Climate Investment Funds

CTF/TFC.2/8
January 16, 2009

Meeting of the CTF Trust Fund Committee
Washington, D.C.
January 29-30, 2009

CLEAN TECHNOLOGY FUND
INVESTMENT PLAN FOR MEXICO

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INTRODUCTION

1. The Clean Technology Fund (CTF)[1] Investment Plan is a "business plan" agreed among, and owned, by the Government of Mexico for the International Bank for Reconstruction and Development (IBRD), the Inter-American Development Bank (IADB) and the International Finance Corporation (IFC) to provide support for the low-carbon objectives contained in Mexico's 2007-2012 National Development Plan, its National Climate Change Strategy and Special Climate Change Program. This multi-year business plan identifies the programs that are proposed to be co-financed by the CTF jointly with the IBRD, IADB and IFC. The Investment Plan (IP) is being presented to the CTF Trust Fund Committee in January 2009.

2. The IP is considered a dynamic document, with the flexibility to consider changing circumstances and new opportunities. Such flexibility is particularly important during the current period of uncertainty associated with worsening global economic conditions and financial markets. In addition, in the case of Mexico, not all the programs proposed for financial support by the CTF are equally fleshed out at this point in time. It is expected that the programs presented in the annexes to the Investment Plan will be further detailed in the coming year, and that more programs may be designed for potential submission to the CTF.

3. This IP builds on the three development banks' experience, gained through their long-standing and comprehensive environmental programs in Mexico. Early efforts have tackled air pollution and sustainable use of natural resources, including protection of Mexico's unique ecosystems. In recent years, the IBRD and IADB have supported both projects and development policy lending for environmental protection and mainstreaming climate change mitigation and adaptation in key economic sectors, as well as major analytical work on the effects and costs of climate change.

I. COUNTRY AND SECTOR CONTEXTS

4. According to Mexico's Third National Communication to the UNFCCC, Mexico emitted 643 million tons of carbon dioxide equivalent (Mt CO_2e) in 2002 of which almost 400 Mt CO_2e from combustion of fossil fuels. Mexico ranks thirteenth in the world based on total GHG emissions and is the second largest emitter in Latin America after Brazil. It accounts for 1.4% of global CO_2 emissions from fossil fuels, excluding other GHGs and land-use change and forestry. And as shown in Figure 1, Mexico's CO_2 emissions have been growing steadily over the past 25 years.[2]

5. The sources of Mexico's GHG emissions are energy generation (24%), transport (18%), forests and land-use change (14%), waste management (10%), manufacturing and construction (8%), industrial processes (8%), agriculture (7%), fugitive emissions (6%), and other uses (5%) (see Figure 2). The oil and gas sector is responsible for about 12% of GHG emissions, about half of which is classified under energy generation. Although the consumption of fossil fuels is expected to grow in the next decade, the economy became less carbon intensive in the period 1990 – 2002 primarily due to government policy and programs including implementation of over 100 Clean Development Mechanism (CDM) projects, 98.6 percent the consumption reduction of chlorofluorocarbons (CFCs) between 1998 and 2007, and promoting the use of natural gas (see Figure 3 and 4).

6. Mexico's total GHG emissions are equivalent to about 6 t CO_2e per capita, or about 4 t CO_2e per capita if one considers only the CO_2 emissions from fossil fuel combustion.

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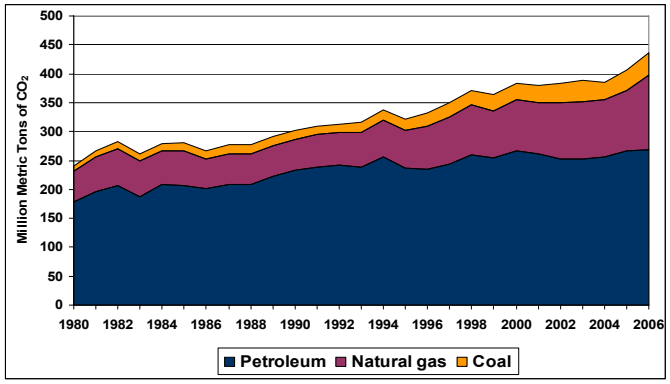
[1] The Clean Technology Fund invests in projects and programs that contribute to the demonstration, deployment and transfer of low carbon technologies with a significant potential for long term greenhouse gas emission savings. The CTF Trust Fund Committee oversees the operations of the Fund. The World Bank (IBRD) is the Trustee of the Fund.

[2] The difference between total GHG emissions and CO_2 emissions from the consumption and flaring of fossil fuels is due to other GHG than CO_2, and emissions from land-use change.

7. Although, as a non-Annex I country, Mexico is not mandated to limit or reduce its GHG emissions under the Kyoto Protocol, the country has firmly adopted the UNFCCC principle of "common but differentiated responsibilities" and pledged to reduce its GHG emissions voluntarily. At the 14th Session of the Conference of the Parties to the UNFCCC in December 2008 Mexico announced that it would reduce its GHG emissions by 50% below 2002 levels by 2050.

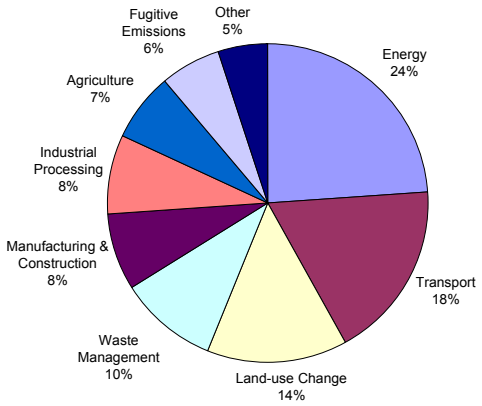
8. Mexico has submitted three National Communications to the UNFCCC establishing the National GHG Inventory (including from land-use change), reporting on the first studies on Mexico's vulnerability to climate change and laying out future emission scenarios.[3] Mexico is the only non-Annex I country to have submitted a Third National Communication and is currently preparing its Fourth National Communication.

Figure 1: Mexico's CO_2 Emissions from Fossil Fuels
(Excluding other GHG and land-use change)



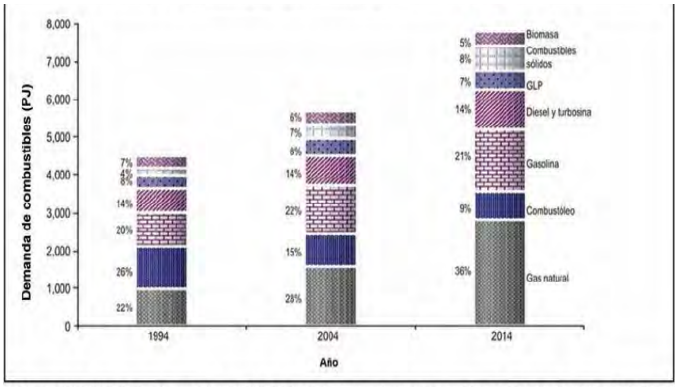
Source: Energy Information Administration, US Department of Energy

Figure 2: Mexico's GHG Emissions by Source, 2002



Source: ENACC, 2007.

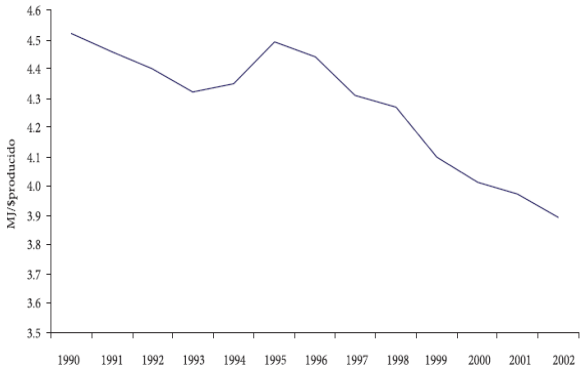
Figure 3: Fuel Consumption and Share



FUENTE: CMM, 2006. Elaborada con datos del BNE 2004 y de las prospectivas del sector eléctrico, gas natural, gas LP y petrolíferos, 2005-2014, publicados por SENER.

Source: ENACC, 2007.

Figure 4: Energy Intensity
(fossil fuel consumption per GDP, 1993 prices)



Source: Mexico's Third National Communication to UNFCCC

9. Recognizing the multi-sectoral dimension of the climate change challenge, Mexico established the Intersecretarial Commission on Climate Change (*Comisión Intersecretarial de Cambio Climático* – CICC) in April 2005. The CICC's key mandates include the formulation and coordination of national

[3] See http://unfccc.int/resource/docs/natc/mexnc3.pdf

climate change strategies and their incorporation in sectoral programs.[4] The CICC contains several working groups, namely on mitigation, adaptation, as well as the Designated National Authority on Climate Change. Associated with the CICC is a Consultative Council on Climate Change, which creates a link between the CICC, the scientific community and civil society.[5]

10. On May 25, 2007, President Calderón announced the National Climate Change Strategy (*Estrategia Nacional de Cambio Climático* – ENACC),[6] thereby committing the country to place climate change at the heart of the country's national development policy. The ENACC sets the long-term climate change agenda, together with medium to long-term goals for adaptation and mitigation. In the Strategy, the country commits itself to reducing GHG emissions on a voluntary basis.

11. Mexico is currently developing a Special Climate Change Program (*Programa Especial de Cambio Climático* – PECC), which is expected to be adopted in the first half of 2009. As all government programs, the PECC is considered part of the 2007-2012 National Development Plan, in particular the environmental sustainability pillar of the National Development Plan.[7] The PECC defines how to operationalize the ENACC, in particular by identifying priorities and financing sources, both domestic and international.[8] The PECC's main mitigation objectives and recent developments to support its implementation are discussed in Section II.

II. PRIORITY SECTORS FOR GHG ABATEMENT

12. ENACC sets a long-term climate change agenda for Mexico, together with medium to long-term goals for adaptation and mitigation. As shown in Table 1, ENACC identifies measures and associated emission reduction potential that enables Mexico to reduce the carbon intensity of development. It distinguishes between production and consumption of energy, and vegetation and land-use change as the main categories of mitigation options. In the area of production and consumption of energy, ENACC identifies the following sectors as having the largest emission reduction potential: (i) land use, forestry and bioenergy; (ii) end use energy efficiency; (iii) power generation and distribution; (iv) oil and gas; and (v) transport.

13. PECC will further elaborate on ENACC by identifying priority actions and associated reductions in GHG emissions. The draft PECC report of July 2008 identifies specific measures and the associated emission reduction potential for each of the key sectors and sub-sectors. PECC is expected to become available in February 2009.

14. In the past few months, a number of studies and reports have supported the Government of Mexico in identifying priority actions and areas for reducing the growth in GHG emissions and thus contributed to priority-setting in the PECC, including the following: (i) the Mario Molina Center's Low Carbon Growth study funded by ClimateWorks and carried out in cooperation with the government of

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[4] The CICC is chaired by the Minister of Environment and Natural Resources with the following Ministries serving as members: Agriculture; Communication and Transportation; Economy; Social Development; Energy, and Foreign Affairs. The Ministry of Finance is a permanent invited member to the CICC's deliberations.

[5] See http://www.semarnat.gob.mx/queessemarnat/politica_ambiental/cambioclimatico/Pages/c4.aspx.

[6] See www.semarnat.gob.mx/Documents/Estrategias_libro_completo_compress2.pdf for the complete Strategy in Spanish. An executive summary in English can be found at http://www.semarnat.gob.mx/queessemarnat/politica_ambiental/cambioclimatico/Documents/enac/sintesis/sintesisejecutiva/Executive%20Summary.pdf.

[7] This pillar considers environmental sustainability as a transversal element of public policies to assure that all public and private investments are compatible with environmental protection.

[8] See the PECC draft at http://www.semarnat.gob.mx/queessemarnat/consultaspublicas/Documents/pecc/PECC_VCP.pdf. At the President's request, this draft is being revised by the CICC and a new version is expected in February 2009.

Mexico and McKinsey & Company; (ii) the IBRD-financed low-carbon country case study for Mexico (coined MEDEC); and (iii) the IADB-financed National Economics of Climate Change study.[9] Mario Molina Center's Low Carbon Growth study, which forms a component of the IADB study, and the IBRD's MEDEC identify long-term mitigation potential and costs, while the IADB study also has a focus on the cost of adaptation.

