REQUEST FOR CEO APPROVAL[1]

PROJECT TYPE: Medium-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

PART I: PROJECT INFORMATION

Project Title: Integrated responses to short lived climate forcers promoting clean energy and energy efficiency			
Country(ies):	Mexico	GEF Project ID:[2]	4999
GEF Agency(ies):	UNEP (select) (select)	GEF Agency Project ID:	00828
Other Executing Partner(s):	National Institute of Ecology (INE), Molina Center for Energy and Environment (MCE2)	Submission Date:	2012-06-29
GEF Focal Area (s):	Climate Change	Project Duration(Months)	3 years
Name of Parent Program (if applicable): For SFM/REDD+ ☐		Agency Fee ($):	90,909

A. FOCAL AREA STRATEGY FRAMEWORK[3]

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount ($)	Cofinancing ($)
CCM-1 (select)	Outcome 1.2: Enabling policy environment and mechanisms created for technology transfer	Output 1.2: National strategies for the deployment and commercialization of innovative low-carbon technologies adopted	GEF TF	889,090	21,999,043
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)	Others		(select)		
		Subtotal		889,090	21,999,043
		Project management cost[4]	GEF TF	20,000	495,080
		Total project costs		909,090	22,494,123

B. PROJECT FRAMEWORK

[1] It is important to consult the GEF Preparation Guidelines when completing this template
[2] Project ID number will be assigned by GEFSEC.
[3] Refer to the Focal Area/LDCF/SCCF Results Framework when filling up the table in item A.
[4] GEF will finance management cost that is solely linked to GEF financing of the project. PMC should be charged proportionately to focal areas based on focal area project grant amount.

Project Objective: Contribute to the development and implementation of a more comprehensive and sustainable Low Emissions Development Strategy (LEDS) for Mexico through an integrated assessment of short-lived climate forcers (SLCF), and the development and demonstration of targeted SLCF mitigation policies						
Project Component	**Grant Type**	**Expected Outcomes**	**Expected Outputs**	**Trust Fund**	**Grant Amount ($)**	**Confirmed Cofinancing ($)**
Component 1. Characterization of methane, black carbon (BC) and co-pollutants from key emissions sources	TA	1.1.Improved knowledge on key emission sources and of mitigation potential of addressing SLCF	1.1Activity data and emission factors for methane and BC to define targeted mitigation measures 1.2 Characterization of methane and BC from main sources 1.3 Comprehensive emission inventories for SLCF	GEF TF	399,365	611,191
Component 2. Assessment and selection of technically feasible and economically viable SLCF mitigation policies for implementation in Mexico	TA	2.1 Decision making on efficient SLCF mitigation policies based on improved data on emission sources and on quantified impacts including co-benefits	2.1 Technical report including selection, evaluation and ranking of SLCF mitigation policies in terms of climate benefits, energy efficiency, health, agricultural production and ecosystem protection from sector specific data.	GEF TF	213,850	1,045,922
Component 3. Demonstration of SLCF mitigation technologies for key sources	TA	3. Increased knowledge on cost and benefits of promising SLCF mitigation technologies for decision making	3.1 Demonstration of priority SLCF mitigation technologies as basis for learning and replication	GEF TF	218,965	446,365
Component 4: Integration of SLCF mitigation measures into LEDS	TA	4.1 Mexico's LEDS incorporate priority SLCF mitigation policies	4.1 Results from components 1-3 compiled, integrated in LEDS, regularly updated and monitored	GEF TF	21,800	19,690,000
Component 5: Capacity building, awareness raising, monitoring and evaluation	TA	5.1 Enhanced capacity and knowledge in measurement of SLCF emissions and in evaluating and selecting mitigation policies	5.1 National SLCF action plan 5.2 Guidance document developed 5.3 Staff trained on SLCF related inventories and measures 5.4. Peer reviewed articles 5.5. Monitoring and evaluation reports	GEF TF	35,110	205,565
	(select)			(select)		

	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
			Subtotal		889,090	21,999,043
			Project management Cost[5]	(select)	20,000	495,080
			Total project costs		909090	22494123

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME ($)

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount ($)
Bilateral Aid Agency (ies)	USAID	Grant	20,000,000
GEF Agency	UNEP	In-Kind	500,000
National Government	INE	In-Kind	750,000
National Government	INE	Grant	250,000
Others	MCE2	In-Kind	516,595
Others	MCE2	Grant	152,853
Others	ARI	In-Kind	50,000
Others	UNAM-CCA and II	In-Kind	257,175
Others	UAEM	In-Kind	12,500
Others	GIRA	In-Kind	5,000
Total Co-financing			22,494,123

D. GEF/LDCF/SCCF/NPIF RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY[1]

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in $)		
				Grant Amount (a)	Agency Fee (b)[2]	Total c=a+b
UNEP	GEF TF	Climate Change	Mexico	909,090	90,909	999,999
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				909,090	90,909	999,999

E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Estimated Person Weeks	Grant Amount ($)	Cofinancing ($)	Project Total ($)
Local consultants*	513.00	83,792	207,365	291,157
International consultants*	277.60	242,298	541,867	784,165
Total		326,090	749,232	1,075,322

* Details to be provided in Annex C.

[5] Same as footnote #4.

F. PROJECT MANAGEMENT COST

Cost Items	Total Estimated Person Weeks/Months	Grant Amount ($)	Co-financing ($)	Project Total ($)
Local consultants*			50,000	50,000
International consultants*			350,000	350,000
Office facilities, equipment, vehicles and communications*				0
Travel*			2,400	2,400
Others**	Project team Meetings	10,000	30,000	40,000
	Reporting	10,000	62,680	72,680
Total		20,000	495,080	515,080

* Details to be provided in Annex C. ** For others, to be clearly specified by overwriting fields *(1) and *(2).

G. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? (Select)

(If non-grant instruments are used, provide in Annex E an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

H. DESCRIBE THE BUDGETED M &E PLAN:

The project will follow United Nations Environment Programme (UNEP) and Global Environment Facility (GEF) requirements for project monitoring, reporting and evaluation processes and procedures. Substantive and financial project reporting requirements are an integral part of the UNEP legal instrument that will be signed by the executing agency and UNEP. The Monitoring and Evaluation (M&E) process will include an end of project assessment undertaken by independent review teams. The final reports will be submitted to the GEF M&E Unit as well as other stakeholders involved in the implementation of this project. A report on the status of implementation of the project will be submitted to the regular meetings of the Project Steering Committee (PSC). The project will be evaluated on the basis of: execution performance, output delivery, and project impact. Evaluation of the project's success in achieving its outcomes will be monitored continuously throughout the project through the bi-annual progress reports, annual summary progress reports and the final evaluation. Details of M&E activities are provided in the Table below.

Type of M&E activity	Responsible Parties	Time-frame	Budget (US$)
Project Implementation Review, PIR	Project Manager, TM and UNEP FMO	Yearly	Included in project management
Monitoring project indicators	Project Manager, TM	End of project	Included in Component 5
Completing tracking tools	Project Manager, TM	End of project	Included in project management
Yearly monitoring reports	Project Manager, TM	Yearly	Included in

including on estimated global environmental benefits			Component 5.
Independent final Evaluation report	EOU	3 months prior to terminal review meeting	25,000
Total indicative cost			

PART II: PROJECT JUSTIFICATION

A. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

A.1.1. The GEF focal area/LDCF/SCCF strategies/*NPIF Initiative*:

The proposed project is consistent with the climate change mitigation objective CCM 1, which seeks to promote the demonstration, deployment and transfer of low carbon technologies. High carbon technologies are generally defined by their emissions of CO2 but low efficiency combustion technologies not only emit unnecessarily large amounts of CO2, but also significant levels of carbon, including black carbon aerosols particles and carbon containing gases such as carbon monoxide (CO), methane (CH4), and non methane volatile organic compounds (VOCs). The project will characterize black carbon and CH4 plus corollary CO and VOC emissions from important Mexican high carbon technologies such as on-road and off road vehicles, domestic cooking and heating appliances, brick kilns, and key natural gas and petroleum production facilities. In each case emissions from currently deployed technologies will be measured, and where possible compared with low carbon alternatives. Integrated assessments of the key emission sources of SLCF and subsequently assessment and analysis of SLCF mitigation options will help the GoM to prioritize efficient mitigation policies for their Low Emission Development Strategy (LEDS).

The proposed project is also in line with GEF **CLIMATE CHANGE FOCAL AREA SET-ASIDE PROGRAMMING STRATEGY.** In this strategy up to $10 million may be used to target areas and programs which will produce a significant transformational impact of global environmental benefits on a global or regional scale, but which have limited appeal to individual countries. Black carbon is specifically mentioned (GEF/C/39/Inf.10).

