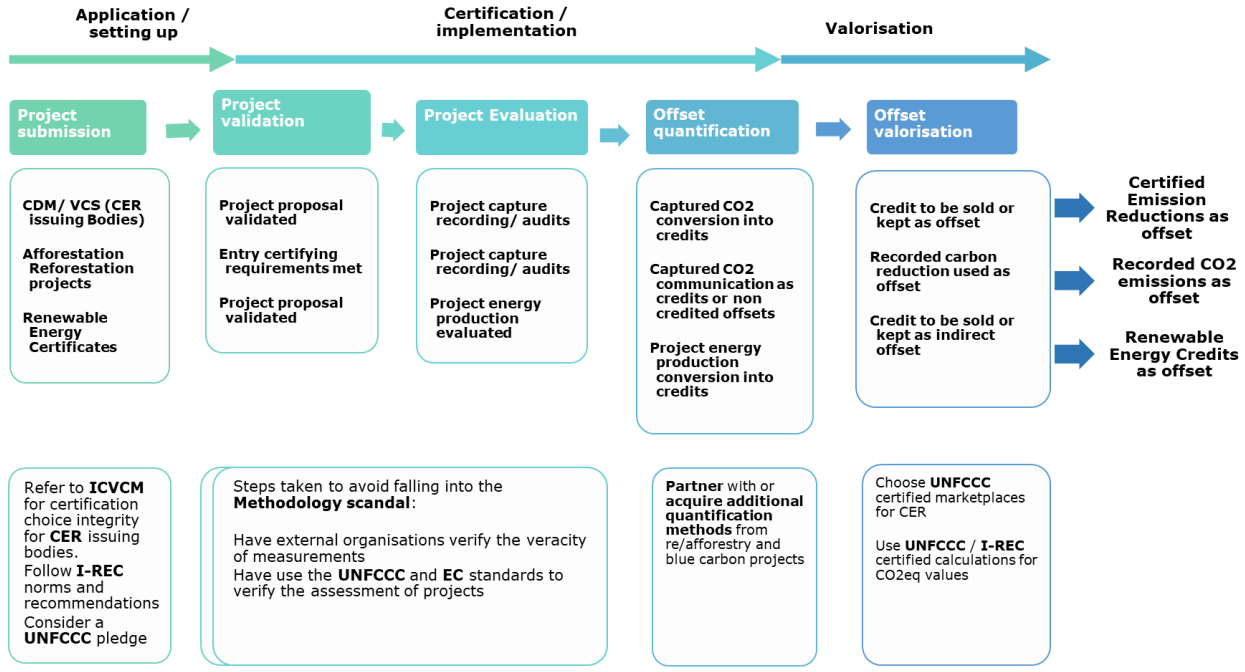

Figure 6. General course of actions to ensure service quality

5.4.3. Priority of choices

Recommendations of the actions to offset the LEAP-RE emissions have been elaborated. The recommended priority of service option is:

1. **Reforestation and Afforestation cooperative donation or partnerships** as these projects do not have well-defined carbon reduction calculation methodologies for their specific and transparent carbon-reducing activities. This would potentially allow LEAP-RE to choose a project to certify or include a project into the cooperative's portfolio.
2. **Reforestation and Afforestation project donation or partnerships** as these projects do have well-defined carbon reduction calculation methodologies for their specific and transparent carbon-reducing activities. This would allow LEAP-RE to ask for project inclusion (from LEAP-RE portfolio to their portfolio).
3. **Clean Development Mechanisms** (CDM) are still the best Certified Emission Reduction (CER) credit choice for both accreditation and purchase as they allow for a wider choice in methodology and 3rd party verification and audit choice. They are also less affected by the methodology scandal aimed at their private counterparts which are the Voluntary Carbon Standards.
4. **Voluntary Carbon Standards** (VCS) are generally faster to implement than Clean Development Mechanism (both CER choices are however lengthy processes) with a more standardised pricing scheme regardless of project size or duration, most also come with verified (yet criticised) methodologies

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of reduction calculation and should thus be considered the least viable choice for accreditation or purchase.

These recommendations are also detailed in terms of action and where they would fit in Table 16.