Table 1: ENACC's Estimated GHG Emission Reduction Potential in Selected Sectors[10]

(in Mt CO_2e over the period 2007-2014)

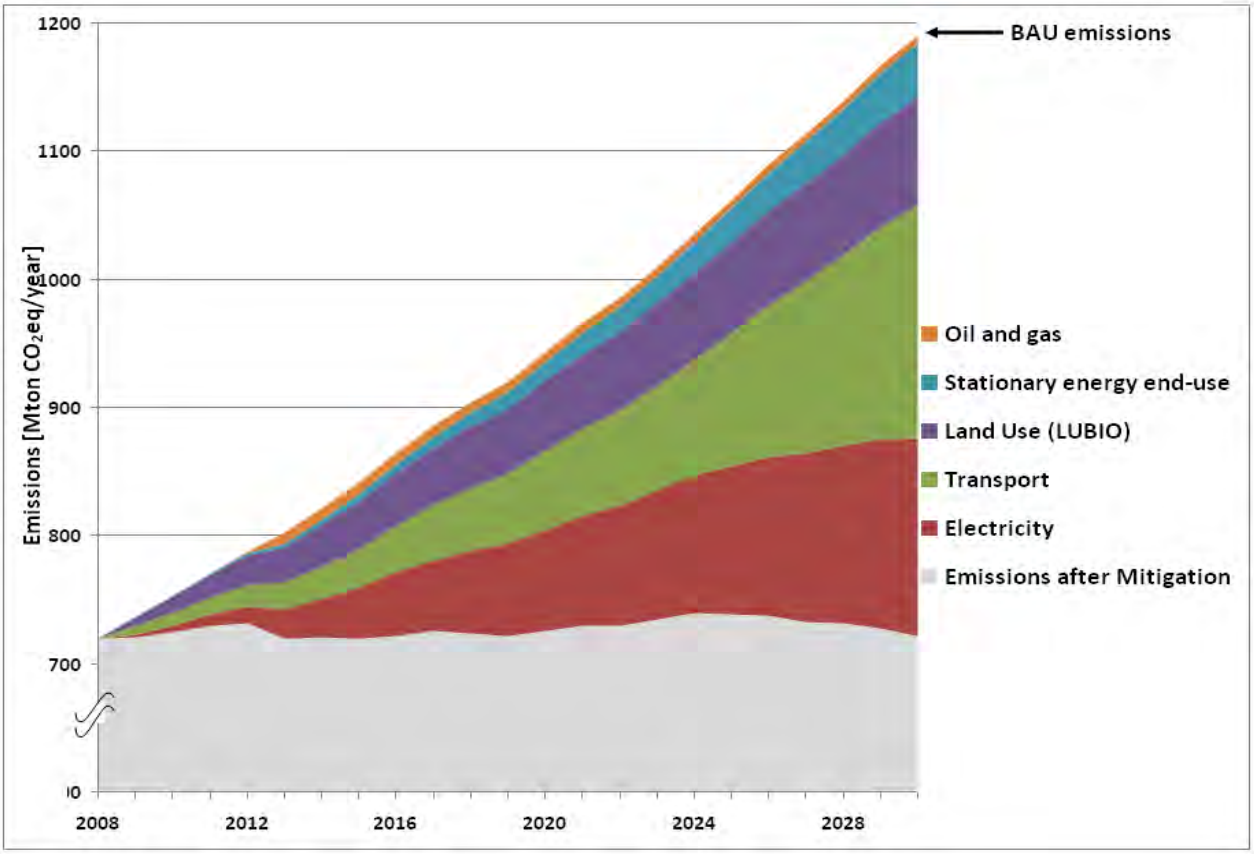
Measure	Estimated Potential (Mt CO_2e)
Land Use, Forestry and Bio-energy	
Reforest 285,000 hectares a year through the *ProÁrbol* program, to accumulate 1.71 million hectares.	10-20
Restore degraded soils by 115,000 hectares annually through *ProÁrbol*, to accumulate 690,000 hectares.	5-15
Expand commercial plantations by 100,000 hectares per year, to accumulate an additional 600,000 hectares.	3-7
Identify opportunities for carbon capture projects in forest ecosystems under the CDM.	n.a.
Introduce 500,000 high efficiency wood burning stoves in rural communities.	2.5
Restore agricultural land to perennial and mixed crops in 900,000 hectares, through the PROCAMPO program.	4.2
Develop standards for fertilizer use according to region and crop.	n.a.
Reduce slash and burn-related forest fires from 50% to 35%.	n.a.
Employ conservation tillage and foster cover crops in 200,000 hectares.	0.9
Rehabilitate 450,000 hectares of grazing and rangelands through cattle production support program "PROGAN".	4.6
End Use Energy Efficiency	
Continue application of current energy efficiency standards and develop and implement new ones.	24.0
Strengthen current FIDE programs and promote new ones.	3.9
Develop the CHP potential of the national cement, steel and sugar industries, among others.	>25
Power Generation and Distribution	
Increase the efficiency of transmission and distribution lines by 2%.	6.0
Increase thermal efficiency of fuel oil-fired thermoelectric plants by 2%.	0.7
Reorient oil production incentives; gasification terminal for imported LNG; convert fuel oil-fired plants to combined cycle.	21.0
Install 7,000 MW of renewable energy capacity to generate 16,000 GWh per year.	8.0
Introduce sustainably produced biofuels.	n.a.
Oil and Gas	
Install CHP plants in the facilities of the National Refining System and in other PEMEX facilities.	7.7
Substitute individual generation plants for a 115 MW combined cycle plant connected to offshore platforms.	1.9
Increase PEMEX's energy efficiency target by 5%.	2.7
Reduce fugitive methane emissions from natural gas production, transportation and distribution.	2.4
Transport	
Replace freight trucks and diesel busses ≥10 years old from 2008 onwards.	2.0
Increase rail coverage for freight transportation by 10%.	1.5

[9] Some of the studies' preliminary findings differ with respect to the magnitude of the emission reduction potential and the cost of mitigation that are assumed across measures.

[10] Of note is that transport measures identified by ENACC are a subset of all possible options now considered under more recent analysis.

15. Although the MEDEC study has a longer time horizon (2008 to 2030) than ENACC (2007 to 2014), the preliminary data from MEDEC relative to the reference period of ENACC are comparable and suggest that land use and bio-energy, transport and power generation are among the sectors with highest GHG emission reduction potential. Figure 5 shows each sector's 'wedge' of emission reduction relative to the business-as-usual (BAU) scenario. If all the wedges are implemented by 2030, Figure 5 suggests that Mexico's emissions may be at a similar level in 2030 as they are today. This would mean that additional efforts would be necessary in order to meet the objective of 50% reduction below 2002 levels.

Figure 5: Climate Change Mitigation Wedges for Mexico (2008-2030)



Source: MEDEC draft report, 2009.

16. Although there are a number of other sectors, where emissions are high and could be reduced (as explained below), not all of the sectors have equal priority for this Investment Plan, as explained in Section III. MEDEC identifies the following main mitigation opportunities:

- **Land use, forestry and bio-energy (LUBIO):** Mexico's LUBIO sector has potential to reduce its carbon footprint through the following low-carbon interventions: (a) reduced deforestation and degradation, (b) commercial tree plantations, (c) reforestation and restoration, (d) minimum tillage for maize production, (e) improved cook stoves, (f) efficient charcoal kilns, (g) ethanol from sugarcane, (h) ethanol from sorghum, (i) biodiesel from palm oil, and (j) biodiesel from *Jatropha***.**
- **Transport:** The transport sector represents 18% of the country's GHG emissions. Mexico's transport emissions increased by 27% between 1990 and 2005 and now account for about 2% of the global transport sector's emissions. The sector has great potential to reduce its carbon footprint through the following low-carbon interventions: (a) densification of urban areas, (b) energy efficiency standard for new vehicles, (c) hybrid buses for public transit, (d) optimization of

transportation routes, (e) bus rapid transit (BRT), (f) non-motorized transport (NMT), (g) freight company coordination, and (h) promotion of freight trains.

- **Power Generation:** The demand for electric power in Mexico has been growing faster than GDP over the past several decades and this trend is likely to continue for the foreseeable future as electricity use continues to grow in the residential, commercial, and industrial sectors. To meet the increasing demand for power under a BAU scenario, total CO_2 emissions from power generation are estimated to increase by 230% between 2008 and 2030 – from 138 to 312 Mt CO_2e. Based on their economic costs of production – excluding carbon and local externalities – both coal and gas-fired power generation would increase under the BAU, with coal accounting for 37% of the new capacity, and gas 25%.
- **Energy End-Use:** There is considerable potential for improving the efficiency of energy use across sectors in Mexico, including in the industrial, municipal, commercial, public and residential sectors. Among the interventions with the largest potential are: (a) cogeneration in the cement, and iron and steel industries; (b) industrial motors energy efficiency program; (c) room air conditioner energy efficiency; (d) refrigerator energy efficiency; (e) improvement of refrigerator standards; (f) residential compact fluorescent lighting program; (g) water pumping energy efficiency in water utilities; (h) street lighting efficiency; (i) federal building lighting efficiency; (j) air conditioning and lighting efficiency in non-residential buildings; and (k) solar water heater program in homes.
- **Oil and Gas:** Mexico's oil and gas sector has great potential to reduce its carbon footprint through the following low-carbon interventions: (a) cogeneration in PEMEX refineries, (b) reduction in gas flaring and venting, (c) refinery efficiency, and (d) gas transport leakage reduction.

17. Table 2 summarizes the mitigation potential of all sectors. Although these are preliminary numbers, the data highlight the relative magnitude of each sector.

Table 2: Preliminary MEDEC Results

Sector	Cumulative GHG emissions reduction from 2008 to 2030 (Mt CO_2e)	Emissions reduction achieved in 2030 (Mt CO_2/year)	Key Sector Mitigation Measures
Land use and bio-energy	1,450 (31.1%)	125	Expanded programs for reducing deforestation and degradation and expanding reforestation and forest management and managed fuelwood production.
Transport	1,140 (24.5%)	139	Reduced fuel demand (by promoting higher density urban growth, efficient mass transit, and non-motorized transport in urban areas, and by vehicle fleet efficiency); improved logistics management; and increased use of rail for freight transport.
Power generation	1,095 (23.5%)	114	Reduced fossil-fuel consumption in power generation by increasing the utilization of low-carbon technologies, including industrial cogeneration and renewables – wind, geothermal, biomass, and hydro.
End-use energy efficiency	757 (16.3%)	72	Reduced electricity demand by tightening minimum energy performance standards, accelerated programs to replace inefficient appliances, lighting devices, and industrial motors. Reduced fuel demand by scaling up solar water heating in the residential and commercial sectors.
Oil and Gas	214 (4.6%)	15	Reduced gas flaring and gas leakage in transportation and storage.
Total	4,656 (100%)	464	

Source: MEDEC draft report, 2009.

III. RATIONALE FOR SELECTED SECTORS

18. This section of the Investment Plan explains the considerations for selecting the emission reduction opportunities presented to the CTF. Although the sectors proposed to the CTF are identified by the various studies completed or underway, not all the measures identified by these various studies are presented as programs to the CTF. The measures put forward fall in three subsectors, namely (i) urban transport, (ii) renewable energy, and (ii) energy efficiency. These are the result of several months of discussions between the government of Mexico and the IBRD, IADB and IFC, and build on years of development experience and policy dialogue between these institutions and the government of Mexico. The choice of programs reflects a combination of the government's priorities and sector implementation readiness, the development banks' capacity and focus, and priorities established by the CTF. The paragraphs below present the rationale for the programs put forward.

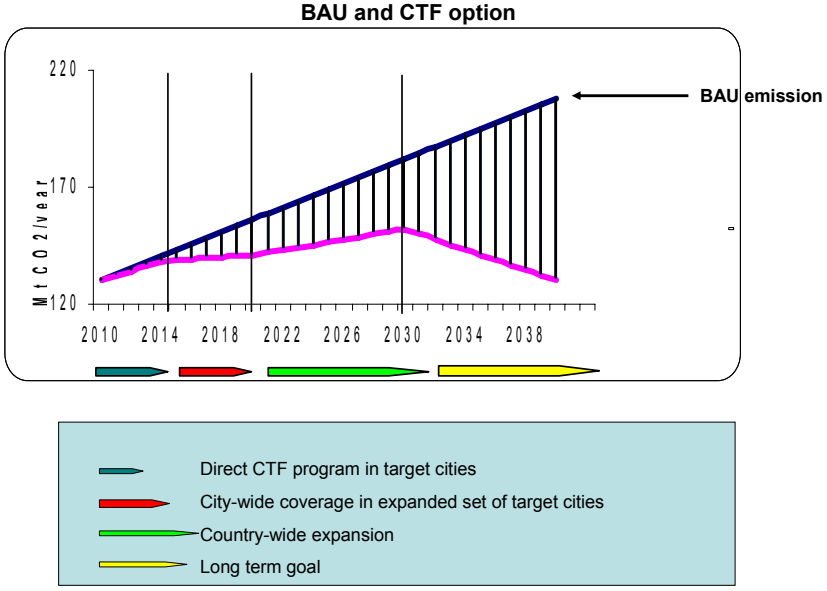
19. None of the measures from the land-use change and bioenergy and gas sectors are being put forward to the CTF at this stage for the following main reasons: (i) the CTF does not allow land-use change activities; (ii) some of the bioenergy measures are expected to have either a low emission reduction potential and/or a high abatement cost; and (iii) a national debate is taking place on reform of the oil sector, which complicate the planning of specific investments at this time, in spite of the clear emission reduction potential of this sector.