There is currently no dedicated global regime to regulate SLCF *per se*. Today black carbon, one of the key SLCF, is not controlled under the UNFCCC. However, its consideration in the climate change context and discussions is gaining increasing attention as demonstrated in the recently released publication "Near Term Climate Protection and Clean Air Benefits: Actions for controlling short-lived Climate Forcers" (UNEP, 2011). Measures addressing black carbon cover some of the key GHG emitting sectors such as transport, residential, industry and agriculture.

The recently launched "**Climate and Clean Air Coalition to Reduce SLCPs**" of which Mexico forms part, also demonstrates the importance given to this issue at a global level and the willingness to address it. The coalition aims to reduce SLCPs and realize near-term climate, health, air quality and environmental co-benefits. The proposed project represents a pro-active approach of moving the agenda forward and of addressing it at the national level in such a manner that it can be replicated in other countries facing similar issues with SLCFs.

Mexico is recognizing the transformational impacts of addressing SLCF in an integrated manner and is dedicating significant resources towards this end through the LEDS to which the proposed project contributes. Over the next 3 years an estimated USD 20 million is allocated to the development of LEDS and related activities by the USAID as part of the collaboration between the US and Mexican governments. The GoM is keen to use part of its STAR allocation in the proposed project, representing, not only as a pilot effort with global learning value, but also for a nationally integrated SLCF assessment and demonstration of key SLCF mitigation measures.

A.1.2. For projects funded from LDCF/SCCF: the LDCF/SCCF eligibility criteria and priorities:

A.1.3 For projects funded from NPIF, relevant eligibility criteria and priorities of the Fund:

A.2. National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NIPs, PRSPs, NPFE, etc.:

The 4th National Communication has not prioritized these activities for the reason that short lived climate forcers or recommendation on which methodology tier to use are not specifically included in the scope of the National Communication. The proposed project is expected to provide valuable inputs to the national and GHG emissions inventories and to the mitigation chapters being prepared for the Fifth National communication. The proposed project will also contribute to the development of Mexico's Low Emissions Development Strategy (LEDS) and establish linkages to the TNAs and NAMAs for the sectors addressed by the project.

B. PROJECT OVERVIEW:

B.1. Describe the baseline project and the problem that it seeks to address:

Climate change represents one of the biggest challenges of our times. Deep emissions cuts are required now to keep temperature increases below the UNFCCC target of 1.5 to 2°C to manage the unavoidable consequences. However, there is a serious gap today between the global emissions reduction goal and the expressed emission reductions commitments. Near-term and long-term strategies are needed to protect the climate. Slowing of near-term warming can be achieved by reducing the emissions of short-lived climate forcers (SLCF) whereas carbon dioxide emission reductions, beginning now, are required to limit long-term climate change. Implementing both reduction strategies reduces significantly the risk of crossing the 2°C threshold. The latest UNEP report "near term climate protection and clean air benefits" identifies and evaluates 16 mitigation measures that fully implemented by 2030 are estimated to reduce global warming between 2010 and 2040 by about 0.4C.

Short lived climate forcers (SLCF) are harmful air pollutants that remain in the atmosphere only a relatively short time. The three most important short lived, positive, climate forcing agents are black carbon (BC), methane (CH4), and tropospheric ozone (O3). **Methane**, a precursor of tropospheric ozone, is a potent, short-lived greenhouse gas that remains airborne in the atmosphere for about 10 years and has about 25 times the global warming potential of CO2. Major methane emissions include ruminant livestock, rice cultivation, microbial waste processing (landfills, manure, and waste water), coal mining, and oil and natural gas systems. **Black Carbon**, a component of particulate matter and often referred to as soot, is produced by both natural processes and human activities from the incomplete combustion of fossil fuels, biofuels, and biomass. Primary sources of black carbon include diesel engines, industrial sources, residential coal and solid biofuels for cooking and heating, and agricultural and forest fires. Open biomass burning (41%) and residential cooking and heating (27%) are responsible for about two-thirds of total BC emissions globally. Transportation and industrial sources are significant emitters of BC as well. BC contributes to global warming by absorbing sunlight and when deposited, melting of snow and ice. BC resides in the atmosphere only days to weeks, which means that reducing emissions may result in a relatively rapid climate response. **Tropospheric ozone** is not directly emitted. It is a secondary pollutant that is formed by atmospheric, photochemical processes and must be controlled by reducing its precursor pollutants, primarily NOx (NO + NO2), carbon monoxide (CO) and volatile organic compounds (VOCs) as well as methane.

Reducing SLCF offers a realistic opportunity to significantly reduce the rate of global warming over the next two to four decades. Targeted emission reduction measures of these forcers could immediately begin to protect climate, in addition to improving energy efficiency, reducing adverse effect on human health, ecosystems and agriculture. WMO/UNEP's *Integrated assessment of Black Carbon and Tropospheric Ozone* and UNEP's *Near term climate protection and clean air benefits* reports identify a set of 16 mitigation measures to address SLCF which form a strong starting point. However, there is a need now to translate these measures into a national context taking into consideration national circumstances. The sources of SLCF emissions are manifold, occur at different scales (involve mostly a large number of small sources) and vary across regions with each country having a unique combination of emission sources making it necessary to generate region and country specific data in order to

employ targeted mitigation measures. Acting at the national level allows a country to incorporate the reduction of SLCFs into its air quality, climate change and development policy and regulatory frameworks, as well as into relevant sectoral policies according to its national priorities. However, SLCF mitigation measures complement but do not replace anticipated carbon dioxide reduction measures even if addressing SLCF will also have implications for the GHGs covered by the Kyoto protocol as they interact. Major carbon dioxide reduction strategies mainly target the energy and large industrial sectors and would not necessarily result in significant reductions in SLCF emissions.

Mexico is undertaking several efforts to assess SLCF emissions and to foster mitigation measures, also partly under its national communications. Methane mitigation has been an important component of Mexico's national policy on climate change. Mexico began developing its national GHG emissions inventory in 1995. Landfill, wastewater treatment, fugitive emissions from oil and natural gas operations, and agriculture are key sources identified by national inventories of GHG emissions. They are also included as key sources in state inventories, with variation according to the level of urbanization and emissions sources in each state. With regard to black carbon, the Government of the Federal District published in 2010 the first black carbon emissions inventory for the Metropolitan Area of Mexico City for the year 2008 (SMA-GDF, 2010). The State of Mexico also recently published the emissions inventory for black carbon. Both inventories used the EPA methodology of estimating black carbon from PM2.5/BC speciation profiles. The sources of tropospheric ozone precursors and their impact on regional ozone concentrations in Mexico City have received much attention in the past decade, both from analyses of ongoing air quality monitoring data and analyses of extensive datasets from two major field campaigns (MCMA-2003 and MILAGRO-2006). Key findings and policy implications have been used by the government officials to design Mexico's new air quality management program and climate action plan (PROAIRE 2011-2020). The proposed project will complement and update Mexico's two national emission inventories: 1.) The Mexican National emissions inventory (MNEI) which includes criteria pollutants and their precursors. Pollutants reports include NOx, SOx, CO, VOC, NH3, PM10, and PM2.5; and 2.) The GHG national emission inventory (INEGEI) reported in national communications which presents the annual emissions from 1990 to 2006 for the six controlled Kyoto gases (CO2, CH4, N2O, HFCs, PFC and SF6). The INEGEI uses IPCC's procedures at Tier 1 and intermediate level. More details are needed in both inventories to include near-term climate impacts as a basis to define targeted mitigation measures.

Mexico has several climate strategies in place that the proposed project can contribute to. In 2009, Mexico adopted its Special Climate Change Program (PECC, for its acronym in Spanish), which includes a set of mitigation and adaptation actions to be undertaken in all relevant sectors. The full implementation of the PECC will achieve a reduction in total annual emissions of 51 million tons of CO_2e by 2012, with respect to the business as usual (BAU) scenario. At COP15 in Copenhagen in 2009, Mexico committed voluntarily to reduce 30% of its GHG emissions (261 $MtCO_2e$) by 2020, with respect to the BAU baseline scenario, provided the provision of adequate financial and technological support from developed countries is part of a global agreement. To fulfill its commitment, the Mexican government has set as a priority green growth, which encompasses a set of initiatives devoted to promote economic growth and equity among citizens preserving or incrementing environmental capital. The Low Emissions Development Strategy (LEDS) is the central element to green growth, focusing on low-carbon growth, the development of which is supported by USAID as part of the collaboration between the US and the Mexican governments. The LEDS and SLCF mitigation measures target the same sectors (transport, waste, agriculture, residential, industry, oil and gas, etc.) demonstrating the value the assessments and demonstration undertaken under the proposed project will have for the achievement of the LEDS' objectives. The exact linkages between the proposed project and the LEDS and Mexico's GHG emission inventory conducted under the national communication are demonstrated in appendix 14 as well as the main objectives of the LEDS in appendix 13.