Table 16. Option qualification and priority

Service choice	Priority	Place within LEAP-RE?	How?
Communities, cooperatives, independent projects	1	• Can partner for indirect carbon offsetting (joint project) • Can include LEAP-RE projects into portfolio (direct)	• Through a partnership for management under LEAP-RE • Through the support of project for indirect offset (through donation or partnership).
Reforestation and Afforestation Projects	2	• Can partner for offset purchases (indirect) • Can provide offsets through their projects (indirect) • Can adopt LEAP-RE projects into their portfolio (direct)	• Through donations by LEAP-RE through their site • Through their inclusion of a LEAP-RE project into their portfolio
Clean development mechanisms	3	• Can certify LEAP-RE projects (pyrobiofuel, purams where adapted, RE4AGRI) into clean development mechanisms (direct)	• Through certification of LEAP-RE projects by the organisms • Through the purchase of Carbon Credits from the organism once certified
Voluntary carbon credit certifiers	4	• Can certify LEAP-RE projects (pyrobiofuel, purams where adapted, RE4AGRI) (direct) • Can provide indirect offsetting options (indirect)	• Through certification of LEAP-RE projects by the organisms • Through the purchase of Carbon Credits from the organism

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6. Ex-ante estimate of carbon savings linked to future deployment of LEAP-RE innovations

The upscaling of the LEAP-RE projects on renewable energy focused on renewable energy within the market is expected to result in decreased carbon emissions for the innovations adopters. In this framework, the deployment of renewables could be certified via a Renewable Energy Certification (REC). Potential buyers of REC could then claim to use renewable energy from a low or zero carbon emissions source, thus reducing their scope 2 emissions. The certification ensures the use of renewable energy generation, and broaden the range of electricity service options available to the adopters.

The selection of LEAP-RE projects can be based on the shift from fossil fuels to renewables. Projects that identify potential resources (e.g, geothermal, hydrogen) of renewables are not relevant at the time of writing this deliverable, since their results will lead to the production of renewables in a longer timeframe. Examples of LEAP-RE projects that aim at producing renewable energy in Africa include:

- BIOTHEREP: Hybrid Biochemical and Thermochemical conversion of Slaughterhouse biowaste for Renewable Energy production
- GEOTHERMAL VILLAGE: Smart/off-grid Geothermal stand alone, cascade-use systems
- HYAFRICA: a natural hydrogen solution for power supply in Africa
- LEOPARD: Micro-grid technology for a widespread use of renewable energy sources in Africa
- MG-FARM: Smart stand-alone micro-grids as a solution for agriculture farms electrification
- PURAMs: Productive Use in Rural African Markets using Standalone Solar

Renewable Energy Certificates and the International Renewable Energy Certification (IREC) do not offer direct or indirect offset options. Energy Certifications have the same functioning across certifying bodies and all issue the same type of accreditation. Only IREC-certified certifying bodies should be solicited and a quantification plan for LEAP-RE projects' electricity production should be set up. The amount of produced energy can be calculated by the I-REC's tracking tool, enabling to have an overview of the potential carbon savings linked with the deployment of LEAP-RE projects focused on renewable energy.

7. Conclusion

To sum up, LEAP-RE's Carbon accounting revealed that plane travel is the main contributor to LEAP-RE's carbon footprint, generating 354 tonnes of CO_2 over the 365 tonnes of CO_2 emitted through travels. Flights have been avoided in certain instances through the implementation of online meetings and hybrid meetings, due to the covid-19 pandemic.

Recommendations for further reduction of carbon footprint include:

- While acknowledging the importance of substantial interactions among consortium partners, the LEAP-RE project plans to arrange face-to-face meetings only when absolutely essential.

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- When possible, the LEAP-RE project prioritises the use of trains and public transportation over other modes of transport.
- When air travel becomes necessary, direct flights are recommended. Whenever possible, the project prefers advanced biofuel flights or those operated by energy-efficient aircraft. Additionally, choosing the best available rate for economy class is the standard practice.
- To minimise environmental impacts and promote knowledge sharing, the project aims to coordinate presential event organisation with other EU projects. This approach not only reduces costs but also facilitates the rationalisation of resources across multiple initiatives.

To ease the implementation of carbon reduction and improve the carbon accounting, it is recommended that partners detail their travels and stays by filling attendance sheets and their travel details (ie, mode of transportation, layover…). This centralised information collection should allow for a more precise calculation of carbon emissions throughout tasks and work packages.

Lastly, in the last version of the deliverable, final calculations will be available on the travel related emissions. Additionally, final calculations on the estimated emissions savings by the project travel policy (virtual vs. physical meetings), also referred as KPI 1.1.4, will be available.

Offsetting can be done in different ways:

- External reforestation and afforestation projects without clear carbon reduction calculation methods may be considered for cooperative donation or partnerships. Reforestation and afforestation projects with defined carbon reduction calculation methods could lead to project inclusion in LEAP-RE's portfolio.
- Clean Development Mechanisms (CDM) are the preferred choice for Certified Emission Reduction (CER) credits due to their broader methodology options, third-party verification, and resilience against the methodology issues faced by the private Voluntary Carbon Standards. Voluntary Carbon Standards (VCS) projects may be less suitable for accreditation or purchase due to their criticised reduction calculation methodologies.