20. The programs proposed for CTF support do not involve new technology per se. They involve technology that is readily available to Mexico today, but face institutional, regulatory, or cost barriers (especially upfront investment cost barriers) which must be overcome for large-scale deployment. Support from the CTF would help overcome these barriers.

3.1 Urban Transport

21. Transport is an important contributor to the carbon footprint of the country and is growing at more than 2% per year. Thus, changing the sector's carbon path has the potential to alter the overall footprint of the Mexican economy. The new path would be centered on a massive effort to affect modal share towards energy efficient, low carbon mass transport systems. This modal shift can be secured through the deployment of BRT (bus rapid transit systems), light rails and similarly efficient transport modes. These are further enhanced through the application of low carbon drive systems (such as hybrid, articulated, high capacity vehicles), effective 100% scrapping of displaced rolling stock, and implementation of transport integration and transfer systems that promote harmonized urban development, climate and transport policies. Such a modal shift toward public transport systems is

Figure 6: Mexico Transport Sector BAU and CTF option



Source: Vergara, et al. World Bank (forthcoming)

proposed to be applied in three stages, starting with large metropolitan areas with a significant potential for reductions and eventually applied to all urban areas over 0.75 million inhabitants. If similar innovations are deployed nationally by 2040, the carbon footprint of the country's transport system would remain at the 2007 levels. Even more important, the induced changes in infrastructure, equipment and behavior would lock these and additional savings for the long term.

22. Unless a transformation of the sector is undertaken that maximizes a modal shift toward mass transport systems, and fuel efficient vehicles, the business-as-usual scenario will see an increase in motorization rates in the foreseeable future, with mass and public transport services continuing to lose share, thereby exacerbating the increase in Mexico's carbon footprint.

23. *Priority Activities*. Investment in activities to promote a modal shift in urban areas, including those associated with an improvement in the efficient allocation of public space for transport, such as bus rapid transit systems and associated measures (urban densification, the use and linkage with non motorized transport and demand management actions), rank amongst the most cost effective in the sector.

24. *Cumulative emissions savings.* The program for scaling up public transportation through implementation of about 20 BRTs and associated measures (expansion of metro systems based on low carbon power supply, low carbon vehicle technologies, low carbon or non motorized integrated measures, integration with other modes of transport) is anticipated to result in a reduction of 2 Mt CO_2e per year. Over the 20 year lifetime of the investment the accumulated reductions will be around 40 Mt CO_2e. CTF resources would enable wide expansion of the modal-shift experiences and would promote the adoption of policy and regulatory change to remove barriers to their implementation.

25. *Replication and scalability potential.* The adoption of these measures in the target cities, at the scale proposed, could stimulate a transformation of urban transport systems in Mexico, represent major scaling-up of current efforts and would have wider regional impacts. The focus on modal shift also has the potential to reduce transport costs and improve efficiency at a level that may overcome traditional barriers for change. The adoption of low-carbon bus technologies in Mexico has the potential to bring down the costs of alternatives by providing incentives for manufacturers to produce low carbon transport systems. All in all, this program has the potential to drastically change the surface transport sector in Mexico.

26. The successful implementation of the BRT program in Mexico City (METROBUS) has provided momentum to initiate a larger program in the country. Under the program, additional BRTs (20) would be implemented, resulting in a ridership of 5 million passengers per day and an emission reduction of 2 million tons GHG-year. It is anticipated that the effort would have a multiplicative effect. It is estimated that a national BRT program over time, could achieve a share of 30% of daily trips in major urban areas (over one million), with a ridership eventually exceeding 20 million passengers per day, which could lead to an overall reduction of 20% in the carbon footprint of the transport sector. This, if achieved, and in absence of other measures, could result in a reduction of 3-4% of the national carbon footprint. As an example of the interventions to be supported, in the city of Monterrey, a highly integrated low carbon public transport system would be supported, including expansion of the metro, confinement and expansion of bus transit, linkage to other modes, including non motorized transport and the provision of renewable energy to power the metro system.

27. *Environmental co-benefits.* Adoption of the measures would result in reduction in exposure to airborne pollutants. The experience in Mexico City has demonstrated that the operation of well run and designed BRTs have the potential to reduce exposure to airborne pollutants and air toxics. Mexico's National Institute of Ecology, in collaboration with the Sustainable Transport Center, conducted a study to estimate the impacts of the METROBUS operation on local pollutants. Concentrations of CO, PM2.5, PM10, and benzene were measured before and after the implementation of the corridor (see Table 3). The results of the measurements are summarized in the table below. Similarly, the operation of Insurgentes

(the main BRT artery) has resulted in a 95% reduction in accidents, which represent an additional economic benefit.

28. The reasons for this significant reduction related to the operation of METROBUS are threefold including: (a) improved technologies with better emission controls; (b) fewer stops than previous system, thus reducing major emissions during start-ups; (c) separate bus lanes and reduced generation of airborne pollutants in the area of influence of the corridor. These health benefits would be multiplied accordingly under the proposed program.

29. Currently, more than 65% of Mexico's population lives in urban areas, in which most of the country's economic growth is concentrated and continues to expand. As a case in point, the Mexico City Metropolitan Area (MCMA) now constitutes the largest area source of airborne pollutants and GHGs in the country and it is one of the largest in the Americas. These are produced by the 50,000 industries and 4 million vehicles operated within the MCMA, which results in emissions of GHG and local pollutants, e.g., hydrocarbons, ozone, nitrogen oxides, particulate matter and carbon monoxide. Exposure to these airborne pollutants has serious health and environmental implications[11].

Table 3: Reduction of Exposure to Airborne Pollutants along Insurgentes Corridor

	Transport Modes		
	Microbus	Autobus	Metrobus
Number of runs	36	37	68
Concentrations of:			
Carbon monoxide (ppm)	15.8	11.4	7.5
Particulate matter PM2.5 (µg/m3)	152	129	99
Particulate matter PM10 (µg/m3)	196	202	183
Benzene (ppbv)	10.2	8.9	4.2

Source: INE 2006

30. *Social co-benefits.* BRTs target low and middle income riders. The gains in efficiency (reduced congestion, better use of public space, associated urban renewal) would therefore bring benefits to both passengers and urban dwellers in the area of influence of the systems.

31. Program results indicators are as follows. Cost effectiveness of reductions is estimated at US$30/ton for the entire financing, or about US$6 of CTF resources/ton.

Indicators	Baseline	Investment Program Results
Mexico's carbon intensity reduced	0.6 Mt CO_2e per million US$ of GDP at PPP	Remains at 0.6 arresting anticipated increase
Number of BRT corridors increased	3 in Mexico City and Leon	At lest 20 in Mexico City Metropolitan Area, Guadalajara, Leon, Monterrey, Ciudad Juarez, Mexicali, Puebla and others with a total target population of 30 million.
Estimated annual GHG emissions from the transport sector in target areas decreased	20 Mt CO_2 per year.	Annual emission at 18 Mt CO_2 per year, reflecting a 2 Mt CO_2 reduction per year
BRT ridership increased	300,000 passengers per day	5 million passengers per day
Current BRT adopts low carbon technologies	Articulated standard diesel buses	Articulated advanced hybrid bus technologies

[11] Under the IBRD-funded Formulation of the Third Air Quality Management Plan, an economic assessment of air quality impacts was undertaken. The assessment estimates that obtaining air quality compliance with WHO standards yields health and environmental benefits of approximately US$2 billion per year.

Modal shift from passenger vehicles to BRTs along BRT routes	Baseline	20% from the baseline

32. The additions to a business as usual scenario include:

- The consolidation and acceleration of BRT programs in the target cities, without which the program would be scaled down and delayed over time with significant opportunity costs related to delaying emissions reductions in the fastest growing sector in terms of emissions, as well as delayed health benefits.
- The physical integration and optimization of public transport systems, seeking an optimization of modal shift toward low-carbon modes of transport.
- The introduction of a scrapping program to eliminate the rolling stock displaced by the BRT, which otherwise would just be moved to other areas of the cities involved or other urban areas. This program would cement the emission reductions achieved through the introduction of new vehicles.
- The introduction of hybrid articulated buses, which would further reduce by an estimated 40% the emissions of standard articulated diesel, and which would otherwise not be achieved as these buses represent an additional financial commitment, not justified by current regulations.
- The adoption of a program to reduce congestion through travel management measures geared to maximize modal shift (land zoning, parking lots, access routes for non motorized transport, links to other high capacity modes) that would add to the cost of BRTs and would be undertaken under a business as usual scenario.

3.2 Energy

33. For the energy sector, the draft PECC identifies the following main opportunities and emission reduction potentials: renewable energy (about 16 Mt CO_2/year), energy efficiency in power generation (about 13 Mt CO_2/year), energy efficiency in the residential and services sectors (about 8 Mt CO_2/year), transport (about 7 Mt CO_2/year), the petroleum sector (about 6 Mt CO_2/year), and energy efficiency in industry (about 4 Mt CO_2/year). Whilst the numbers are tentative, they provide a good indication of the relative importance of these various sectors in the national efforts to curb GHG emissions.

34. Financing is a significant barrier to renewable energy and energy efficiency investments due to the following causes: (a) the high initial investment cost of new and more efficient equipment; (b) the lack of incentives and knowledge of the benefits of a shift to more efficient equipment; (c) weak credit and unfamiliar risk profiles of potential clients (e.g., energy users or generators); (d) risk-averse bank lending practices and the banks' apprehension to develop new or unproven business/products lines; (e) the weak collateral value that energy-efficient equipment often has, and the dependence on appropriate operations and management to achieve an appropriate return on the investment; and (f) the lack of relevant expertise and capacity of financial institutions to analyze and appropriately structure energy efficiency deals, which typically results in relatively high transaction costs and high interest rates that discourage potential borrowers even when energy-efficient projects may clearly be cost-effective. All these have resulted in the lack of adequate financial instruments to support renewable energy and energy efficiency projects.

35. The government of Mexico is implementing multiple interventions in the energy sector to address GHG reductions in an integrated manner to improve both energy both supply and demand side management and reduce the associated carbon footprint. On the supply side, significant efforts are being

made to increase renewable energy, including massive development of wind and small hydroelectric power plants. On the demand side, multiple actions are also being developed targeting all segments of society but focusing mainly on electricity consumption activities in the industrial, residential, commercial and public sectors. In many cases it has been recognized that for scaling-up energy efficiency measures, some level of public intervention and support is needed to correct market failures, organize the market and catalyze investment.

3.2.1 Renewable Energy

36. Despite having world class renewable energy resources and the prospect of wind power and other sources achieving economic competitiveness in the short-medium term, the renewable energy sector of Mexico remains relatively untapped. Around 7% of Mexico's primary electricity output comes from renewable energy, which is largely accounted for by large-scale hydropower and unsustainable use of biomass associated with deforestation and forest degradation.

37. *Cumulative emissions savings.* According to studies inputting to the Economics of Climate Change Study, by 2030 renewable energy could result in as much as 72 Mt CO_2e per year of abatement from five main sources: hydropower (both large and small), wind power, geothermal, energy from biomass, and solar. Combining such renewable energy investments with smart grids could result in a further 15 Mt CO_2e abated by 2030. A scaled up CTF renewable energy program could produce cumulated savings of 355 Mt CO_2e (or 18 Mt CO_2e reduced per year in 2030) at an abatement cost of around \$38/t CO_2e (\$39.5/t CO_2e for wind energy and \$31.6/t CO_2e for small hydro projects).

38. *Priority Activities.* It is proposed that CTF resources be utilized to accelerate and scale-up recent commitments towards implementation of a comprehensive national renewable energy program, with CTF and MDB financing being used to prioritize the following activities:

a) Design of policy and regulatory incentives for scaling-up renewable energy investments and commercialization of these technologies in the medium-term.

b) Establishing a financing facility in NAFIN (*Nacional Financiera*), a local infrastructure bank, to leverage and complement the proposed Energy Transition Fund, and support investments for accelerating public and private investment in renewable energy.

c) Provision of financing instruments and capacity-building for developers and local financial intermediaries to develop projects and/or programs for scaling-up private sector investments in renewable electricity, heat and transport fuels.

d) Technical and financial assistance to lower the costs of interconnection associated with increased installed capacity of renewable energy power within the power system.

e) Support to local renewable energy research centers for demonstration of technologies designed to optimize local conditions, i.e. particularly strong wind resources or development of 'smart grids.'