Even though significant efforts are underway in Mexico to assess the sources of SLCF, these efforts have not led yet to a national emission inventory covering all the main sources and guiding SLCF mitigation strategies in an integrated manner. An integrated mitigation approach in line with better knowledge on the specific sources of SLCF is necessary to develop and implement more targeted priority mitigation measures. Furthermore a national policy framework is needed to promote and support these measures in a sustainable manner. Mexico, like many other countries, faces significant uncertainties with evaluating the emission sources of SLCF. Current assessments of methane emissions for example mainly conducted under the national communications are not covering the whole range of sources throughout the country and do not occur at a depth needed to define effective SLCF mitigation

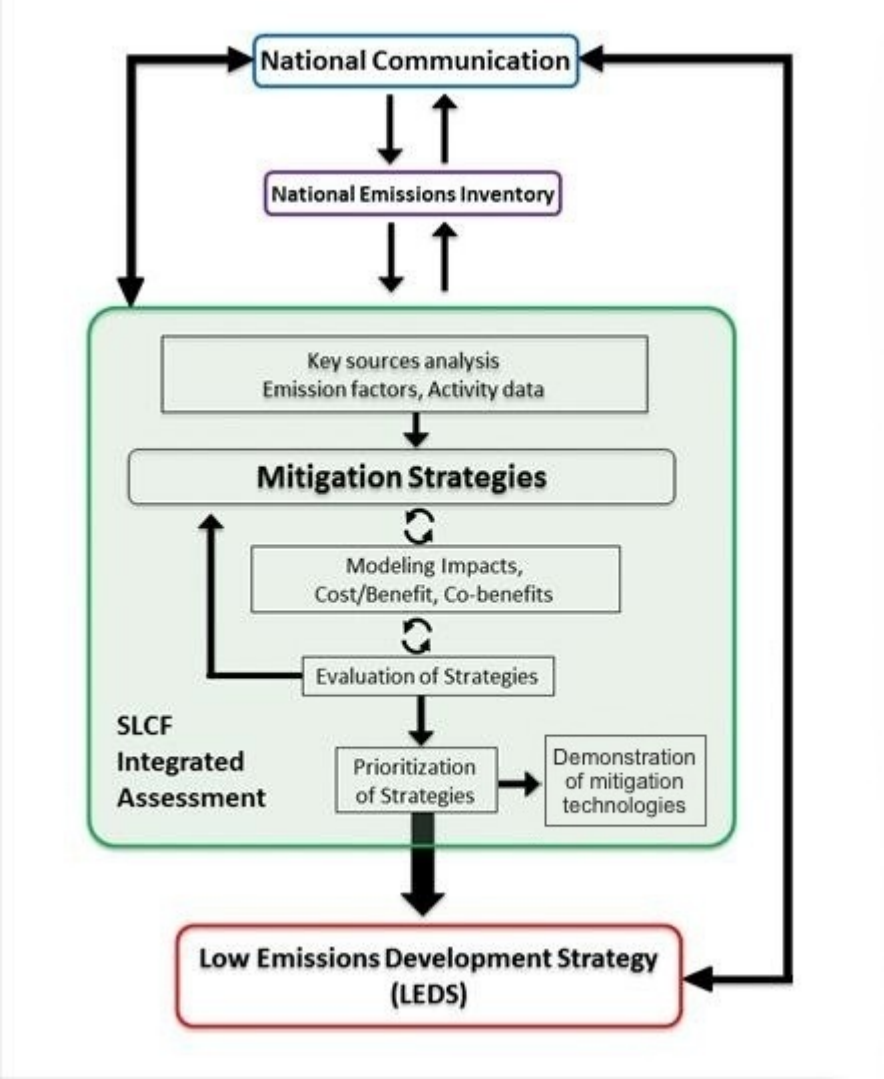
strategies. The outcomes of the project are expected to provide important inputs to the updated GHG emissions inventory being developed for the fifth national communication. As BC and O3 precursors emission assessments have only been carried out at local levels, more in-depth and national level evaluations of SLCF are therefore required along with testing of suitable mitigation technologies.

B. 2. incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

The overall goal of the proposed project is to contribute to the development and implementation of a comprehensive and sustainable Low Emissions Development Strategy (LEDS) for Mexico by promoting clean energy and energy efficiency through an integrated assessment of short-lived climate forcers (SLCF), and the development and demonstration of targeted SLCF mitigation policies. USAID together with the Government of Mexico are financing the development and implementation of the LEDS, while GEF funding will focus on analysis, impacts and solutions to short lived climate forcers. The incremental argument for this intervention is to help the GoM to sequence first those activities that will have short-term impacts. Given current uncertainties of the second commitment period of the Kyoto Protocol and of the shape of the global climate agreement to enter into force in 2020, it is important to support activities that will minimize climate change in the short term in a complementary manner to addressing carbon dioxide emission reductions to limit long-term climate change. More detailed incremental cost arguments for each component are included in Appendix 1.

The proposed project will support five main components to achieve its objective all of which are to be coordinated and implemented through Mexico's National Ecology Institute (INE), and the Molina Center for Energy and Environment (MCE2). INE is a deconcentrated entity within SEMARNAT and has the mission to generate scientific and technical information related to environmental problems and to strengthen capacities in order to inform society, to support decision making processes, to foster environmental protection, to promote the sustainable use of natural resources, and to support the ministry of environment in attaining its objectives. INE is also Mexico's leading agency for the development of national communciations and of Mexico's LEDS thereby ensuring that produced data and results under the proposed project are complementary and integrated. The Molina Center has been involved in various research and educational activities, in particular on the local and global impacts of emissions generated from megacities.

The project proposes the following approach: Depending on the specific sector, activity data and emission factors are needed to obtain an inventory of the corresponding emissions. This is accomplished by using sector specific techniques. For example, emissions for the transport sector will be characterized using a mobile laboratory equipped with suites of instruments to measure on-road vehicle emissions parameters for various types of diesel buses and trucks fitted with different emissions control technologies and under different driving conditions; emission fluxes from fixed point or area sources (landfills, water treatment plants, oil/gas systems) will be measured by utilizing an external tracer released at a known flow rate at or near the pollutant source. Based on this information, mitigation strategies will be proposed, evaluated and prioritized in terms of emission reductions, energy efficiency, human health, crop production and ecosystem viability using sector specific data. Furthermore, promising mitigation technologies will be demonstrated and barriers in their application at larger scale evaluated and strategies to overcome these identified. Given the pilot character of the project, it will also support capacity building and awareness raising activities to strengthen the sustainability of the project's results and to foster replication in other countries.



Component 1: Characterization of methane, black carbon and co-pollutants from key emission sources
The **objective** of the component is to reduce the uncertainty with regard to the sources of SLCF emissions focusing particularly on areas of relevance for energy efficiency and renewable energy.

For impact assessment of mitigation strategies, depending on the specific sector, activity data and emission factors are needed to obtain an inventory of the corresponding emissions. However, total emissions from various sources have a large uncertainty due to the inherent uncertainty in activity data and the determination of emission factors. For example, there is a discrepancy of about 35% in the population figures for cattle presented by the INEGI and SAGARPA. Furthermore, no studies have been conducted in Mexico to measure *in vivo* methane production by cattle or other domestic species, therefore Mexican emission factors for CH4 do not exist. This increases the degree of uncertainty in the predictions of mitigation potential.

The Project will coordinate with the corresponding Mexican government agencies and institutions to help in the integration of available databases to develop more reliable activity data for sources such as residential wood burning, brick kilns and small industries based on types of fuel, ovens, boilers, etc. In addition, it will be necessary to obtain local emissions factors by measuring black carbon emissions from these sources.

The activities supported under this component are expected to **result** in improved emission factors and more reliable activity data for key emission sources of SLCF; in a robust, national and integrated SLCF inventory; and in documentation and an assessment of the challenges, needs, requirements and opportunities in developing such an

inventory guiding similar efforts in other countries.

The measurements will focus on the main emission sources in Mexico according to current assessments. These are as follows for black carbon: diesel and gasoline vehicles, flares from oil wells and refineries, brick kilns, agricultural burning (especially sugar cane), small industrial boilers and domestic and commercial cooking and heating. The main emission sources for CH4 in Mexico as identified by national inventories of GHG emissions are landfills, wastewater treatment, fugitive emissions from oil and natural gas production and distribution, and agriculture.

The component will support the following activities:

1.1) Estimation of black carbon emissions inventory using two different methodologies: i) estimation of national emission inventory for a base year within MNEI framework; ii) Estimation of the national emission inventory for a base year within the INEGEI framework; iii) Inclusion of BC as a new pollutant in national emission inventory adapted for modeling.

