

Leakage from Forest Again Project Activities

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Project activities are expected to cause GHG emission-related leakage primarily from transportation. The field headquarters for operations will be at KEEP. There is no electricity in this area. KEEP uses photo-voltaics for any electricity that is needed primarily for computers. In addition, Making Connection's office, when constructed, will also be net carbon zero (when measured annually) due to solar heating and electricity.

Transportation Related GHG Emissions

We used World Resource Institute's (2006) GHG Protocol for templates and carbon conversion factors (see appendices). Project activities were divided into two phases:

1. **Phase One (years 1-6)** – the active planting and rigorous maintenance phase of project. During this phase, project activities are expected to demand more of all team members and thus the transportation requirements.
2. **Phase Two (years 7-40)** – basic management and maintenance phase of project. During this phase, it is projected that transportation related to project activities will be half that of phase one.

The following information was used to estimate annual and total project GHG emissions related to transportation.

Phase One

Air Travel (MC)	# people	# trips/yr	Miles per trip
MC International	2	2	14,500

Business Ground Travel	# people	# trips/yr	Miles per trip
MC Staff	2	2	720
PMT Members	8	12	55
Field Director	1	24	18
Field Staff			300

Seed Delivery		# trips	Miles per trip
	1	2	720

Phase Two

Air Travel (MC)	# people	# trips/yr	Miles per trip
MC International	2	1	14,500

Business Ground Travel	# people	# trips/yr	Miles per trip
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MC Staff	2	1	720
PMT Members	8	6	55
Field Director	1	12	18
Field Staff			300

Explanation of Transportation Numbers

MC International air travel includes roundtrip flights from Boise, ID, USA to Nairobi, Kenya (via Denver and London). WRI (2006) GHG protocol spreadsheet for business travel was used to convert these numbers into carbon emissions.

MC ground travel includes medium sized, gasoline vehicle roundtrip from Nairobi to Kakamega Forest.

PMT ground travel includes 8 PMT members traveling to KEEP headquarters from place of work. PMT members live and work in various places within 150 miles of the forest. Two members live and work in Eldoret (150 miles north), two members live and work in Kakamega (15 miles east of forest), and the rest live and work within 5 miles of forest. Most will use public transportation (12-15 passenger vehicle), but we used medium-sized personal vehicle for estimates to remain conservative. WRI (2006) GHG protocol spreadsheet for business travel was used to convert these numbers into carbon emissions.

Field Director ground travel includes 1 person traveling from KEEP headquarters to Kakamega town for business and banking matters. Transportation will be either a bicycle or public but we used a medium-sized personal vehicle for estimates to remain conservative. WRI (2006) GHG protocol spreadsheet for business travel was used to convert these numbers into carbon emissions.

Staff ground travel includes all staff travel related to project activities. All staff live within 5 miles of KEEP headquarters and most walk or bicycle. Especially in inclement weather, some public transportation will be used to get to and from work.

Seed delivery includes transportation of seeds from Kenya Forestry Research Institute (Nairobi) to nurseries.

Transportation related to planting, maintenance, and management of project sites

All seedlings will be transported from nurseries to project sites via donkey carts (supporting local entrepreneurs). All project staff will walk or use bicycles to get to and from sites. Sites are within 2-3 km (1-2 miles) of KEEP headquarters and nurseries.

Results

Items	Projected GHG Emissions from Forest Again Project Activities (tonnes CO2)	
	Phase 1 (Years 1-6)	Phase 2 (Years 7-40)
Employees	40	14
Business Air Travel		
Miles per year	58,000	29,000
Tonnes CO2 per phase	61.8	176.8
Business Ground Travel		
Miles per year	7452	3596
Tonnes CO2 per phase	13.8	37.4
Seed Delivery		
Miles per year	1440	-
Tonnes CO2 per phase	2.4	
Total GHG Emissions 292.4 (tonnes CO2 over 40 years)		

Year: Phase One (per year @ 6 years)							
	Step 1			Step 2		Step 3	
		A	B	C	D	E	F
Mode of Transportation	Description	Distance Traveled	Unit	CO ₂ emission factor kg/unit	kg/Unit	CO ₂ emissions in kg	CO ₂ emissions in metric tons
						E=AxC	
Air	Short Flight	0	km	0.15	kg/km	0	0.00
	Medium Flight	7725	km	0.12	kg/km	922	0.92
	Long Flight	85620	km	0.11	kg/km	9,418	9.42
Train	Intercity (e.g., Amtrak)		km	0.20	kg/km	0	0.00
	Commuter		km	0.10	kg/km	0	0.00
	Transit Rail		km	0.10	kg/km	0	0.00
	UK Rail		km	0.06	kg/km	0	0.00
Bus	Diesel long-distance		km	0.05	kg/km	0	0.00
	Diesel urban		km	0.19	kg/km	0	0.00
	CNG urban		km	0.14	kg/km	0	0.00
Car	Gasoline/Petrol - Small		km	0.16	kg/km	0	0.00
	Gasoline/Petrol - Medium	7452	km	0.19	kg/km	1,416	1.42
	Gasoline/Petrol - Large		km	0.22	kg/km	0	0.00
	Small Diesel (2.0 L engine or less)		km	0.16	kg/km	0	0.00
	Large Diesel (2.0L engine or greater)		km	0.19	kg/km	0	0.00
Step 4: Sum CO ₂ emissions:						11.8	

Appendix 1: Summary of WRI (2006) GHG Protocol Spreadsheet for one year during phase one.

Year: Phase Two (per year @ 34 years)							
	Step 1			Step 2		Step 3	
		A	B	C	D	E	F
Mode of Transportation	Description	Distance Traveled	Unit	CO ₂ emission factor kg/unit	kg/Unit	CO ₂ emissions in kg	CO ₂ emissions in metric tons
						E=AxC	
Air	Short Flight	0	km	0.15	kg/km	0	0.00
	Medium Flight	3863	km	0.12	kg/km	461	0.46
	Long Flight	42810	km	0.11	kg/km	4,709	4.71
Train	Intercity (e.g., Amtrak)		km	0.20	kg/km	0	0.00
	Commuter		km	0.10	kg/km	0	0.00
	Transit Rail		km	0.10	kg/km	0	0.00
	UK Rail		km	0.06	kg/km	0	0.00
Bus	Diesel long-distance		km	0.05	kg/km	0	0.00
	Diesel urban		km	0.19	kg/km	0	0.00
	CNG urban		km	0.14	kg/km	0	0.00
Car	Gasoline/Petrol - Small		km	0.16	kg/km	0	0.00
	Gasoline/Petrol - Medium	3596	km	0.19	kg/km	683	0.68
	Gasoline/Petrol - Large		km	0.22	kg/km	0	0.00
	Small Diesel (2.0 L engine or less)		km	0.16	kg/km	0	0.00
	Large Diesel (2.0L engine or greater)		km	0.19	kg/km	0	0.00
Step 4: Sum CO ₂ emissions:							5.9

Appendix 2: Summary of WRI (2006) GHG Protocol Spreadsheet for one year during phase two.