39. *Replication and scalability potential.* The program would build upon and leverage existing renewable energy projects in a more programmatic approach towards scaling-up investments in wind power; geothermal and solar (including solar thermal heating, solar photovoltaics and concentrated solar power). Existing activities underway with support of the GEF would be built upon and maximized in terms of scale-up and replicability and new projects would be supported to demonstrate the impact that financial incentives can have in attracting private investment. Setting up a regional or country wide wind energy initiative, based on practical experiences, would create particular opportunities for replication throughout Central America, including potential for regional interconnection for load-management and most efficient use of installed capacity. There would also be clear opportunities for scaling up throughout other areas in Latin America and the Caribbean. Scaling-up as well as global technology learning benefits

through such scale-effects, so driving down the costs of such investments in the region. A further added benefit of the investment would be assessment of smart grids and potential for scaling these up.

40. *Environmental co-benefits.* The adoption of renewable energy has a range of local and regional air quality benefits, as well as reduced pollution on water supply and through reducing deforestation can enhance local ecosystem services. Relevant studies are underway to assess the environmental impacts of scaling-up wind power.

41. *Social co-benefits.* Developing the Mexican renewable energy industry would help create new sources of employment and increase Mexico's competitiveness in a growing global industry.

42. *Economical co-benefits*. As already seen and quantified in international experiences where a large grid integration of electricity coming from renewable energy sources has taken place, the positive effects of the integration have been reflected on net reductions on electricity consumer prices and avoided costs due to a reduced dependency on price instabilities and supply risks for fossil fuels.

43. Program results indicators are as follows. Cost effectiveness of reductions is estimated at around 0.06 tons CO_2e reduced per CTF dollar invested at a net abatement cost of \$37.9/t CO_2e.[12]

Indicators	Baseline	Investment Program Results
Installed renewable energy capacity increased	85 MW of installed wind capacity (2008)	500 MW of new wind capacity 325 MW of new hydro capacity
Estimated annual GHG emissions from the electricity sector reduced	138 Mt CO_2e per year (2008).	1.8 Mt CO_2e per year (18 Mt in the first 10 years)
Scope for avoided annual GHG emissions from the electricity sector is to be replicated according to the existing potential (5,000MW wind + 3,250MW small-hydro)	138 Mt CO_2e per year (312 Mt CO_2e per year by 2030)	18 Mt CO_2e per year (6% of total projected emissions from the power sector in 2030)

44. The additions to a business as usual scenario include:

- Development of local wind power industry, with local developers and wind manufacturers becoming established, creating hundreds of thousands of new jobs.
- The program will also provide considerable co-benefits of energy security, through diversification away from a high reliance on fossil fuels, and position Mexican industry for becoming a World leader in renewable energy technology development and utilization.

3.2.2 Energy Efficiency

45. Energy intensity (energy use per unit of GDP) in Mexico has been declining over time. Mexico's carbon intensity of generation has declined over the 1990-2005 period, and compares favorably with

[12] Cost-effectiveness factor defined according to the CTF Investment Criteria. CLEAN TECHNOLOGY FUND INVESTMENT CRITERIA FOR PUBLIC SECTOR OPERATIONS, paragraph 12 from January 5, 2009.

respect to other countries. According to the Energy Savings National Commission (CONAE), more than 20% of the national electricity consumption could be reduced through cost-effective energy efficiency measures. Despite recent achievements, there are still substantial opportunities for increasing the energy efficiency of various sectors of the Mexican economy. The GoM is seeking to strengthen this trend by implementing a comprehensive national energy efficiency program in several sectors.

46. Potential energy efficiency interventions include:

- *Cogeneration in the cement, and iron and steel industries.* The estimated potential for co-generation in Mexico's cement and iron and steel industries is about 660 MW and 2,400 MW, respectively. Assuming that by 2030 the cement industry installs 500 MW and the iron and steel industry 2,000 MW, the emission reduction is projected to be 2.1 and 6.1 Mt CO_2e per year, respectively, and at a net cost of -US$38/t CO_2e.
- *Industrial motors energy efficiency program* involves the substitution of standard motors with 90% efficiency motors. Despite the efficient motors being more than twice as expensive than the standard motors, the intervention has net economic benefits, with a mitigation cost of -$35/ton and a mitigation of nearly 1 MtCO_2 per year in 2030.
- *Room air conditioner energy efficiency* entails phasing out of all current stock ACs by 2030. On average, the new ACs will use 30% less electricity than outgoing ones. The annual emissions reduction achieved by 2030 will be about 2.9 Mt CO_2e/year, with a mitigation cost of -$25/t CO_2e.
- *Refrigerator energy efficiency* involves the substitution of refrigerators 10 years or older by new devices compliant to the current standards.
- *Improvement of refrigerator standards* involves improving the current standards for residential refrigerators. This intervention has a cost of US$49/t$CO_2$e and would mitigate more than 4 million tons of CO_2 per year in 2030.
- *Residential CFL lighting program* entails the scaling up of the CFL government program, aiming at substituting 100% of residential light bulbs with CFLs. This intervention would result in about 10 Mt CO_2 emissions per year reduction by 2030 at a net cost -$38/t CO_2.
- *Water pumping energy efficiency in water utilities.* Mexico's water utilities have the potential to reduce electricity consumption by 25%. MEDEC estimates that this reduction would result in annual emissions reduction of 0.5 Mt CO_2e/year by 2030, with a net cost of -$22/t CO_2e.
- *Street lighting efficiency.* This intervention is estimated to result in emissions reduction of 2.5 MtCO_2e/year by 2030, with a net cost of -$32/t CO_2e.
- *Federal building lighting efficiency.* This intervention will result in emissions reduction of 0.32 MtCO_2e/year by 2030, with a net cost of -$32/t$CO_2$e.
- *Air conditioning and lighting efficiency in non-residential buildings*. The intervention assesses the effects of substituting current ACs and light bulbs with state-of-the-art devices.
- *Solar water heater program in homes.* This intervention involves the substitution of Liquified Petroleum Gas and natural gas-fired hot water boilers for solar water heaters. Assuming that by 2030, 2.6 million homes, or about 6.7% of the total homes, have installed solar water heaters, the emission reductions would be about 5 Mt CO_2 per year at a net cost of -$9/t CO_2e.

47. A summary of the end-use energy interventions is given in Table 4:

Table 4: Interventions: Costs and Emission Reduction Potential in 2030

Intervention	Net Benefit of Mitigation (M 2008 US$/t CO2e)	Emission Reduction in 2030 (Mt CO2/year)
Cogeneration in cement industry	$38	2.1
Cogeneration in iron and steel industry	$110	6.1
Industrial motors energy efficiency	$36	30
Room AC efficiency	$25	2.9
Refrigerator efficiency		
Residential CFL Lighting	$38	10.5
Municipal water pumping energy efficiency	$22	0.5
Efficient Lighting in federal buildings	$25	0.3
Street lighting	$32	2.5
Efficient AC in commercial buildings		
Solar water heating	$9	5.0

Source: MEDEC draft report, 2009

48. *Social and environmental co-benefits*. Energy efficiency has a range of global and local and air quality benefits. Air pollution from the energy sector includes not only GHG emissions, but also SO_2, NOx, Hg, and PM emissions; national inventories registered the following annual emissions for 2003 in Mexico: 1.31 ton Hg, 250 kton NOx, 1.557 kton SO_2 and 104.07 kton PM.[13]

49. *Other co-benefits*: These include increased energy security and lower dependence on fuel imports and fuel price volatility, deferred investments in generation capacity, significant savings in electricity subsidies, and lower energy expenditures.

3.2.2.1 Industrial and Commercial Energy Efficiency

50. The industrial sector is the second largest end-user after transport and accounts for about 27% of total end-use energy in Mexico. It is the largest electricity user and accounts for 58% of industrial electricity use attributable to the commercial and services sector, because a number of large non-industrial buildings pay an industrial electricity tariff which is the basis on which the data is collected. Therefore, industrial electricity tends to be overestimated and usage by the commercial and services sectors is underestimated by current electricity statistics of total electricity consumption in Mexico. Over half the industrial energy use is in five main sub-sectors, which also account for 65% of all industrial fuel consumption in particular due to some fuel-intensive industries such as cement, iron and steel, and chemical and petrochemical.

51. Activities include replacing at least 35,000 electric motors in operation for efficient, variable speed motors and the effort would be channeled through companies and private sector financial and other intermediaries (i.e., commercial banks and Sofoles/Sofomes) to overcome financial and non-financial barriers to new technology adoption.

52. The modernization of the Tortilla Industry aims to transform the industry decreasing production costs and end-prices to consumers of a basic consumer product of the Mexican economy. Increasing corn and subsequent Tortilla prices have substantially affected the economy of low income households. The comprehensive approach of the program intends to substitute obsolete and energy intensive equipment through energy efficient appliances and introduction of efficient lighting and solar water heaters in the production facilities.

[13] See http://www.iea.org/textbase/work/2008/iew/Monday/Vijay.pdf

53. *Cumulative emission savings*. The energy savings potential within the productive sector are estimated to be between 15% and 40% of the sector consumption. Achieving such savings will require a substantial scale-up of investment underpinned by policy, regulatory and financing approaches that can transform the market for energy efficiency goods and services. For the transformation of the productive sector alone such costs are estimated in US$ 5.6 billion. Cumulative savings up to 2030 from industry are estimated at 27 Mt CO_2e/year.

54. *Priority activities.* Industrial and commercial energy efficiency interventions include programs that directly or through financial and other intermediaries target not only high emitting industries such as cement, steel, glass and metals but also other sectors involving small and medium size enterprises (SMEs). Activities would include working directly with companies and private sector financial and other intermediaries (i.e., commercial banks and Sofoles/Sofomes) to overcome financial and non-financial barriers to new technology adoption.

55. *Replication and scalability potential:* Many low carbon technologies which are relevant in one high GHG emitting sector (e.g., cogeneration or Waste Heat Recover systems), are also applicable in other high emitting sectors (e.g., glass and metals). Therefore, once the technology is proven and successful in one industry, would be feasible to replicate the approach to technology adoption in other similar industries. In sectors where transformation requires interventions with many small institutions, appropriate public and/or private sector financial institutions would be engaged. NAFIN, the Mexican development bank, is already moving forward with a national energy efficiency program and is designing an initial four to five pilot programs.

56. Program results indicators are to be developed as part of the design of the program, based on emission reduction potentials (as outlined in table 4); reduced GHG emissions from agreed sector and country baselines, as well as co-benefits in terms of energy security, and reduced costs of basic goods and services.

3.2.2.2 Energy Efficient Lighting and Appliances

57. The residential sector accounts for about 18% of total end-use energy in Mexico. The commercial and public sector in Mexico are also important electricity consumers, accounting for over 11% of total electricity use. Lighting, air-conditioning, and home appliances are expected to be the main growth areas of residential electricity demand in Mexico. Several small-scale efforts to increase the penetration of more efficient technologies in these sectors have been implemented in the country. The main lesson learnt through these pilots is that for dramatically scaling-up the market share of efficient technologies some level of public intervention and support is needed to correct market failures, organize the market and catalyze investment.

58. *Priority activities*. SENER is seeking CTF resources to develop a large-scale energy efficiency transformational program leading for efficient lighting (residential, commercial, street and public lighting) and efficient domestic appliances in low income households (refrigerators and air conditioners). Appropriate public and private sector financial institutions would also be engaged to leverage an adequate financial package. The program would result in lower electricity consumption, significant emissions reductions and increased energy security.

59. *Cumulative emissions savings.* On efficient lighting, the CTF program would support the replacement of 1 million mercury vapor lamps with high-pressure sodium vapor lamps in municipal street lighting, improvements in about 6 million lighting devices in commercial and public buildings, and the substitution of about 72 million incandescent bulbs with fluorescent lamps in low income households. On efficient appliances, the program would support the replacement of 1.6 million refrigerators and 250,000 air conditioners older than 10 years. The proposed CTF intervention would target –in average- between 15-30% of the respective market potentials, triggering the transformation of the lighting and domestic

appliances markets in a sustainable and achievable manner. This would help to significantly reduce the carbon intensity of the power sector in Mexico. Before scaling up, the CTF co-financed program is expected to reduce about 4 Mt CO_2e/year through electricity savings in the order of 6,400 GWh per year. Once fully implemented, electricity savings would be in the order of 22,000 GWh per year (which represents about 10% of total electricity use reported in 2007), translating into about 13 Mt CO_2e/year (or accumulated 70 Mt CO_2e in the first 10 years) after replication and scaling-up, also deferring about 5,000 MW additional power generation capacity.