The project proposes the application of two methods in developing a preliminary **black carbon inventory**. Both methods will use latest available data and include all the major sources of BC within the country. The first method is based on the fraction of black carbon in the emissions of PM2.5 from the sources contributing to the PM inventory. It will be applied systematically to the inventories of criteria pollutants using the latest PM2.5 inventory available. The second method is based on emission factors derived from energy consumption using data from the National Energy Balance. It will be applied to the National Emissions Inventory of GHG. The emission factors data base will be updated with emissions factors obtained during recent field studies for forest fires and agricultural burning

Expected results: i.) national emission inventory for BC within MNEI and INEGEI frameworks for a base year; ii) guidance document for methodology in estimating BC emissions inventory for MNEI and INEGEI, following IPCC good practice guidance using Tier 2 approach and top-down and intermediate tiers for the latter; iii) BC in national emission inventory for modeling.

1.2) Characterization of methane, black carbon and co-pollutants from key emissions sources using mobile laboratory for the following sources: i) methane emissions from waste water treatment plants (WWTP); ii) methane emissions from landfills; iii) BC and absorbed organic emissions from brick kilns; iv) BC, methane and associated emissions from oil and natural gas operations; v) BC and associated emissions from agricultural burning.
Expected results: i) Measured methane emission factors from key waste water facility components and from range of active and inactive landfills and quantification of emissions; ii) quantified BC and associated co-pollutants emissions and impacts from brick kilns, flaring, and agricultural burning.

1.3) Characterization of vehicular emissions using simulator: i) Measurement of emission samples from specimen vehicles and collecting samples; and ii) estimation of emission during virtual driving cycles in Mexico.
Expected results s: i) 3-D maps relating RPM-Torque-emissions (criteria pollutants, polycyclic aromatic hydrocarbons (PAH), BC); ii) Detailed high resolution emissions and factors (criteria pollutants, (PAH), BC).

1.4) Complementary characterization of small combustion sources: i) on site measurements and laboratory analysis of emission samples of small combustion sources using biomass or other fuels. The small combustion sources include traditional stoves, brick kilns, ceramic ovens etc.
Outputs: i) emission profiles, emission factors from small combustion sources for GHG, PM2.5, OC, BC and specific VOC and PAH; ii) Efficiency analysis for actual use conditions for those small combustion sources.

1.5) Complementary characterization of BC, GHG and other pollutants from artisanal brick production in Mexico: i) review and update of activity data estimations for artisanal brick production in Mexico and field measurements of representative kilns in use in Mexico.

Expected results: i) Emission factors of BC, GHG and other pollutants from artisanal brick production from two types of kilns used in Mexico.

1.6) Characterization of methane emissions from enteric fermentation of cattle: i) Estimation of national inventory for methane from enteric fermentation of cattle in Mexico based on simulation models. According to the 2006 National Inventory of Greenhouse gases, enteric fermentation from cattle contributes about 20% of the methane emissions and has been identified as a priority sector for mitigation actions; ii) Improvement of methane emissions inventory from cattle by reviewing herd structure and feeding practices in two climatic regions, together with emission factors measurements in vivo, in vitro and models.
Expected results: i) improved activity data and emission factors for cattle in Mexico; ii) methane emission factors for different cattle categories and different climatic regions; iii) methane inventories for cattle in Mexico; and iv) better description of Mexican cattle herd and its structure.

1.7) Characterization of methane from waste water treatment plants: i) Development of detailed inventory of municipal WWTP in Mexico considering technologies installed, treated flow rate, input and output water quality; ii) Measurement of methane emissions in sample of facilities; iii) estimation of methane from municipal WWTP using IPCC methodology; iv) Development of model to obtain methane emission factor for WWTP in Mexico.
Expected results: i) Wastewater technologies used in Mexico and treated flow rate; ii) Methane emissions of representative facilities evaluated; and iii) methane emissions estimated and emission factor developed.

1.8) Characterization of BC from open agricultural burning: i) estimation of emission factors for BC from burning of sugar cane residues; ii) evaluation of human health impacts of emitted air toxic species.
Expected results: i) measured BC emission factors from agricultural residues.

1.9) Integration of improved emission source data into INEGEI and MNEI; i) integration of measured BC and methane emissions, estimated emission factors into INEGEI and MNEI for modeling studies; ii) quality assurance of data collected by inventory experts.
Expected results: i) INEGEI and MNEI are updated based on improved emission source data for BC and methane obtained through activities 1 to 8 to be used for modeling studies.

1.10) Documentation of procedures and challenges in developing national SLCF emission inventories.
Expected results: Guidance document for developing integrated SLCF emission inventories.

Component 2: Assessment and selection of technically feasible and economically viable SLCF mitigation policies for implementation in Mexico

The objective of this component is to identify priority SLCF mitigation policies in Mexico for their integration into the LEDS. The activities supported under this component will result in the selection, evaluation and ranking of SLCF mitigation policies in terms of climate benefits, energy efficiency, health, agricultural production and ecosystem health from sector specific data; quantification of impacts of selected SLCF mitigation strategies including estimation of cost and benefits of these, informing prioritization process; and embedding of priority mitigation policies in Mexico's LEDS. The mitigation measures selection process will be further guided by the improved emission inventories supported under component 1.

The component will support the following activities:

2.1) Integrated assessment of mitigation measures: i) Preliminary scenario analysis using list of suggested strategies based on proven general measures and using initial model-ready emissions inventory data; ii) Selection of mitigation strategies for integrated assessments based on improved knowledge of emission sources from component 1; iii) Evaluation of mitigation potential of selected mitigation measures with the help of mobile laboratory and other measurements; iv) Application of regional air quality model to evaluate impact of mitigation strategies on regional climate and air quality combined with epidemiological studies and crop-responses with the help of the WRF Chem model (for BC – cookstoves, diesel, brick kilns, oil and gas, agricultural burning; for CH4: landfills, wasterwater, livestock, fugitive emissions); v.) Implementation of cost benefit analysis of selected mitigation

strategies by analyzing mitigation benefits and co-benefits and by comparing to cost of implementation and of other alternatives and prioritization of evaluated mitigation measures; vi) Integrated assessment of selected mitigation strategies on regional climate, human health, agricultural production, and energy efficiency.
Expected results: i) Preliminary modeling results of mitigation scenarios; ii) Technical report with impacts of selected mitigation strategies evaluated including quantification of cost and benefits and ranked in terms of climate benefits, energy efficiency, health, agricultural production and ecosystem health from sector specific data; iii) List of technically feasible and economically viable SLCF mitigation strategies;

For the **integrated assessment of mitigation measures**, the project proposes to apply regional air quality modeling to investigate the impact of mitigation strategies on regional climate and air quality for Mexico. The regional-through –urban online-coupled climate and chemistry model (WRF Chem model) can simulate urban air pollution and global climate change for integrated air quality management and climate change mitigation. This will be combined with epidemiological studies to create an accurate forecast of the human health impacts of mitigation strategies for SLCFs in Mexico at the local scale. The project will also review crop yield information, including crop-specific responses to increased heat and tropospheric ozone, and develop impact estimates for current crop production in Mexico. The information obtained will be used to develop a refined model for the prediction of health and agricultural benefits from SLCF mitigation strategies. The model will allow users to vary key parameters associated with the mitigation measures and the human, agricultural, and climatic responses to the measures, enabling a range of sensitivity runs to be made. From Global Circulation Models (GCM), national relevant data related to SLCF scenarios will be generated through downscaling. To identify the effects on air quality of a given strategy a sensitivity analysis will be performed.

2.2) Scenario analysis for Central Mexico: i) Gathering information to generate modified emission scenarios from proposed mitigation actions; ii) Run air quality model with modified emission inventories (What if analysis); and iii) perform cost-benefit analysis.
Expected results: i) modified emission inventory; ii) maps of ozone and BC levels in Central Mexico, maps of exceedance from critical levels, maps of potential population exposure to ozone. These will be compared to base case and modified scenarios; and iii) Scenarios with benefits due to changes in ambient concentrations simulated.

Component 3: Demonstration of SLCF mitigation technologies for key sources

The objective of this component is to demonstrate promising SLCF mitigation activities and technologies with significant mitigation potential in the areas of renewable energy and energy efficiency. The activities supported under this component are expected to result in the demonstration of priority SLCF mitigation technologies as a basis for learning and replication; and as inputs for the further development and implementation of a comprehensive LEDS.

The component will support the following activities:

3.1) Demonstration of mitigation technologies for cookstoves: i) mobile laboratory measurements of BC, methane and associated NOx, CO and VOC emissions from a range of innovative lower emission cook stoves under varied operating conditions and fuel types; ii) characterization of emission samples and energy efficiencies from different cookstove models being promoted in Mexico.
Expected results: i) emission factors for BC, CH4, NOx, CO and VOCs for a range of traditional and innovative cook stoves; ii) emission profiles, emission factors from inproved stoves; and iii) efficiency analysis for actual use conditions for different cook stoves.