Finally, the deployment of renewable energy solutions in the market can be accounted through Renewable Energy Certification.

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9. Annexes

9.1. Cost details linked with carbon offsets

Table 17. Cost comparison (in euros) of Certified Emission Reductions issuing between lead Voluntary Carbon Standards

	Account opening (euros)	Cost of credit (euros)	Verification / other (euros)	Review (euros)	Audit (euros)	Validation (euros)
Verra	468	0.0019 to 0.19	2 324			
Plan vivo	930	0.37 to 0.42	1209 (other)	325.28	1 860 to 3254	930 to 1860
NFS	567	Case by case	1702		2 270 to 3404	1419
Climate Action Reserve	468	0.2	468 (other annual)	468 to 651	1255	

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Table 18. Carbon footprint form

Organisation & GA number	Name & Surname	Departure Location	Transportation mode from your home city to the GA meeting place	Number of days onsite	If you took the plane, did you have a layover? If so, where?	Any other comments (ex: not a roundtrip journey)

9.2. Offset certifications details

VERRA: Fee Rate Account opening fee USD 500 for each account opened with the Verra Registry

Registration fee For each project registration request:

Where registration is requested without submission of the verification report, or registration is requested with submission of verification report and verification period is at least one year: (Estimated annual volume of emission reductions2) x (USD 0.10); capped at USD 10,000

Where registration is requested with the submission of verification report and verification period is less than one year: (Verification period quantity) x (USD 0.10); capped at USD 10,000 The registration fee is credited toward future VCU issuance levies.

VCU (Verra Credit Unit) issuance levy For cumulative VCU issuances from a project occurring within a calendar year

VCU issuance levy, conversion of GHG credits from approved GHG programs USD 0.05 per VCU

Retroactive label fee USD 1,500 flat fee for each retroactive label event5

Note: An investigation into Verra, the world's main organisation for approving carbon offset projects, found more than 90% of rainforest-related offsets to be "worthless". Verra responded with a statement arguing that the research was based on incorrect methodologies, while several forest experts called for not abandoning offsets as a financial tool.

Conclusions about Verra: With the controversial state of this certifying body, it would be advised not to certify LEAP-RE with their certification.

Scrutiny of the carbon offset market is growing - FT Channels

Plan Vivo:

This project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

The project should not be operational yet, offsetting will only be counted up to 3 years prior if already operational

For all project requirements see link:

<https://www.planvivo.org/Pages/FAQs/Category/eligibility-criteria>

The first step towards becoming a Plan Vivo-certified Project is submitting a Plan Vivo project idea note (PIN). A PIN defines the main elements of a proposed project and how it will contribute to sustainable livelihoods.

Then they need a PDD then they get verified then they can sell carbon credits and must be checked every 5 years

Projects that generate less than or equal to 10,000 PVCs (Plan Vivo Credits) per year can opt to be considered microscale projects. These smaller types of projects can choose to be audited through the internal validation and verification process, meaning they can be audited by Independent Experts rather than VVBs. The objective of this change is to minimise the financial pressure of the auditing process on the smallest of projects. Please note these are the fees associated with the Plan Vivo certification process and do not include the external costs to the VVBs and Independent Experts.

Conclusion: Plan vivo is a rather specialised certifying body with rather precise demands concerning the status of both the coordinator, project beneficiaries and the area of the project. It may be adapted to LEAP-RE projects notably Biofuel and plantation-related projects if the beneficiaries and area of the plantation meet the demands. It is however also targeted by the latest controversy (Plan Vivo statement in response to recent Guardian article | Plan Vivo Foundation) and would also potentially hurt the images of LEAP-RE and LGI.

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9.3 Calculations details

Table 19. Distances & equivalent CO_2 emission per land transport

Meeting	Transport type	Departure	Arrival	Departure /Arrival	Distance	KgCO2
PMB March 31st 2022 Paris	Train Germany	Aachen	Italy	Aachen-Italy	1491	99.5988
PMB March 31st 2022 Paris	Train Italy	Italy	Aachen	Italy-Aachen	1491	47.2647
PMB March 31st 2022 Paris	Subway	CDG2	Faidherbe Chaligny	CDG2-Faidherbe Chaligny	21.9	0.060006
PMB March 31st 2022 Paris	Train France	Marseille	Paris	Marseille-Paris	660	1.5576
PMB March 31st 2022 Paris	Train France	Paris	Marseille	Paris-Marseille	660	1.5576
PMB March 31st 2022 Paris	Train France	Yport	Paris	Yport-Paris	177	0.41772
PMB March 31st 2022 Paris	Train France	Paris	Yport	Paris-Yport	177	0.41772

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m under Grant Agreement 963530.