60. *Replication and scalability potential.* Preliminary estimates indicate that there are at least 270 million non-efficient lighting devices countrywide to replace or improve in the residential sector, about 6 million lamps in street lighting, and at least 20 million non-efficient lighting systems in commercial and public buildings, and at least 10 million refrigerators older than 10 years that could potentially be replaced with more efficient units. These proposed CTF interventions would target between 15-30% of the respective estimated market potentials for these sectors. Replication and scaling up would be achieved by leveraging carbon finance and private sector participation under the government's coordination strategy and policy measures. Different delivery alternatives would be considered during the design phase of the program to ensure a successful implementation and market uptake/transformation of these particular sub-sectors.

61. Program results indicators are as follows. Cost effectiveness of reductions is estimated at US$9.3/ton CO_2 for the entire financing, or about $0.71/t CO_2e of CTF resources.

Indicators	Baseline	Investment Program Results
Mexico's carbon intensity reduced	0.6 Mt CO_2e per million US$ of GDP at PPP	Remains at 0.6 arresting anticipated increase
Electricity consumption in the country reduced	230,000 GWh (in 2007)	22,000 GWh per year which represents 10% of the country's current electricity consumption.
Power generation capacity from conventional sources deferred	Baseline	5,000 MW
Estimated annual GHG emissions reduced from the program intervention	138 Mt CO_2e per year emission from electricity sector	13 Mt CO_2e per year (70 Mt CO_2e in the first 10 years)

IV. ENABLING POLICY AND REGULATORY ENVIRONMENT

4.1 Urban Transport

62. The current policy, institutional and regulatory environment is characterized by:

a) *Reorganization of public transport and improvements in mass transit* by enhancing the institutional framework, through the use of appropriate tools for metropolitan integration, building capacity at the municipal and state levels, and gradually increasing the involvement of the GoM in urban transport through the newly created Federal Fund for Infrastructure (FONADIN).

b) *Inter-agency and inter-state coordination* with respect to transport improvements and transport reorganization. The GoM seeks to provide the necessary financial and technical incentives to implement integrated urban transport, land use and air-quality and low GHG strategies, which

will allow for the selection of projects with the greatest rates of return, which would not be implemented with only local funding.

c) *Improvements in the mobility of the poorest.* Urban transport improvements can contribute to poverty reduction both indirectly, through its impact on the city economy, and directly, through its impact on the daily needs and access to basic services for poor people.

d) *Private sector participation to provide appropriate financing mechanisms.* Private sector investment in transport infrastructure, maintenance and operation may reduce the fiscal burden of the public sector and provide additional resources for the modernization of transport in cities. The GoM has set up a framework for private sector investment through regulatory interventions and providing support for competitive tenders for service provision and infrastructure construction concessions and other PPPs.

e) The launching of a financial instrument (FONADIN) to promote investments in infrastructure – including Urban Transport – through the provision of federal subsidies for projects that incorporate private sector participation or have important environmental benefits.

4.2 Energy

63. The energy sector is structured in the following way: There are three key state-owned enterprises which exercise near-monopoly control over the energy industry as a whole: *Petróleos Mexicanos* (PEMEX), the state's oil enterprise, *Comisión Federal de Electricidad* (CFE), and *Luz y Fuerza del Centro* (LyFC). CFE and LyFC are both vertically integrated power companies responsible for generation, transmission and distribution of electricity, with virtual monopoly in their respective areas of service. A number of independent power producers (IPPs) generate and sell power to the utilities, as well as some small auto-suppliers (less than 20 MW). CFE serves most of the country (more than 90%) with the exception of the Federal District and part of the metropolitan area where service is provided by LyFC.

64. SENER is responsible for planning and formulating energy policy, and for approving exploration activities related to natural resources. The Energy Regulatory Commission (*Comisión Reguladora de Energía* – CRE) is responsible for the regulation and oversight of private power generation and gas distribution. The Ministry of Finance approves the electricity tariffs proposed by CFE for retail distribution.

65. *The Energy Sector Program for the period 2007-2012 (PROSENER)* provides a comprehensive policy framework focused on energy security, technical efficiency, environmental sustainability and climate change. Indeed, its policy objectives and specific targets provide the enabling policy framework necessary to advance the country's climate change agenda. In electricity, PROSENER focuses on strategies to (i) balance and diversify primary sources of energy (e.g., lower share of fuel oil and coal based generation from 38 to 30% by 2012 and increase share of renewable source power generation from 2 to 6%); (ii) promote the efficient use and production of energy (e.g., increase energy savings from 21,686 GWh in 2006 to 43,416 by 2012; and (iii) promote reduced energy consumption in the residential sector.

66. Mexico's current system of tariff-based electricity subsidies is among the most complex and largest in the world (US$9 billion in 2006). Today, the system consists of over 112 different billing possibilities for residential consumers. These subsidies have largely been financed by a book-keeping transfer. The federal government essentially reimburses CFE for providing subsidies to its customers by discounting the taxes and dividends (*aprovechamiento*) that CFE would otherwise have to pay the

government. Since 2002, the volume of subsidies has exceeded the notional amount of *aprovechamiento*[14] and has begun to erode CFE's capital base.

67. A recent study of electricity subsidies shows that the under-pricing of electricity to residential consumers in Mexico results in overconsumption and excessive GHG emissions. Average residential electricity prices only cover about 40% of the cost of supply, while agricultural tariffs cover only around 30%. This price distortion reduces the incentive for customers to take energy saving measures.

68. During the last decade average electricity tariffs in Mexico have been held below cost with the aim of maintaining macroeconomic and social stability. For all tariffs, an interagency group comprised of CFE, LyFC, SHCP, SENER, CRE, and CNA (*Comisión Nacional del Agua*) meet regularly and once a year they prepare a tariff proposal for the subsequent year. Tariffs are approved by SHCP and not by the energy sector regulator.

69. The Constitution mandates least-cost procurement of electricity generation sources, and CFE interprets this mandate strictly, which constitutes a barrier for the penetration of cleaner but more expensive technologies.

4.2.1 Renewable Energy

70. On November 28, 2008 a number of energy reform bills were signed into law, including the *Ley para el Aprovechamiento de las Energías Renovables y el Financiamiento de la Transición Energética (*LAERFTE*), calling for* development of a national strategy for promoting renewable energy and energy efficiency, as well as a new Energy Transition Fund ($300m /year for 2009 - 2011 from the federal spending budget).

71. The LAERFTE has commissioned SENER to establish a target for renewable energy capacity and production, and the detailed design of the rules for implementing the Law, including the role of the Energy Transition Fund. The regulator, CRE, will design and establish the regulatory framework for the mentioned law including the calculation of the incentives given to the different renewable energy technologies considering as well the necessary rules regarding capacity and technical conditions for the generation.

72. A number of previous initiatives for reducing barriers to the implementation of renewable energy projects have had limited success so far. These include: the *Interconnection Contract for Renewable Energy* from 2001 to provide ease of access to the grid access for intermittent sources of electricity and, in a later version (2005), to allow for appropriate compensation for capacity availability of renewable energy plants; *Accelerated Depreciation for Environmental Investments* (2005), to allow tax deduction of 100% of the investment cost in the first year and more recently a *Model Contract for Small Grid Connected Solar Energy Systems* (2007) to encourage residential and industrial customers to take advantage of Mexico's tiered electricity tariff system and shave peak hours off of bills. This par could be deleted

4.2.2 Energy Efficiency

73. On November 28 2008, the *Ley para el Aprovechamiento Sustentable de la Energía* was signed into law, establishing the following programs and entities in the area of energy efficiency, including: (a) National Program to promote energy efficiency actions, in which there is a specific mandate to formulate a strategy on efficient lighting; (b) National Commission for Energy Efficiency to promote the adoption of EE measures at various levels of government and among private entities; (c) Advisory Council to back-

[14] 9% of net fixed assets.

up EE programs; and (d) National Information System to promote energy efficiency. All of these efforts are to be led by the Secretariat of Energy (SENER), as the head and highest level authority in the energy sector in Mexico.

74. As with the renewable energy law, a regulatory framework is being developed (scheduled for 2009), which will allow the Law to become fully operational. Importantly, the Law also allows CRE to regulate externalities, which would overcome the barrier to energy efficiency, and renewable energy currently created by the Constitutional mandate for least-cost investment. The Law also has provisions for certification of energy consuming equipment and appliances.

75. The *Energy Savings National Commission* (CONAE) is a governmental organization responsible for the development of a national strategy for energy savings, as well as the efficient and rational use of the energy. CONAE also promotes the use of renewable energy. The *Private Trust Fund for Electricity Savings (*FIDE) was created as a non-profit institution (1990) at initiative of CFE, with the purpose of encouraging electricity conservation in almost all consuming sectors.

V. IMPLEMENTATION POTENTIAL

76. This section addresses the capacity in place to implement the proposed investments, some of the constraints and key risks that could impede implementation. A generic risk for all investments designed to reduce the carbon footprint of Mexico, and indeed of most other countries, is the volatility of oil prices. Generally speaking, an increase in oil prices tends to make a transition to a low-carbon economy more financially attractive. Conversely, the current downward trend in oil prices might make the necessary investments less financially attractive.

77. In terms of oil prices, Mexico's policy has been to maintain prices stable in real terms. Throughout the last decade the level was above prices in the United States and indeed above the international prices that Mexico pays on its imports. With the sharp increase in world oil prices over the past two years, the price of gasoline in Mexico temporarily fell below import prices, thereby causing a negative excise tax. However, with the reversal and the sharp drop in oil prices since mid-2008, domestic gasoline prices have not followed and are currently once again higher than international prices. This policy has been kept in place in part out of inflation stabilization objectives.

78. In a country such as Mexico, where fiscal revenues heavily depend on oil production, the harmful effect of an oil price reduction on investments in renewable energy, energy efficiency and more sustainable urban transport, could potentially be significant. However, Mexico is strongly committed to a progressive climate change policy, as indicated by the important institutional and political developments described in the first section of this Investment Plan. In particular, Mexico's announcement at the 14th Session of the Conference of the Parties to the UNFCCC in December 2008 that it would reduce its GHG emissions by 50% below 2002 levels by 2050 is yet another proof that the country is determined to contribute its share to the global effort on climate change, despite the current reduction in oil prices.

5.1 Urban Transport

79. The Bus Rapid Transit systems (BRTs) are relatively easy to implement when compared to large-scale infrastructure for new highways or underground systems. Scrapping of vehicles is technically feasible. Many large metropolitan areas in developing nations are considering BRT, which could be upgraded to maximize emission reductions. Cities would adopt those cost-effective systems that combine ease of congestion and health benefits with substantial emission reductions.

80. Overall risk for the transport investment is moderate based on the expectation that institutional, regulatory and policy requirements are in place or in process of being adopted in the target cities while the technologies and systems to be deployed have been successfully tested in other countries and/or cities.

However, the implementation capacity poses moderate risk as the program is quite ambitious, and requires coordination with other modes of transportation and operators, but the institutional capacity is limited. The table below summarized the main risks and risk mitigation measures:

Risk	Mitigation	Residual Risk
Policy and regulatory framework	Municipalities will be selected into the program based on their existing policy and regulatory framework and the availability of instruments to promote the adoption of cleaner, safe and efficient transport.	L
Implementation capacity: Limited institutional capacity to manage corridor program expansion Over-ambitious corridor program Coordination with other modes is not effectively achieved	The capacity building component will strengthen the technical, financial and organizational capacity, in order to ensure that project agencies are ready to manage the system's expansion. An advanced financial structuring model will be developed to be used for each corridor and for the system as a whole. Financial sustainability of the corridors will be reviewed through a thorough analysis, including the impact of carbon finance and CTF resources. The World Bank will review the demand estimates, business model and financial results, and agree on an Implementation Program in order to assure that technical capacity and financial resources are available and consistent with an optimized work schedule. The capacity building component will help strengthen local capacities to manage the whole corridor expansion in an integrated manner with other mass transit systems and in coordination with air quality, urban development and transport sector plans.	M
Technology: New bus technology presents operational and maintenance problems	Technologies are not new and no research will be sponsored. The hybrid technology is new to the Mexico urban environment but has been tested elsewhere. The hybrid drives have also been field tested in other cities with similar operational conditions. In addition experiences and lessons learned in other cities with clean bus technologies will be analyzed and integrated.	L
Finance: Lack of resources to implement the corridor program	Loan resources will be complemented with carbon finance, FONADIN, and grant resources will reduce the risk. An adjustment in implementation schedule will reflect available resources including commitments from participating cities.	L
Environmental management: While addressing greenhouse gas emissions, local airborne pollutants and air quality concerns may be ignored	The options to be supported will render both global and local benefits and promote improvements in air quality, while reducing emission of greenhouse gases and air toxics.	L
Development potential: Operators, other stakeholders oppose expansion of the system The experience in Mexico is not used as a basis for replication in other cities	A comprehensive consultation process, initiated at Insurgentes (and ultimately successful) will take place to ensure commitment and ownership by all involved. Dissemination and training actions will be taken to ensure that lessons from Mexico are considered in the development of similar activities in the entire region. Lessons from MDB-financed projects throughout LAC will be used for training to ensure that lessons learned are considered in the development of similar activities in the entire region.	M
Procurement	This has not been an issue in the first phase of the program	L

Risk	Mitigation	Residual Risk
	(Insurgentes Avenue) in Mexico City. The World Bank loan will provide further support where necessary.	
Overall	**Moderate**	

5.2 Renewable Energy

81. There is now a window-of-opportunity for significantly transforming the Mexican power sector through accelerating and scaling-up wind power production in Mexico. This is due to confluence of the recent Laws relating to establishment of targets and policies for renewable energy. At the same time, CRE has been given new powers to enable it to establish a supportive regulatory framework for renewable energy and energy efficiency laws.