3.2) Demonstration of diesel transport technology: i) mobile laboratory measurements of emissions from range of vehicles as a function of engine modifications, diesel fuel improvements and exhaust control technologies;
Expected results: i) measured emission factors for BC, CH4, NOx, CO and VOCs from a range of vehicles with selected diesel engine and exhaust treatment technologies using on road measurements representing Mexican environmental, road and traffic conditions.

3.3) Demonstration of brick kiln technologies: i) evaluation of emissions from a range of improved brick kilns

designs applicable in Mexico estimating potential energy savings and emission reductions.
Expected results: i) emission profiles, emission factors from improved kilns; ii) efficiency analysis for actual use conditions for different kilns.

3.4) Demonstration of methane mitigation technologies for cattle in Mexico: i) demonstration of selected mitigation technologies for tropical and temperate production systems in Mexico; ii) identification of cattle farms for every agro-ecological region where selected mitigation strategies will be implemented by participating farmers. The project will work directly with farmers that will conduct the demonstration activities supported by the project. The ministry of agriculture (SAGARPA) is a project partner and will be involved in this activity.
Expected results: i) methane mitgation strategies for cattle farmers in Mexico identified for different climatic regions and production systems;

3.5) Impacts of and barriers to demonstrated technologies: i) Assessment of economic, social and environmental impacts of demonstrated technologies; ii) Analysis of barriers to their application and of strategies in overcoming these.
Expected results: i) impact and barrier analysis for demonstrated technologies; ii) Data on cost and benefits of demonstrated technologies.

Component 4: Integration of SLCF mitigation measures into LEDS

In line with the overall objective of the project, this component seeks to integrate SLCF mitigation policies in the LEDS based on the improved knowledge of the SLCF emission sources, on evaluated and ranked mitigation policies and on tested mitigation technologies. The results from components 1 to 3 will be compiled, adapted to and integrated into the LEDS. The tools and methodologies to assess SLCF emission sources and to evaluate response options that will have improved through the supported activities will help to continuously update and monitoring the emission source data and the integrated responses. INE will lead this component given their responsibility for developing the LEDS. It will collaborate with all the relevant ministries and institutions as listed under project partners.

4.1) Integration of evaluated priority mitigation measures into LEDS and production of related policy publications: i) Compilation of results from components 1 to 3 and adapting to LEDS format; ii) Presentation of results from measurements and evaluations of mitigation strategies to instances developing and updating LEDS; iii) Integration of priority mitigation policies into LEDS; iv) Monitoring of integrated SLCF responses in LEDS.
Expected results: i) LEDS includes evaluated technically feasible and economically viable priority mitigation measures.

Component 5: Capacity building and awareness raising

The objective of this component is to promote the sustainability of the project by strengthening capacities on developing integrated SLCF emission inventories and on evaluating SLCF mitigation strategies in an integrated manner. In addition dissemination of project results, applied approaches and lessons learned will be supported to foster replication. Expected results include: National SLCF action plan developed and shared; Guidance document for SLCF inventories and strategies developed and shared; local authorities and technical personnel trained on SLCF related inventories and measures; expression of interest by other countries to replicate project approaches on addressing SLCF; and use of different media and dissemination tools for project results i.e. production of peer reviewed articles in technical and scientific journals, website, guided tours, etc.

The activities supported under this component include:

5.1) Training and capacity building: i) Organization of training to postdoctoral associates, graduate students, undergraduates from Mexican institutions together with government technical personnel on applied measurement methodologies and modeling tools; ii) guided tours to monitoring sites; and iii) scientific workshops on the operation of the equipment being used in campaign.
Expected results: i) Number of authorities and technical personnel trained; ii) science and policy workshops

conducted,

5.2) Organization of outreach and dissemination activities: i) dissemination of national SLCF action plan, project results and guidance document on requirements for developing integrated SLCF emission inventories and on selecting and evaluating targeted SLCF mitigation measures including related challenges; ii) organization of presentations and talks with students, professors and the general public; iii) publication of project results in relevant peer reviewed journals.
Expected results: i) action plan, project activities and results and guidance documents disseminated through various channels: relevant websites, SLCP coalition, regional climate change networks etc. iii) published scientific and policy relevant articles in relevant scientific and technical journals, book chapters, technical reports and peer reviewed by leading scientists on SLCF related issues.

5.3) Project monitoring and evaluation
The Implementing Agency and Executing Agency will execute project monitoring and evaluation as described above, in Part I.H. M&E results will be incorporated in "real time" into project management decisions to ensure adaptive management that responds appropriately to changing conditions and observed effectiveness of the project's activities and theory of change. Monitoring and evaluation reports will be produced as indicated in table H.

Component 6: Project Management

The objective of the component is to ensure effective project management and monitoring and evaluation of the project's results in accordance with identified performance indicators and work plans. The component will support two types of activities:

6.1) Project coordination and fostering smooth collaboration among working groups

The Executing Agency will manage the project to:
• Develop and implement an effective management and implementation structure to carry out and supervise activities in accordance with agreed work plans and indicators;
• Ensure clear, transparent, and participatory decision-making processes;
Ensure guidance by steering committee on project implementation and strategic orientation;
Support frequent and effective communication among project participants;
• Foster clear, transparent communication with and outreach to the project's stakeholders;
• Ensure sound financial management of the project and oversight of consultants and purchases, and other administrative details. And
• share with GEF-STAP findings of the project that may have a strategic bearing on the scope and focus on the GEF's climate change funding.

Replicability:
Given that there is currently no national integrated SLCF assessment available with a methodology that can be applied in different national contexts, the proposed project represents a pilot initiative with global learning value. The supported activities will contribute to develop a robust inventory methodology for SLCF so that emissions estimates are as transparent, reproducible and robust as the well proven emission inventories for the GHG. This will enable the application of such methodology and the consideration of the lessons learned in that process in other countries making comparisons between countries possible. Furthermore the project will lead to detailed impact assessments and demonstration of selected SLCF mitigation measures with the potential to implement these in other countries and regions facing similar issues with SLCF. The project will support the dissemination of its results and approaches to other countries facing similar issues with SLCF. It is expected that by the end of the project at least two countries express interest in applying the project's approach in addressing SLCF. In that context the project will share project results and lessons learned and help guide replication efforts.

Adequacy of funding level:
The level of proposed funding is adequate. A significant part of the considered resources will be needed to reduce

the uncertainty on the SLCF emission sources and to generate solid data to feed the model that will enable the assessment of mitigation measures. However, the project will benefit from ongoing efforts that will be complementary to the proposed project such as the GHG inventories under the national communications and the national emissions inventory. The project will also link to existing and planned climate strategies and contribute to broaden these to account for the short term benefits of reducing SLCF emissions. The collaborating partners to this proposal have also indicated their commitment and represent significant co-finance resources for this project as quantified in the budget tables and specified in the types of their contributions. There are already several existing mitigation technologies identified in Mexico that the definition of SLCF policy measures can build upon. The project will improve the impacts of the application of these technologies by taking into account their contribution to regional and short term climate change and by rendering them more targeted. Finally the project will benefit from the resources invested in the development of the LEDS thereby counting on significant co-financing. The proposed funding will contribute to strengthening the SLCF mitigation potential in the LEDS.

Estimation of global environmental benefits of projects, including applied assumptions and methodologies
The project will lead to regional and near term climate benefits thus contributing to improving the chances of keeping temperature increases at a manageable level. The project has also a global learning value given its pilot character. To date there are no integrated and country specific SLCF assessments and projects. The project will thus contribute to develop integrated approaches in assessing SLCF, testing them and generating SLCF related data that will be beneficial to other countries that face similar problems with SLCF and can also lead to benefits for health, agriculture and ecosystems in these countries.

B.3. Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF). As a background information, read Mainstreaming Gender at the GEF.":

The proposed project is expected to generate significant socioeconomic benefits by reducing the negative impacts of SLCF on health, ecosystems, and agriculture beyond the already emphasized climate benefits. The project is expected to positively impact the health of women and children being the groups that often bear the greatest burden of soot pollution and the products of dirty burning fuels.