Meeting	Transport type	Departure	Arrival	Departure /Arrival	Distance	KgCO2
PMB March 31st 2022 Paris	Train Germany	Berlin	Paris	Berlin-Paris	878	58.6504
PMB March 31st 2022 Paris	Train France	Paris	Berlin	Paris-Berlin	878	2.07208
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103

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Research and Innovation Program under Grant Agreement 963530.

LEAP-RE

Meeting	Transport type	Departure	Arrival	Departure /Arrival	Distance	KgCO2
PMB March 31st 2022 Paris	Taxi	CDG2	Paris	CDG2-Paris	26.7	0.29103
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781
PMB March 31st 2022 Paris	Subway	Paris	Paris	Paris-Paris	6.5	0.01781

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Table 20. Calculated flight distances per departure / arrival

Departure/Arrival	Distance
Aachen-Italy	1102
Algeria-France	1340
Algeria-Germany	1930
Algeria-Helsinki	3033
Algeria-Italy	1095
Algeria-Kenya	5475
Algeria-SA	7478
Austria-SA	8340
Austria-Kenya	5733
Belgium-Kenya	6445
Benin-Lille	6436
Benin-Reunion	6222
Benin-Kenya	3913
Burkina Faso-SA	5334
Burkina Faso-Kenya	4498
Danemark-SA	9212
Djibouti-Italy	4425
Djibouti-Kenya	1571
Egypt-Kenya	3548
Ethopia-Kenya	1054
Finland-SA	9577
Finland-Kenya	6948
France-Algeria	1340
France-Helsinki	1881
France-Kenya	6502
France-Madagascar	8484
France-SA	8740
Germany-Algeria	1930
Germany-Lille	744
Germany-SA	8766
Germany-Kenya	6250
Helsinki-Algeria	3033
Helsinki-France	1881
Helsinki-Italy	2236
Helsinki-Kenya	6909
Helsinki-SA	9586
Italy-Algeria	1095
Italy-Djibouti	4425
Italy-Helsinki	2236
Italy-Kenya	5306
Italy-SA	7730
Italy-Aachen	1102
Kenya-Algeria	5475
Kenya-France	6502
Kenya-Helsinki	6909
Kenya-Italy	5306
Kenya-SA	2924
Kenya-Austria	5733
Kenya-Belgium	6445
Kenya-Benin	3913
Kenya-Burkina Faso	4498
Kenya-Djibouti	1571
Kenya-Egypt	3548
Kenya-Ethopia	1054
Kenya-Finland	6948
Kenya-Germany	6250
Kenya-Spain	6143
Kenya-Sweden	6891
Kenya-Switzerland	5953
Kenya-Togo	4222
Kenya-UK	6817
Kenya-Romania	5175
Kenya-Rwanda	758
Kenya-Netherlands	6670
Kenya-Portugal	6402
Kenya-Morocco	5901
Kenya-MoSAmbique	2780
Lille-Benin	6436

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Departure/Arrival	Distance
Lille-Germany	744
Lille-Spain	1030
Madagascar-France	8484
Madagascar-SA	2054
Morocco-SA	7448
Morocco-Kenya	5901
MoSAmbique-Kenya	2780
Namibia-SA	1031
Netherlands-Kenya	6670
Nigeria-SA	4529
Paris-Pisa	841
Paris-Romania	1890
Pisa-Paris	841
Portugal-SA	8208
Portugal-Kenya	6402
Reunion-Benin	6222
Romania-Paris	1890
Romania-Kenya	5175
Rwanda-SA	2696
Rwanda-Kenya	758
Spain-Lille	1030
Spain-SA	8034
Spain-Kenya	6143
Sweden-Kenya	6891

Departure/Arrival	Distance
Switzerland-Kenya	5953
Togo-Kenya	4222
UK-Kenya	6817
USA-SA	12819
SA-Algeria	7478
SA-Austria	8340
SA-Burkina Faso	5334
SA-Danemark	9212
SA-Finland	9577
SA-France	8740
SA-Germany	8766
SA-Helsinki	9586
SA-Italy	7730
SA-Kenya	2924
SA-Madagascar	2054
SA-Morocco	7448
SA-Morocco	7448
SA-Namibia	1031
SA-Nigeria	4529
SA-Portugal	8208
SA-Rwanda	2696
SA-Spain	8034
SA-USA	12819
SA-Zimbabwe	826
Zimbabwe-SA	826

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