82. A number of multilateral and bilateral agencies have engaged with a broad array of Mexican policy, technical, financial and environmental agencies and actors to build consensus on the need for energy sector diversification and the technical assistance and program approaches required to stimulate and sustain long-term renewable energy development. The PERGE program (*Proyecto de Energías Renovables a Gran Escala*) which works on the implementation of pilot renewable energy projects, has generated necessary knowledge and critical mass for scaling up of investment. .

83. GEF funding has been used to support an Action Plan for Removing Barriers to the Full-Scale Implementation of Wind Power in Mexico. Phase I, has been underway since 2004, focusing on revising the regulatory framework, training of decision makers and support for development of local technical capacity through a regional wind technology centre in Oaxaca. GEF also supports the PERGE, which implementation phase began in early 2007. PERGE, which works on the implementation of pilot renewable energy projects, has generated the necessary knowledge and critical mass for scaling up of investment.

84. Carbon finance projects such as *La Venta 2* wind farm in Oaxaca also provide useful lessons of the role that Carbon finance can play in scaling-up wind power generation provided the appropriate policy and regulatory frameworks and incentives are in place.

85. The table below summarized the main risks and risk mitigation measures. Overall risk is moderate taking especially into account the remaining work on regulation of the new Law on Renewable Energy, which will set incentives and objectives for the implementation of new renewable energy capacity in the medium to long term. Nevertheless, as a culmination of efforts of the GoM and its political decision in the field it is expected that long term market certainty will be achieved through the existing legal, economic and technical tools gained through the leading role of the country in the Latin American context.

Risk	Mitigation	Residual Risk
Policy and regulatory framework: An incorrect implementation and regulation of the law could lead to misleading objectives	The recently approved Law on renewable energy indicates strong political will for scaling-up investment in renewable energy, particularly the private sector. IADB technical cooperation with policy and regulatory agencies (notably CRE), as well as the state monopoly, would be prioritized to support the design, development and implementation of appropriate incentives.	L
Implementation	Considerable capacity already exists through institutions as the	L

capacity: Limited human capacity resource and inadequate technology transfer	Instituto de Investigaciones Eléctricas (IIE) and CERTE, regional wind research centre which was established with GEF assistance (limited in time). CTF resources will extend assistance to the centre and guarantee appropriate capacity building activities in a regional context (Central and South America).	
Technology: Extreme wind conditions at Mexican sites and negative experiences up to date show adaptation need of foreign technology design	Wind power development has been tested in Mexico and improvements on design are underway. The program will work with the IIE to ensure appropriate designs and skills are developed. (No concrete risks for small hydroelectric power since it is a proven technology at the regional level)	L
Finance: Lack of incentives for investing Uncertainty in future interconnection infrastructure and its financing	Once the interconnection charges are covered and appropriate policies designed the investment will become commercially viable and private sector driven. However, with the current financial crisis the risk is placed as medium.	M
Environmental management: Uncontrolled and unsustainable development of renewable energy projects degenerating in negative reputation for the sector	A full social, economic and environmental impact assessment is already being conducted for the region with the support of GEF.	L
Development potential: Market uncertainty and long term stability could affect investment	Private sector developers are active, with Mexico being the most representative market in LAC.	L
Procurement: Absence of best practices and technical standards	Competitive bidding would be used to acquire equipment where necessary. Technical assistance will be provided to support the development of the bidding documents using technical specifications based on best international practice.	L
Overall	**Moderate**	

5.3 Energy Efficiency

86. There remains huge potential for energy efficiency improvements in Mexico. After significant improvements in the 1990s, the downward trend in the energy intensity of GDP in Mexico has stalled.

This is primarily due to the rapid increase in electricity consumption, which has grown significantly faster than GDP. Electricity demand in Mexico is expected to grow at 4.8% per annum, slightly above the projected economic growth (3-3.5%). If Mexico were to meet this increasing demand through additional installed capacity (i.e., about 2,276.5 of additional MW each year), annual investments could be over US$ 5.5 billion and, under current conditions, GHG emissions would increase by 6.6 Mt CO_2/year).

87. Given these constraints, Mexico has embarked upon an aggressive program of energy efficiency, which also supports its climate change agenda. The recently announced National Program to promote energy efficiency, alongside the new National Commission for Energy Efficiency, Advisory Council to back up energy efficiency programs; and a National Information System to promote energy efficiency are to be put in place within the next six months.

88. The recently announced National Program to promote energy efficiency, alongside the new National Commission for Energy Efficiency, Advisory Council to back-up energy efficiency programs; and a National Information System to promote energy efficiency are to be put in place within the next 6 months.

89. SENER, CFE, FIDE, CONAE and NAFIN have all accumulated a wealth of practical experience with various types of energy efficiency programs since 1990. As of September 2007, FIDE had completed 25,917 energy diagnoses and concluded 3,899 energy saving projects. As with the renewable energy law, a regulatory framework is being developed, which will allow the Law to become fully operational. The Law also has provisions for certification of energy consuming equipment and appliances.

90. At the same time, experience of other countries and sectors indicate the readiness for private sector activities in provision of financing for energy efficiency services. The proposed programs will include capacity building components and the necessary measures to enhance the relevant policy and regulatory frameworks.

91. Though only the proven technologies would be used, the regulatory and policy requirements are yet to be implemented. In addition, the implementation capacity is limited. Therefore, the overall risk is moderate. The table below summarized the main risks and risk mitigation measures.

Risk	Mitigation	Residual Risk
Policy and regulatory framework: Low level of implementation of measures mandated under the new efficiency law	The capacity building component will provide technical support to the relevant energy agencies in order to develop the additional regulatory and policy measures that are mandated under the new law.	M
Implementation capacity: Limited institutional capacity to coordinate the implementation of the proposed interventions and assess additional potential Limited capacity for scaling up the carbon finance asset generation in a programmatic manner.	Technical, organizational and financial assistance to strengthen the relevant agencies will be provided. These include federal technical agencies and participating municipalities. Additionally, studies will be developed (first 6 months) to further determine additional priority activities for such agencies to be included in an updated Investment Plan. Additional support on carbon finance will be provided to support the development of programmatic CDM to pursue carbon credits that would support scaling up of the interventions. This also entails technical support during the implementation/verification phases.	M

Risk	Mitigation	Residual Risk
Technology: New more efficient technologies present operational and maintenance problems	Only well proven technology would be used. The manufacturing/servicing sectors and distributors will be provided with technical assistance if needed.	L
Finance: Lack of resources to upscale the implementation of the program	The financial crises and global and national economic recession will eventually force the government to revise the budget and adjust prioritization of projects across sectors. Initiatives proposed have been prioritized by the National Development Plan, PECC, ENACC, PROSENER and recently announced Laws. Loan resources will be complemented with carbon finance and private sector participation. Working with private sector banks will build their experience and activities in energy efficiency, and secure sustainability of the financing sector longer term.	M
Environmental management	Technical assistance will be provided to strengthen capacity. Programs will follow approved procedures and annual performance audits will be carried out.	L
Development potential Low penetration of new technologies	Support in designing a phased approach will be provided together with the right incentives and supportive regulatory framework in order to ensure an adequate market uptake of the new technologies.	L
Procurement	Competitive bidding would be used to acquire equipment where necessary. Support will be provided in the development of the bidding documents using technical specifications based on best international practice.	L
Overall	**Moderate**	

VI. FINANCING PLAN AND INSTRUMENTS

92. This investment plan aims at developing an adequate financial package from various available sources, including multilateral, public and private financial institutions as well as carbon finance, to leverage enough resources to achieve the plan's ambitious objective. A cross-cutting issue for Mexico's low-carbon strategy is whether and how carbon finance, through the existing Clean Development Mechanism, as well as future opportunities created through a post-2012 framework, may be used to help finance low carbon investments. Whilst the current uncertainty over the shape of carbon market mechanisms and carbon prices, add significant risks for the carbon revenues in the long term, it is important that Mexico focuses attention on where carbon financing opportunities may exist. The World Bank Carbon Partnership Facility can have a role in mitigating some of these uncertainties when it becomes fully operational as can IFC's existing carbon financing facilities. The IADB is currently considering the potential for scaling up activities for working with large industries and PEMEX on programmatic CDM, or for piloting a sectoral approach.

93. It must be noted that carbon revenues, if obtained, would only be made available to the project annually, starting after the first year of project implementation, and only once actual GHG emission reductions have been measured and verified (huge verification bottlenecks are currently delaying annual payments and affecting the financing structure of large scale transactions). These risks mean that project

developers may, and often do, discount carbon revenues when making investment decisions. As a result CTF funding, structured appropriately, would still be required for projects that are expected to receive carbon revenues, both in situations when (i) carbon revenues are not sufficient to make the project feasible and (ii) when the risks of receiving such revenues is perceived to be excessively high so as to prevent a project from taking place.

94. The table below summarizes the investment needs and proposed allocations across the various sources of financing (in US$ million). It must be noted that these are notional amounts, revisable according to Government plans.

Financing Source	Urban Transport IBRD	Renewable Energy IDB	Energy Efficiency IDB	Lighting and Appliances Efficiency IBRD	Private Sector Energy IFC	TOTAL
	Annex 1	Annex 2	Annex 3	Annex 4	Annex 5	
CTF	200	125	75	50	50	**500**
GoM	750	600	25	50		**1,425**
GEF	6					**6**
CCIG	1					**1**
IBRD loans	600			400		**1,000**
IADB loans	150	300	50			**500**
IADB grant		10	1.5			**11.5**
IFC					135	**135**
Other		300	10		365	**675**
Carbon finance	50		100	150		**300**
Other private sector	643	850	150			**1,643**
TOTAL	**2,400**	**2,185**	**412**	**650**	**550**	**6,197**

ANNEX 1: URBAN TRANSPORT PROGRAM (IBRD)

Problem Statement

1. The transport sector represents 18% of the Mexico's GHG emissions. Mexico's transport emissions increased by 27% between 1990 and 2005 and now account for about 2% of the global transport sector's emissions and is currently increasing at a better than 2% per year. Growing urbanization in the country, an increasing middle class and demand for goods and services in urban settings is resulting in growing motorization rates. Unless changes in urban transport modal share is affected, this will result in a continuous increase in emissions of GHG and air toxics of the sector with the combined negative effects on air quality, productivity and congested public space. Without a concerted effort from both public and private sectors that maximizes a modal shift toward mass transport systems, and fuel efficient vehicles, the business-as-usual scenario in the transport sector will see a rapid increase in Mexico's carbon footprint.

2. The government's effort to address climate change issues in transport has led to the formulation of citywide climate change strategies in selected urban areas, the restructuring of regulatory and business structure frameworks for surface transport, and the implementation of the first Bus Rapid Transit (BRT) System demonstration projects in Mexico City and Leon. A major challenge for Mexico is to accelerate the modal shift towards energy-efficient, low-carbon mass transport systems, in order to change the transport sector's carbon path, and thereby the overall footprint of the Mexican economy by 2050.

Proposed Transformation

3. The transformational modal shift toward public transport systems is proposed to be applied in three stages, starting with large metropolitan areas with a significant potential for reductions and eventually applied to all urban areas over 0.75 million inhabitants. If similar innovations are deployed nationally by 2040, the carbon footprint of the country's transport system would remain at the 2007 levels. Even more important, the induced changes in infrastructure, equipment and behavior would lock these and additional savings for the long term.

4. The proposed CTF co-financed program seeks a significant reduction in emissions from the urban transport sector in cities that are ready to engage in the adoption of transformational measures and are among the largest GHG emitters in the country (Guadalajara, Monterrey, Puebla, Leon, Mexico City Metropolitan Area), as well as others (Chihuahua, Mexicali). A comprehensive and systemic approach to urban mobility is proposed. through the deployment of 20 BRTs, light rails (including one zero-carbon light rail system) and similarly efficient transport modes, further enhanced through the application of low carbon drive systems (such as hybrid, articulated, high capacity vehicles), effective 100% scrapping of displaced rolling stock, and implementation of transport integration and transfer systems that promote harmonized urban development, climate and transport policies. The result would be GHG emissions savings of about 2 million tons of CO_2 per year.