The project will contribute to the development of a more comprehensive and sustainable LEDS the implementation of which will lead to significant environmental, social and economic benefits. The extent of these benefits will depend on the exact design of the LEDS but the assessment of the mitigation strategies supported under this project and the results thereof which will be integrated into the LEDS will undergo a cost benefit analysis in terms of their benefits for climate, health, agriculture and ecosystems. This will ensure that the mitigation measures with the highest benefits are being prioritized for subsequent implementation. The project will also support the demonstration of four mitigation technologies which house significant potential for socioeconomic benefits once implemented and up-scaled. The following table provides an overview of these expected benefits:

Technology	Socio-economic benefits
Mitigation technologies for cookstoves	- Health protection - Indoor air quality - Energy efficiency by using improved cookstoves - Crop protection through reduced ozone impacts on crop yields
Diesel transport technology	- Health protection - Crop protection
Brick kiln technologies	- Health protection - Energy efficiency by replacing traditional brick kilns with more efficient brick kilns - Improved quality of bricks
Methane mitigation	- Crop protection through reduced impact on crop yields

technologies for cattle	- Improved milk and meat quality and productivity

Supported demonstration of technologies will be done in close collaboration with local farmers, households, producers (i.e. brick kilns), etc. thus contributing to the buy in of mitigation measures and to enhancing capacities in addressing SLCF at the local level. The supported activities will also contribute to enhancing capacities at the national level by supporting the application of state-of-the-art measurement tools for SLCF emissions and by supporting pioneering efforts in carrying out integrated assessments of SLCF mitigation measures. Overall, the project will lead to increased public awareness on the SLCF issues and the impacts and generate an improved knowledge base for the development and implementation of targeted SLCF mitigation measures.

Overall benefits of addressing SLCP

Confidence is high that black carbon measures provide substantial health benefits. The World Health Organization (WHO) estimates that 3.1 million people, mostly in developing countries, die prematurely each year from indoor and outdoor air pollution. Two SLCFs – black carbon and tropospheric ozone – are important pollutants causing these health impacts. This is particularly acute on the health of the women who are exposed to the smoke from traditional, inefficient cookstoves. The reduction in outdoor particulate air pollution from fully having implemented the measures identified in the WMO/UNEP report by 2030 would avoid an estimated 2.4 million (range 0.7–4.6 million) premature deaths annually. It would also greatly reduce impacts on health from indoor exposures. The health benefits of the measures come from reduced exposure to fine particulate matter (PM2.5) concentrations resulting from reductions in black carbon and other particle emissions. Because particulate matter is reduced rapidly after the measures have been implemented, the health benefits will also be felt immediately.

Energy is essential to meet our most basic needs: cooking, boiling water, lighting and heating. It is also a prerequisite for good health. According to WHO, around 3 billion people still cook and heat their homes using solid fuels in open fires and leaky stoves. About 2.7 billion burn biomass (wood, animal dung, crop waste) and a further 0.4 billion use coal. Most are poor, and live in developing countries. Such cooking and heating produces high levels of indoor air pollution with a range of health-damaging pollutants, including small soot particles that penetrate deep into the lungs. In poorly ventilated dwellings, indoor smoke can be 100 times higher than acceptable levels for small particles. Exposure is particularly high among women and young children, who spend the most time near the domestic hearth. To combat this burden of disease, it is important to raise awareness and to build capacity on the use of cleaner and more efficient technologies for cooking, heating and lighting.

Confidence is also high that controlling methane emissions and ozone precursor emissions by implementing black carbon measures would reduce ozone concentrations and its impacts on crops. Implementing all 16 measures would avoid annual losses from four major crops of about 32 million tonnes (range of 21-57 million tonnes) each year after 2030 when all the measures have been implemented (note that the UNEP/WMO Assessment gave a higher central value of 52 million tonnes, reflecting differences between global models). Half of these benefits result from implementing the methane mitigation measures and the other half from black carbon measures. The greatest crop benefit from the methane measures comes from reducing emissions from coal mines, especially in North East Asia, South East Asia and the Pacific; from oil and gas production in all regions; and from long-distance natural gas transmission pipelines in North America and Europe. The crop benefits from action on black carbon emissions largely come from the implementation of measures in the transport sector, especially the wider implementation of Euro-6/VI standards.

B.4 Indicate risks, including climate change risks that might prevent the project objectives from being achieved, and if possible, propose measures that address these risks to be further developed during the project design:

Risk	Rating	Risk mitigation measure
Possible failures in institutional	Low	The involved institutions have already

coordination that may hinder the information flow.		collaborated in the past on related issues. Also the fact that INE is the agency involved in developing the national communications and the LEDS will ensure efficient coordination and complementary approaches.
Delays in the flow of supplies and equipment for customs.	Low	Coordination with the relevant authorities (e.g., customs officials) will be sought early on in the planning stage;
Failure of equipment due to safety and environmental events.	Low	All equipment will be carefully examined and calibrated prior to the measurements.
Uncertainties prevail for defining targeted mitigation measures	Low	The just released global SLCF assessment that includes targeted mitigation measures and Mexico's extensive GHG mitigation experience including in the area of methane will help guide the process of defining nationally appropriate mitigation measures and reduce uncertainties.
Integrated assessment might be hampered by complexity given manifold sources of SLCF emissions occurring at different scales	Low	Global assessment will help guide this process as well as involvement of several relevant national research institutes. Furthermore Mexico has already produced helpful data for methane and tropospheric ozone, including also partly for black carbon, that the proposed project will build on
Project results are not integrated into LEDS	Low	Institution developing LEDS is part of project management team and continuous sharing of project results will ensure relevant priority mitigation measures are integrated accordingly

B.5. Identify key stakeholders involved in the project including the private sector, civil society organizations, local and indigenous communities, and their respective roles, as applicable:

This project will be jointly implemented by several Mexican and U.S. institutions, as well as European and Latin American institutions, including the Molina Center (MCE2), Aerodyne Research Inc. (ARI), NASA, U. of Iowa, U. of California Berkeley from the USA, ILASA (Austria), Fundación Chile and U. Andres Bello (Chile). In Mexico, research groups at UNAM, U. Edomex, INE, U. Nuevo Leon, and other collaborating institutions working on climate change, air quality, energy, livestock and waste management will be strengthened through this collaboration. This also provides opportunity for Mexican technical and policy officials to collaborate with international scientific and policy experts.

Partners include: Univ. Nacional Autónoma de México (CCA, II, I Geografía), Univ. Autónoma del Estado de México, Aerodyne Research Inc., NASA, ILASA, Secretaria del Medio Ambiente del Distrito Federal, Instituto de Ecología del Estado de Guanajuato, Secretaria de Desarrollo Sustentable del Estado de Nuevo León, Puebla, Aguascalientes, INE (Programa de Cambio Climático, DGICUR, DGIPEA, CENICA), Fundación Chile, Univ. Andrés Bello, Chile, CONAGUA, CONAFOR, SAGARPA, PEMEX, Help International, GIRA, Pronatura, Instituto Mexicano Petroleo (IMP).

They will be involved in emissions characterization and data analysis, demonstration projects, selection of mitigation strategies, modeling evaluation, logistical support, and as relevant integration into LEDS.

B.6. Explain how cost-effectiveness is reflected in the project design:

Demo of cost effectiveness including through assessment of cost effectiveness of project design approach as compared to alternative approaches to achieve similar benefits

The project will support the quantification of the impacts of the selected mitigation measures thereby enabling a ranking of these options based on their cost/benefit ratio. This will lead to promoting measures where most significant positive impacts on climate, health and ecosystems can be anticipated. Also the close linkage of the project to the LEDS and to other related initiatives will facilitate the use of synergies. Given that the same institutions are involved in these activities, overlaps are being avoided and coordination of activities in a complementary manner is ensured.

Investing in reducing SLCF represents a cost effective approach as it influences climate on shorter time scales than those of carbon dioxide reduction measures. Implementing both strategies substantially reduce the risk of crossing the 2 ^{o}C threshold.

According to UNEP's Near term climate protection and clean air benefits assessments, methane mitigation measures would provide larger climate benefits compared to black carbon measures, mainly by recovering methane from oil and gas production and better management of municipal waste. Black carbon measures deliver more modest climate and health benefits in this region, but a relatively large benefit for crop yields, all from addressing diesel-vehicle emissions. In terms of estimated cost implications of the evaluated mitigation measures in UNEP's assessment, about half of the emission reductions of both methane and black carbon could be achieved by measures that would deliver financial cost savings (as a global average) over the lifetime of the measures. The estimate of cost savings does not account for the economic gains associated with reduced health, climate, crop yield and ecosystem impacts. These same measures account for about half of the temperature benefit that could be achieved. However, these measures may be considered less profitable by private-sector investors who expect a fast return on their investments. As a result, it is unlikely that these SLCF measures would be implemented by market forces along under current conditions. Nevertheless, the cost saving is an important feature that could encourage the development of financing schemes for these measures. The remaining temperature reduction could be achieved through measures that would be competitive in the global carbon market, and also by measures that have already been widely implemented by developed countries.

B.7. Outline the coordination with other related initiatives:

As previously mentioned the project is expected to be closely linked to the GHG emission inventory update conducted under the national communication (INEGEI) and to provide important inputs. Activity and emission factors databases will also be provided to the National Emissions inventory (MNEI) system for air pollutants and GHG.

Furthermore will the project be linked to the following activities and programmes:

LEDS: NAMAS, emissions and mitigation strategies
National Communication – National GHG Emissions Inventory
TNA – Technology Needs Assessments
SEMARNAT: National Emissions Inventory
SCT: Modernization Program for the Federal Transport (long haul transport)
CONAGUA: National Water Plan, the proposal of competitive funds for Wastewater Treatment Plants.
SSA: Gender and health programs for rural women's exposure to wood smoke, occupational health programs in brickworks and vulnerable groups exposed to these activities.
SENER: National Energy Strategy 2010-2024

SAGARPA: Sustainable Livestock Production Programme and Livestock and Beekeeping Management Ordinances (PROGAN)
CONAFOR: Strategic Forestry Program 2025 PEF
FEDERAL, STATES: PROAIRES and Climate Action Plans of Nuevo Leon, Puebla, Guanajuato, Aguascalientes, and SMA-GDF.

The project will also be linked to two projects that had been supported by GEF and that continue to provide important results in the transport and waste sectors in Mexico being: "Introduction of climate friendly measures in transport" and "Methane Gas Capture and Use at a Landfill - Demonstration Project".

C. GEF AGENCY INFORMATION:

C.1 Confirm the co-financing amount the GEF agency brings to the project:

UNEP is supporting several projects in Mexico and in the region that the proposed project can build upon and benefit from. These include:
1. Regional Gateway for Technology Transfer and Climate Action (REGATTA). Note: this is a regional project for Latin America covering adaptation and mitigation. It will be key for disseminating and replicating the project's results.
2. Long-term plan for climate change mitigation – Sector specific economic assessment to determine mitigation opportunities and costs across the Mexican economy, including also mapping of potential funding sources
3. Long-term plan for climate change mitigation – Preparatory analytical work to link existing macro-economic models (used to prepare Mexico's current climate change plan to 2012 with sectoral models (see above) being finalized.
4. Facilitating Implementation and Readiness for Climate Change Mitigation (FIRM)
5. Green Economy Scoping Study for Mexico

Furthermore is UNEP already involved in a number of projects with linkages to SLCF that the proposed project can build on and extract lessons from. A detailed list of these projects together with a description of their scope, partners, budget and targeted SLCP is included in appendix 15.

In summary these include:

Science and information:

- Atmospheric Brown Cloud (ABC)
- Integrated Assessment of Black Carbon and Tropospheric Ozone
- Global Atmospheric Forum
- HFCs: A Critical Link in Protecting Climate and the Ozone Layer
- Near-term Climate Protection and Clean Air Benefits: Actions for controlling short lived climate forcers

Pilots and activities:

- Project Surya focusing on black carbon in the residential sector in India and Kenya
- HFC
- Efficient cook stoves
- African Rural Energy Enterprise Development (AREED) programme focusing on black carbon in the residential sector
- Clean Development Mechanism projects focusing on black carbon and methane in the waste, agriculture and residential sectors
- Partnership for Clean Fuels and Vehicles

The involvement of UNEP's ABC and SLCP coalition teams in the project will benefit activities such as the project's assessments of the SLCF sources and mitigation option, the development of a national action plan and the development of Mexico's SLCF emission inventory benefitting from the ABC emission inventory manual.

The estimated UNEP co-financing amounts to USD 0.5 million.

C.2 How does the project fit into the GEF agency's program (reflected in documents such as UNDAF, CAS, etc.) and staff capacity in the country to follow up project implementation:

Mitigation is one of UNEP's priority areas within its climate change programme and in that area UNEP is providing countries with support to enable them to move towards low emission development. With regard to clean technologies, UNEP helps countries to strengthen individual and institutional capabilities in the clean energy sector by building up technical skills and knowledge about policy options and helping to develop mechanisms and policies that ease the costs and risks of entry of financial actors in new climate mitigation investments. UNEP's activities extend to areas as varied as technology needs assessments, resource assessments, end user financial mechanism etc. It also helps countries respond to discussions and obligations arising from the UNFCCC process.

With regard to SLCF, UNEP has extensive technical knowledge on the issue and has been leading the global assessments of SLCF. The last report has just been released in Durban and has received wide media coverage and attention within the climate conference. Furthermore, is UNEP the secretary of the just launched SLCP coalition including partner countries such as Mexico, Bangladesh, Sweden, Ghana, Canada and the US. The activities supported by UNEP in the SLCF context are listed in appendix 15.

UNEP is also involved in supporting national communications, TNAs, NAMAs and low carbon growth strategies development and can thus ensure complementarities and cross linkages to these.

UNEP has been working with Mexico for a considerable time in the area of climate change and among other been engaged in assessments in the context of low emission strategies. The proposed project can build on these efforts.

The Project is also in line with the objectives of the last UNDAF. Particularly with the objectives 1,2 and 3 on poverty reduction and environmental protection. http://www.undg.org/docs/7594/UNDAF%20FINAL.pdf

PART III: INSTITUTIONAL COORDINATION AND SUPPORT

A. **INSTITUTIONAL ARRANGEMENT:**

UNEP will be the sole GEF agency.

PROJECT IMPLEMENTATION ARRANGEMENT:

General implementation arrangements:

The Molina Center will coordinate and execute all technical activities in close coordination with INE through a group of professional staff (GPS) led by a Project Manager, and will also be in charge of all fiduciary responsibilities, including financial management, and the procurement of goods and services. The Molina Center will manage the entirety of the project funds. The implementation of the measurements and demonstration activities will be supported and implemented through the participation of the project partners detailed in Appendix 5 who also contribute co-financing to the project. Oversight of the Project will be the responsibility of a steering committee. An implementation flow chart is shown in Appendix 4.

Technical implementation arrangements:

Steering Committee

The main responsibility of the Steering Committee (comprising of representatives from the Molina Center, INE, and UNEP) is to assure political and strategic support for the implementation of the measurements and demonstration and the coordination with counterpart resources. The Steering Committee will also provide guidance on the implementation of the project work plan and make high-level recommendations regarding the project's development, technical and management issues.

Scientific Advisory Panel

A Scientific Advisory Panel, appointed by the Molina Center and INE, will be convened regularly to advise on project implementation, including reviews of emerging science in the field, assessments of the impacts on climate, health,

agriculture, and ecosystems, and evaluations of the costs and benefits of various mitigation options. The advisory panel will also include UNEP staff that has been working on SLCF related issues depending on the specific issue at stake such as representatives from the ABC team, UNEP staff working on national communications and specifically GHG inventories for component 1, members of the UNEP secretariat of the Climate and Clean air coalition to reduce SCLP, experts on global SLCF assessments etc.

Group of Professional Staff

A group of professional staff (GPS) composed of staff from the Molina Center, INE and Project partners will be responsible for the implementation of project activities led by the Project Manager. Specifically, the Project Manager will be in charge of the overall operational coordination of the project work plan, including monitoring and evaluation of project activities and public outreach.

PART IV: EXPLAIN THE ALIGNMENT OF PROJECT DESIGN WITH THE ORIGINAL PIF

PART V: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):):
(Please attach the Operational Focal Point endorsement letter(s) with this template. For SGP, use this OFP endorsement letter).

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
Claudia Grayeb Bayata	Director General for North America, Asia Pacific and The Caribbean	MINISTRY OF FINANCE AND PUBLIC CREDIT	02/10/2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Maryam Niamir Fuller, Direct GEF Coordination, UNEP		06/29/2012	Seraphine Haeussling	+33 1 44377615	Seraphine.haeussling@unep.org

ANNEX A: PROJECT RESULTS FRAMEWORK

Project Strategy	Objectively verifiable indicators				
	Indicator	**Baseline**	**Target**	**Sources of verification**	**Risks and Assumptions**