5. In particular, the proposed CTF co-financed investments will include:

   a. *Modal shift to low carbon alternatives.* The program will support alternatives that would significantly reduce the carbon signal from the transport sector in the participating cities. These alternatives include the development or accelerated expansion of BRT systems. BRT systems will be developed as part of an integral strategy linked to urban development options, and air quality goals that would maximize the gains in carbon efficiency and improve the efficiency and safety of transport operations. This will also include measures to ease congestion, scrap inefficient vehicles, link to other low carbon or non-motorized transport options, urban zoning tied to improvements in access to public space and others that promote modal shift. The project will finance the infrastructure and support scrapping and modal shift

measures. The project will benefit from the pioneering experience of the World Bank in Mexico City, Bogota, and Lima, facilitating its expansion and replication.

b. *Promotion of low carbon bus technologies*. Field tests supported by the World Bank have demonstrated the viability of low carbon bus technologies (hybrid diesel electric and CNG electric) under local conditions. Hybrid bus technologies can deliver substantial reductions in GHG emissions, while lowering emission of local criteria pollutants. The project will support part of the incremental cost in comparison to the standard technology buses thus making it possible to initiate operation at a commercial scale and providing an experience of global value while reducing its cost.

c. *Capacity Building.* This activity will help expand local capacities to manage project activities, in consonance with the needs to cope with a growing transport demand in the MCMA. The component will focus on business, financial, operational, administrative, procurement, environmental, infrastructure, safeguards, regulatory, institutional capacity building for key agencies involved in transport. It will also provide support for the development of a rational framework to address overarching urban transport issues in the metropolitan areas in order to maximize cost-effectiveness for the institutional and financial resources allocated to the sector. The project will also support capacity building and training to ensure a sustainable operation of hybrid bus technologies.

6. The lessons learned from this experience could be replicated by a wider effort both by public and private sectors resulting in the implementation of about 100 BRTs and up to 5 zero carbon light rail or metro lines by 2020. The ultimate goal by 2030 is the country wide expansion of this program. It is estimated that a national BRT program over time, could achieve a share of 30% of daily trips in major urban areas (population over one million), with a ridership eventually exceeding 20 million passengers per day, which could lead to an overall reduction of 20% in the carbon footprint of the transport sector. This, if achieved, and in absence of other measures, could result in a reduction of 3-4% of the national carbon footprint.

Implementation Readiness

7. BRT systems are relatively easy to implement when compared to large-scale infrastructure for new highways or underground systems. Scrapping of vehicles is technically feasible. Many large metropolitan areas in developing nations are considering BRT, which could be upgraded to maximize emission reductions. Cities would adopt those cost-effective systems that combine ease of congestion and health benefits with substantial emission reductions. The successful 10 year partnership between Mexico City and the World Bank on the issues of transport, air quality, and climate change resulted in significant achievements[15] that constitute a solid platform for the expansion and replication of modal shift measures.

Rationale for CTF Financing

8. Low-carbon BRT systems face a number of barriers:

a. City-wide BRT, while typically cheaper than investments in new highways or underground systems, requires massive public sector investment which is normally not readily available

[15] The initiatives supported by the World Bank were instrumental in causing a reform of the policy framework for the city's transport sector that includes: a) the formulation of a city-wide climate change strategy; b) the restructuring of the regulatory and business structure framework for surface transport in the city; and with carbon finance support in c) the generation of data and experience on the operation of maintenance of a BRT under actual operating conditions and for the deployment of advanced bus technologies.

from municipal or regional authorities facing a multitude of demands for public funds in education, health and other sectors;

b. Adoption of low-carbon technologies (hybrid drives) is currently 30-40% more capital expensive than regular drives, even though their use would typically reduce maintenance expenditures by a similar margin. The additional upfront capital costs thus constitute a significant financial barrier;

c. Scrapping programs are also capital intensive, involving the purchase of many old vehicles and large transaction costs;

d. Modal shift measures, while representing significant reductions in carbon intensity over the long run, also face strong institutional and political economy barriers, requiring fiscal measures that may not prove popular in the absence of financial and regulatory incentives;

e. Harmonization of sector plans and policies in urban development, air quality planning, transport planning and climate change, requires an additional effort that will not be undertaken unless there is a strong program that coalesces these different sectors toward common goals.

9. The availability of low-cost financing would facilitate decisions to adopt low-carbon BRT and reduce the initial financial barriers. Blending CTF resources with IBRD and other financing sources would make available investment capital in infrastructure and rolling stock, which may otherwise not be readily available, or facilitate the speed of adoption and scale-up of city-wide BRT. The low-cost financing would be instrumental in decisions taken to adopt advanced (hybrid drive) systems, and scrapping programs, internalizing some of the climate benefits that are not typically rewarded by the financial markets.

Financing Plan

10. The financing for the first phase of ten years of the program is shown in the table below:

Source	Local	Foreign	Total
GoM	750		750
IBRD *		600	600
IDB *		150	150
Carbon Finance		50	50
CCIG		1	1
GEF		6	6
CTF (IBRD)		200	200
Private Sector	250	393	643
Total	1,000	1,400	2,400

* Notional amounts, revisable according to Government plans

Program Preparation Timetable

11. The project is expected to be prepared along the following timeframe:

Milestones	Dates
Government concept approval/ Bank concept review	April 2008
Project preparation	April 2008 – February 2009
Operations Committee	February 2009
Appraisal/ Negotiations	February 2009 – March 2009
Approval	March 2009
Project Completion	June 2013

ANNEX 2: RENEWABLE ENERGY PROGRAM (IADB)

Problem Statement

1. Mexico's energy matrix is characterized by a high dependence on fossil fuels, resulting in a very high carbon emission factor of 0.6 t CO_2e/MWh. Mexico is endowed with world-class renewable energy resources, utilization of which offers the prospect of developing a commercially viable renewable energy industry in medium to longer-term. Despite the high renewable resource potential, and associated co-benefits of increased energy security and economic competitiveness in green technologies, the Mexican renewable energy sector remains relatively untapped[16]. Lack of policy and regulatory incentives, high entry costs for grid access and inappropriate financing options, are considerable barriers to investment.

Proposed Transformation

2. Concessional finance through the CTF will leverage IDB loans, grants and existing infrastructure financing instruments, in support of an identified pipeline of projects covering the most mature renewable energy and energy efficiency technologies and associated infrastructure. The activities identified in the program will support Mexico's existing objectives and priorities in the energy sector for 2012 (PECC) as well as tangibly demonstrating the commercial viability of renewable energy, and so establishing the basis for a scaled-up approach for the medium and longer-term (2020-2050).

3. The learning-by-doing approach will build firsthand understanding of what is necessary to realize the estimated 72 Mt CO_2e/year abatement potential from renewable energy in Mexico by 2030. As institutional and organizational learning is realized, confidence in the renewable energy sector will develop, working to transform Mexico's energy sector onto a low carbon growth path.

4. The program will also transform how the IDB assists countries with their national mitigation actions by working to mainstream low carbon objectives within existing IDB lending instruments, and promoting a public-private collaborative approach, including leveraging and supporting a coherent approach with CTF resources allocated in annexes 2 and 3.

5. Priority Investments and projects will include:

   a) Establishing a financing facility in a local infrastructure bank (e.g. NAFIN), to leverage the proposed Energy Transition Fund, and support public and private sector investments to demonstrate commercial viability of Renewable Energy projects. The proposed fund based on CTF resources will aim at following projects:

      i. Provision of a guarantee and financial facility for large-scale wind power projects. The first pilot projects under this scheme comprise a total capacity of 500 MW (200 MW+300 MW) in the region of Oaxaca. The operation of the projects over their lifetime will deliver reductions of around 18.4 Mt CO_2e or 0.92 Mt CO_2e per year and cost-effectiveness factor of nearly 0.04 tons CO_2e reduced per CTF dollar invested. Scaling up of the facility to 5,000 MW will deliver reductions of around 184 Mt CO_2 over lifetime of projects, at an abatement cost of US$39.5/t CO_2.

      ii. Leveraging investment for development of an small-hydropower project pipeline, which SENER has already identified. It is intended under CTF co-financing to

[16] Whilst around 7% of Mexico's primary electricity output comes from renewable energy, this is largely accounted for by large-scale hydropower and unsustainable use of biomass.

implement at least 10% of the existing pipeline. The operation of the projects over their lifetime will deliver reductions of around 18.4 Mt CO_2e or 0.92 Mt CO_2e per year and a cost-effectiveness factor of nearly 0.15 tons CO_2e reduced per CTF dollar invested. An identified potential of 3250MW in locations with a capacity of less than 10 MW will deliver reductions of around 170.8 Mt CO_2 over the lifetime of the projects, at a cost of US$31.6/t CO_2e.

iii. Technical assistance to SENER and CRE on the design of policy and regulatory incentives necessary to scale-up renewable energy investments and commercialization of these technologies in the medium-term.

b) Undertaking a comprehensive assessment of opportunities for attracting carbon finance for the renewable energy and energy efficiency sector, in the short-term through a programmatic CDM, and medium and longer-term opportunities, for example sectoral approaches, as guided by a post-2012 framework. Raise awareness, and provide training, to build the capacity of public and private sector financing agencies and intermediaries on opportunities presented by a future carbon market.

c) Support to local renewable energy research centers for demonstration of technologies designed to optimize local conditions, i.e. particularly strong wind resources or development of smart-grids.

d) Leveraging IDB loan/guarantee support to the private sector to facilitate implementation of RE projects, particularly in wind and solar. IDB private sector group will endeavour to collaborate with IFC, as appropriate, to ensure effective use of CTF resources.

Implementation Readiness

6. SENER has now been commissioned to establish targets for electricity production and installed capacity from renewable energy sources and for the formulation and implementation in the medium and long-term of the Special Program for Renewable Energy Utilization as well as the rules governing the Energy Transition Fund (approximately US$300 million/year). In addition, the regulator, CRE has been given new powers and tasked with designing and establishing regulatory framework and rules of the LAERFTE, including the calculation of incentives to be provided to different renewable energy technologies in line with capacity and technical characteristics.

7. The IDB recently approved a Programmatic Policy-based Loan on climate change, with a policy matrix focused on the institutional and regulatory framework for strengthening national and state agendas on mitigation and adaptation. This includes over US$5million in technical co-operation to support relevant aspects of the PECC, including technical cooperation assistance to NAFIN for financing of studies in renewable energy and energy efficiency.

8. The program would build upon existing renewable energy studies and pilot projects supported by various bilateral and multilateral agencies, including the current GEF pilot project, with additional features as having the ability to leverage public and private sector financing of the IDB (and other development agencies and financial institutions) in support of a scaled-up and programmatic approach for implementing a comprehensive national renewable energy strategy and related programs. New IDB/SECCI funds to provide grants for Investment and Technology Innovation will be leveraged alongside existing financing instruments, including leverage of the recently announced Banobras CCLIP for infrastructure development.

Rationale for CTF Financing

9. Channeling CTF funds through a local financial intermediary will build capacity and experience of appropriate financing tools and mechanisms for accelerating and scaling-up low carbon investments, and demonstrate feasible financing options that are broader scope than current assistance tools (GEF). Secondly, developing the fund in early 2009 will provide a viable model for the effective implementation of the Energy Transition Fund announced in the recently approved LAERFTE.

10. Exacerbated by the financial crisis, CTF financing for private sector RE projects is necessary to incentivize private developers to enter the wind and solar sectors. IDB's private sector group has been in discussion with several private developers that are interested in investing in wind and solar but that require appropriate risk incentives.

11. In addition to transforming Mexico's renewable energy industry, particular opportunities exist for sharing lessons-learnt and replication throughout Central America, including potential for regional interconnection to maximize load-management and efficient use of installed wind capacity and other renewable resources regionally. Similarly, the scale-effects of the program will allow technology learning benefits to be realized working to drive down the costs of wind energy investment globally. Developing the Mexican renewable energy industry would lead to job creation and new export opportunities and enhanced competiveness of Mexico within a global low carbon economy.

Financing Plan

12. The financing for the first phase of four years is shown in the table below:

Source	Local	Foreign	Total
GoM (Energy Transition Fund)	600		600
IDB		300	300
Bilateral development assistance (e.g.KfW)		300	300
Carbon Finance		TBD	
IDB grant		10	10
CTF		125	125
Private Sector		850	850
Total	600	1,585	2,185

Program Preparation Timetable

13. The project is expected to be prepared along the following timeframe:

Milestones	Dates
Government concepts approval/ Bank concepts review	March 2009
Project preparations	March – September 2009
Appraisal/ Negotiations	October – November 2009
Approvals	December 2009
Projects Completion	June 2013

ANNEX 3: ENERGY EFFICIENCY PROGRAM (IADB)

Problem Statement

1. Electricity demand in Mexico is expected to grow at 4.8% per annum, well above the projected economic growth (3-3.5%). If Mexico were to meet this increasing demand through additional installed capacity (i.e., about 2,276.517 of additional MW each year), annual investments could be over US$5.5 billion resulting in increased GHG emissions of over 6.6 Mt CO_2e.