Project Objective: Contribute to the development and implementation of a more comprehensive and sustainable Low Emissions Development Strategy (LEDS) for Mexico through an integrated assessment of short-lived climate forcers (SLCF), and the development and demonstration of targeted SLCF mitigation policiesIntegrated responses to short lived climate forcers promoting clean energy and energy efficiency	Inventory for BC at national level available and GHG emission inventory includes methane inventory at higher tier level. SLCF mitigation measures evaluated and prioritized. Priority SLCF mitigation measures integrated in the LEDS. National action plan for SLCF developed and communicated including description of procedures and barriers in addressing SLCFs.	Current national emission inventory does not include black carbon. GHG emission inventories are not developed for methane at depth needed to define targeted mitigation measures. General mitigation measures identified but not supported by in-depth knowledge of emission sources and not assessed in terms of climate, health and agriculture impacts. Current outline of LEDS mentions SLCF but targeted priority mitigation measures are not included. No national action plan for SLCF available.	Mexican national emission inventory (MNEI) includes black carbon inventory. Mexican GHG inventory (INEGEI) includes tier 3 methane emission inventory. At least one measure per most emitting sector identified, evaluated, and demonstrated. National action plan developed and adopted. At least 2 countries interested in applying approach.	• MNEI • National communicatio n • LEDS • Minutes from network and coalition meetings • National action plan • Guidance document for addressing SLCF	• Possible failures in institutional coordination that may hinder the information flow. • Delays in the flow of supplies and equipment for customs. • Failure of equipment due to safety and environmental events. • Uncertaintie s prevail for defining targeted mitigation measures. • Integrated assessment might be hampered by complexity given manifold sources of SLCF emissions occurring at different scales.
Outcome 1: Improved knowledge on key emission sources and of mitigation potential of addressing SLCF	Emission inventory for BC developed and integrated in national emission inventory. Black carbon emission inventory developed such that it can be used for impact modeling. Methane inventory developed applying higher	No national BC inventory. Current BC emission source estimates represent large uncertainties and are not categorized such as to be useable for integration into impact evaluation models. GHG emission inventory includes methane emissions not at level needed to define targeted mitigation	MNEI includes black carbon measurements from project. Model- ready black carbon emission inventory available. National communication and its inventory including CH4 emission source measurements from project.	• MNEI • National communicatio n and GHG inventory	• Possible failures in institutional coordination that may hinder the information flow. • Delays in the flow of supplies and equipment for customs. • Failure of equipment due to safety and environmental events.

	tier level and integrated into GHG emission inventory. Strengthened robustness, transparency and comparability of SLCF emission inventories	measures (mostly conducted at tier 1 and intermediary levels).			
Outcome 2: Decision making on efficient SLCF mitigation policies based on improved data on emission sources and on quantified impacts including co-benefits	SLCF mitigation measures evaluated in terms of mitigation potential. Impact of selected SLCF mitigation measures on health, agriculture and climate assessed, cost and benefit of mitigation measures assessed and mitigation measures prioritized.	Only general SLCF measures defined based on proven technologies and measures evaluated by UNEP. SLCF mitigation measures not evaluated in terms of climate, health and agriculture impacts as well as of their C/B at national level.	At least one measure per most emitting sector evaluated.	• Report with mitigation measures and assessments	• Delays in the flow of supplies and equipment for customs. • Failure of equipment due to safety and environmental events. • Uncertainties prevail for defining targeted mitigation measures. • Integrated assessment might be hampered by complexity given manifold sources of SLCF emissions occurring at different scales.
Outcome 3: Increased knowledge on cost and benefits of promising SLCF mitigation technologies for decision making	Selected SLCF mitigation measures demonstrated and barriers and opportunities for application and replication identified.	No field demonstration with necessary measurement tools conducted.	At least one measure from most significant SLCF emission source demonstrated.	• Evaluation report • Technology assessment including barriers and opportunities	• Identified and evaluated barriers prevent application and up scaling of technology.
Outcome 4: Mexico's LEDS incorporate priority SLCF mitigation policies	Prioritized mitigation measures integrated into LEDS.	Current outline of LEDS mentions SLCF but targeted priority mitigation measures are not included	SLCF mitigation measures incorporated within LEDS objectives and supported activities	• LEDS	

Outcome 5: Enhanced capacity and knowledge in measurement of SLCF emissions and in evaluating and selecting mitigation policies	Procedures and requirements for developing SLCF inventory identified, documented and communicated. Countries expressing interest in developing integrated SLCF inventory and strategy. Number of people trained in developing SLCF inventory and in assessing mitigation measures. Project results documented in peer reviewed journals. Experience and knowledge shared and wider implementation of successful mitigation strategies promoted	Given innovative character of project, specific SLCF capacities are limited. Guidance documents and action plans for addressing SLCF not available	National action plan and guidance document developed and disseminated. Expression of interest by at least two countries to apply project approach. At least 3 training sessions provided. Staff trained on SLCF related inventories and measures. Peer reviewed articles produced.	• National action plan • Guidance document • Network and coalition meetings. • Training materials.	

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

No comments received.

Annex C. Personnel and Consultants to be hired using GEF Resources

Institutions	US$ per person week	Estimated Person week	Tasks to be performed
MCE2			
Research Scientist-1	1,272	51	Emissions characterization and demonstration, data analysis and reporting
Post-doc	1,050	24	Meteorology/ impacts
Research Scientist-2	1,350	48	Mitigation scenarios/ impact analysis
Research Scientist-3	1,155	48	Mitigation scenarios/ impact analysis
Data manager/webmaster	1,324	20	Data management/communication
Total		**191**	
ARI			
Project Scientist	2,904	7.7	Oversee mobile lab operation
Research Scientists	1,268	6.7	Emissions characterization and demonstration
Technician-1	862	3.1	Transport of mobile lab to and from Mexico
Principal Research Scientist-1	3,088	0.5	Mobile Laboratory Instrumentation/Calibration
Principal Research Scientist-2	2,393	0.4	Emissions characterization and demonstration
Technician-2	1,379	0.6	Mobile Laboratory instrumentation/calibration
Technician-3	1,045	6.4	Emissions characterization and demonstration
Principal Research Scientist -3	2,292	8.2	Emissions characterization and demonstration
Principal Research Scientist -4	2,755	3.0	Data QA/QC, data analysis, reporting
Total		**36.6**	
TOTAL (International Consultants)		**277.6**	
UNAM-CCA			
Project Scientist 1	1,754	1	Oversee UNAM-CCA transport project
Assistant	500	1	Field work and data analysis
Tenure Technician	900	32	Analysis of emission samples
Graduate Students	200	25	Field work and data analysis
Technician (field work)	600	12	Vehicular simulation using ADVISOR
Lab technician	1,127	26	Laboratory analysis of PM2.5
Research scientist	900	12	Analysis of emission samples

Senior Technician	1,465	20	Emissions and demonstration of small combustion sources
Senior Scientist	1,612	20	Measurement of PM & BC
Associated Scientist	1,127	20	Emissions and demonstration of small combustion sources
Tenure Scientist	1,315	20	Emissions and demonstration of small combustion sources
Undergraduate student 2	65	26	Analysis of polycyclic aromatic hydrocarbons
Project Scientist 2	900	50	Emissions inventory modifications, sensitivity analysis
Program associate	500	50	Model set up and scenario analysis.
Total		**341**	
UAEM			
Project Scientist	900	25	Coordinate the activities of the cattle component
Research assistant 1	350	20	Methane emission factors by cattle in the temperate regions
Research assistant 2	350	20	Methane emission factors by cattle in the tropical regions
Total		**65**	
UNAM-II			
Ph.D. student	250	96	Inventory and mitigation of municipal wastewater treatment plants
Total		96	
GIRA			
Researcher	1,740	3	Supervise efficiency test for fuel-wood stoves
Researcher	900	4	Coordinate efficiency test for small combustion sources
Research assistant	300	2	Biomass burning and efficiency test for small combustion sources
Field technician	250	2	Installation of stoves and efficiency tests for demonstration
Total		**11**	
TOTAL (Local Consultants)		**513**	

ANNEX C: CONSULTANTS TO BE HIRED FOR THE PROJECT USING GEF/LDCF/SCCF/NPIF RESOURCES

Position Titles	*$/ Person Week**	*Estimated Person Weeks***	*Tasks To Be Performed*
For Project Management			
Local			
International			
Justification for travel, if any:			
For Technical Assistance			
Local			
International			
Justification for travel, if any:			

* Provide dollar rate per person week. ** Total person weeks needed to carry out the tasks.

ANNEX D: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS

A. EXPLAIN IF THE PPG OBJECTIVE HAS BEEN ACHIEVED THROUGH THE PPG ACTIVITIES UNDERTAKEN.

N/A

B. DESCRIBE FINDINGS THAT MIGHT AFFECT THE PROJECT DESIGN OR ANY CONCERNS ON PROJECT IMPLEMENTATION, IF ANY:

C. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES AND THEIR IMPLEMENTATION STATUS IN THE TABLE BELOW:

Project Preparation Activities Approved	***Implementation Status***	***GEF/LDCF/SCCF/NPIF Amount ($)***				***Cofinancing ($)***
		Amount Approved	***Amount Spent Todate***	***Amount Committed***	***Uncommitted Amount****	
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
	(Select)					
Total		0	0	0	0	0

* Any uncommitted amounts should be returned to the GEF Trust Fund. This is not a physical transfer of money, but achieved through reporting and netting out from disbursement request to Trustee. Please indicate expected date of refund transaction to Trustee.

ANNEX E: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used**)**

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/NPIF Trust Fund or to your Agency (and/or revolving fund that will be set up)