2. The industrial sector is the second largest end-user after transport and accounts for about 27% of total end-use energy in Mexico. With residential and commercial sectors together accounting for around 20% of total energy end use (source SIE-SENER 2007). Energy efficiency measures may provide win-win solutions in terms of economic savings, as well as benefits for the climate. Delivering these benefits requires action for overcoming a number of financial and non-financial barriers to energy efficiency across a range of sectors.

Proposed Transformation

3. The IDB group will work with relevant Government Ministries and agencies; industry; financial and other intermediaries; the private sector and consumer groups towards the detailed design and implementation of policy, regulatory and financing approaches to realize the objectives of the Programa Nacional de Cambio Climatico and relevant laws. Utilizing CTF resources in such a programmatic way for priority interventions will foster an integrated approach, resulting in most effective use of public sector resources to effectively accelerate and scale-up private sector investment in EE, including both existing and future opportunities offered by the energy efficiency and carbon markets.

4. The program would help decarbonize key sectors of the Mexican economy as well as address the country's energy security needs, while lowering prices (in a relative sense) through avoided incremental investments and lowering transfers from the Treasury to the sector in the form of subsidies. This will improve Mexico's competitiveness considering that electricity is a key input that substantially affects operating costs and thus productivity.

5. A proposed phase II of the FIDE-IDB Energy Efficiency Market Transformation Program, is identified in the "Programa Nacional de Cambio Climatico" (PECC), which calls for a 5-fold increase in energy savings achieved through FIDE actions compared to the previous goals (up to 2007), and focus on the following sectors:

- Residential sector (low/medium income housing in hot climate): efficient air conditioning systems, thermal insulation[18].
- Industrial sector: replacement of old electric motors.
- Municipalities: replacement of old electric motors.

6. This is expected lead to savings of 8,100 GWh/year, 685 MW avoided new generation capacity, and reduction in emissions of 5.4 Mt CO_2e per year and so over 50 Mt CO_2e over 10 years.

7. Program for the modernization of the Tortilla Industry. The program aims to transform the industry decreasing production costs and end-prices to consumers of a basic consumer product of the Mexican economy. The comprehensive approach intends to substitute obsolete and energy intensive equipment through energy efficient appliances (through the "Sello FIDE" the national energy efficiency

[17] Average for the period 2007-2016

[18] As different EE programs in the housing sector exist additional care would be taken in the implementation phase in order not to produce overlapping between activities.

norm) and introduction of solar water heaters in the production chain. CTF funds will be used for scaling up the existing pilot program with a second enhanced pilot which will be implemented in 5 States covering estimated 800 beneficiaries (*tortillerias)*. A total potential of 63,000 *tortillerias* is envisioned with estimated energy reductions in the order of 15-20% of electricity and 30% of gas consumption, with the consequent reduction in GHG emissions.

8. Working with the private sector, financial and other intermediaries, a CTF-IDB private sector group financing program will be designed to address financial and non-financial barriers for energy efficiency investments in housing and building construction and with small and medium size enterprises in the commercial and services sectors.

Implementation Readiness

9. The IDB has successful experience of working with the Comisión Federal de Electricidad (CFE) and FIDE, in conjunction with *Nacional Financiera* (NAFIN), on a US$46.8 million program (FIDE Phase I), which resulted in cumulative savings up until December 2004 of 5,274 GWh in electricity consumption and 270 MW in displaced power demand, and an environmental benefit for the reduction in emissions of 3.8 Mt CO_2e.

10. Despite these relative achievements, there are still substantial opportunities for increasing the energy efficiency of various sectors of the Mexican economy. The energy savings potential within the productive sector are estimated to be between 15% and 40% of the sector consumption. Achieving such savings will require a substantial scaling-up of investment underpinned by policy, regulatory and financing approaches that can transform the market for energy efficiency goods and services. For the transformation of the productive sector alone such costs are estimated in US$ 5.6 billion just in the productive sector.

11. The proposed program targets multiple actors impacting GHG generation in an expansive fashion, gaining synergies among different individual classes of users and with different levels of income. For the industrial sector, the program envisions replacing at least 35.000 electric motors with high efficiency, variable speed motors that cold reduce power consumption up to 50%, depending on the application. Intermediate targets for 2009 are 8,750; 2010: 12,250; and 2011: 14,000. To achieve these results, three instruments will be used: (i) financing the investment in new, efficient motors through FIDE and commercial Banks by strengthening NAFIN's capacity to provide guarantees and co-financing; (ii) together with manufactures and distributors, the promotion of the retirement and disposition of inefficient motors.

12. Efficient houses in hot climates: the objective of the program is to make 30,000 existing and new houses in hot climates more energy efficient by replacing inefficient equipment and upgrading the house envelope. Intermediate targets for 2009 are 7,500; 2010: 10,500; and 2011: 12,000). This includes the installation of thermally insulated roofs and walls, and double-glass pane windows by specialized companies and the replacement of air conditioners and refrigerators. For new housing developments, the developers will be responsible for selling these houses. Financing will be available from two sources: for low income populations through FIDE loans or FIDE guaranteed- commercial banks loans; and (ii) the promotion of the program to housing financing entities; both public and private. This activity includes evaluation and monitoring of traditional and innovative financing and diffusion mechanisms.

13. The Tortilla Industry Program comprises an integral model with the Secretary of Economy (SE), NAFIN and FIDE as the executing institutions. It includes technical assistance and capacity building in the enterprises and different credit and financing schemes. The experience gained through the first pilot will assure an effective implementation of the wider intended pilot in five Mexican states.

Rationale for CTF Financing

14. Large-scale energy efficiency demand side measures face a number of barriers:

a) Efficient appliances, while typically render significant electricity savings in relative short periods of time, require high initial investments. So far, investment in more efficient technologies remains a non-commercial activity in Mexico given the high upfront investment cost and technical constraints.

b) The lack of aligned incentives and awareness to shift to more efficient equipment also pose significant barriers to a large-scale adoption of more efficient equipment.

c) Replacement programs for electric motors in a large number of customers involves large transaction costs that need to be managed effectively.

d) Market transformation as such, while represents significant reductions in carbon intensity and economic savings over the medium and long-term is constrained by various financial and non-financial barriers that require targeted interventions, coupled with supportive financial and regulatory incentives for execution.

e) Without financial benefits and incentives provided by the CTF program, consumers would not choose to buy more efficient equipment and devices unless the cost of new energy efficient equipment is equal or less than a cost of conventional equipment. The CTF program removes the barrier of affording the new and efficient equipment through the line of soft financing, ensures that the old equipment is scrapped and assures proper monitoring system.

Financing Plan

15. The financing for the first four years of the program is shown in the table below:

Source	Local	Foreign	Total
GoM	25		25
IDB Group (IDB, IIC, MIF)		50	50
IDB Grant		1.5	1.5
Carbon Finance		100	100
CTF		75	75
Private Sector		150	150
Other		10	10
Total	25	387	412

16. Technical cooperation programs will be developed to assist the GoM address the institutional and organizational barriers observed.

17. Financing for the mentioned EE activities could also be channeled through the CTF fund proposed on Annex 1, since the fund is complementary to the Energy Transition Fund from the GoM. The Energy Transition Fund supports all relevant activities in sustainable energy, including the Energy Efficiency sector.

Program Preparation Timetable

18. The project is expected to be prepared along the following timeframe:

Milestones	Dates
Government concepts approval/ Bank concepts review	March 2009
Project preparations	March – September 2009
Appraisal/ Negotiations	October – November 2009
Approvals	December 2009
Projects Completion	June 2013

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ANNEX 4: LIGHTING AND APPLIANCES EFFICIENCY PROGRAM (IBRD)

Problem Statement

1. Electricity demand in Mexico is expected to grow at 4.8% per annum, slightly above the projected economic growth (3-3.5%). If Mexico were to meet this increasing demand through additional installed capacity (i.e., about 2,276.519 of additional MW each year), annual investments could be over US$ 5.5 billion and, under current conditions, GHG emissions would increase by 6.6 Mt CO_2/year). Given these constraints, Mexico has embarked upon an aggressive program of energy efficiency, which also supports its climate change agenda.

2. The residential sector accounts for about 18 percent of total end-use energy in Mexico. The commercial and public sector in Mexico are also important electricity consumers, accounting for over 11 percent of total electricity use. Lighting, air-conditioning, and home appliances are expected to be the main growth areas of residential electricity demand in Mexico.

3. The World Bank has been supporting pilot efforts in Mexico aiming at increasing the penetration of more efficient technologies in these sectors. The main lesson learnt is that for scaling-up dramatically the market share of efficient technologies, some level of public intervention and support is needed to correct market failures, organize the market and catalyze investment.

Proposed Transformation

4. On November 28 2008, the *Ley para el Aprovechamiento Sustentable de la Energía* (Energy Efficiency Law) entered into force establishing the following programs and entities in the area of energy efficiency (EE): (a) National Program to promote energy efficiency actions, in which there is a specific mandate to formulate a strategy towards efficient lighting; (b) National Commission for Energy Efficiency to promote the adoption of EE measures at various levels of government and among private entities; (c) Advisory Council to back-up EE programs; and (d) National Information System to promote energy efficiency. All of these efforts are to be led by the Secretariat of Energy (SENER), as the head and highest level authority in the energy sector in Mexico.

5. The proposed CTF co-financed program would support SENER in the design and implementation of energy efficiency interventions in accordance to the above-referenced Law. Among a set of potential energy efficiency activities, given its high impact and readiness stage, SENER has prioritized the development of a large-scale energy efficiency transformational program leading for efficient lighting (street and public lighting, as well as residential, commercial and industrial) and efficient domestic appliances in low income households (refrigerators and air conditioners). The program would help to reduce the growth in electricity consumption in Mexico by (i) accelerating the increase in market share of more efficient lighting systems in residential, commercial, and industrials uses, as well as in public buildings and street lighting through a large-scale nationwide program, and (ii) by replacing old (more than 10 years) and inefficient domestic refrigerators and air conditioners with more efficient ones.

6. The CTF program would support (i) the replacement of 1 million mercury vapor lamps with high-pressure sodium vapor lamps in municipal street lighting, (ii) improvements in about 6 million lighting devices in commercial and public buildings, (iii) the substitution of about 72 million incandescent bulbs with fluorescent lamps in low income households, and (iv) the replacement of 1.6 million refrigerators and 250,000 air conditioners older than 10 years. On average, the proposed CTF intervention would target between 15-30% of the respective market potentials. This level of market change has been preliminary

[19] Average for the period 2007-2016.

estimated by SENER as a significant threshold to trigger the transformation of the lighting and domestic appliances (L&DA) markets in a sustainable and achievable manner, provided the right financial package is put in place.

7. This program would help to significantly reduce the carbon intensity of the power sector end-use in Mexico. Before scaling up, the CTF co-financed program is expected to reduce about 4 Mt CO_2e/year through electricity savings in the order of 6,400 GWh per year. Once fully implemented, electricity savings would be in the order of 22,000 GWh per year (which represents about 10% of the country's electricity use reported for 2007), translating into about 13 Mt CO_2e/year (or accumulated 70 Mt CO_2e in the first 10 years), after replication and scaling-up, also deferring about 5,000 MW additional power generation capacity.

8. Investments would include:

a) *Acquisition of devices/appliances*: The program would provide dramatic upfront investments needed for large-scale purchases, in order to bring down upfront costs to consumers, and thus create a massive and sustained shift in the Mexican markets.

b) *Policy tools*: Investments will be supported with the development of policy tools to ensure sustainability of the market transformation. These include *inter alia* (i) the normalization of standards for efficient L&DA, (ii) regulatory measures to prevent imports of second-hand inefficient domestic appliances, and (iii) the prohibition of manufacturing and imports of inefficient L&DA once the program is completed.

c) *Environmental management:* Recycling facilities for lightning systems as well as scrapping centers for refrigerators and ACs would be designed and installed.

d) *Capacity building*: These include *inter alia* (i) creation of facilities for locally testing new appliances; (ii) support to local manufacturers and distributors' to shift to new technologies; (iii) development of program monitoring systems; (iv) development of information systems on EE; and (v) support to customs offices to prevent illegal traffic of inefficient L&DA.

e) *Awareness campaigns*: Awareness and promotion campaigns on energy efficiency new technologies and uses are also key factors of success.

9. This proposal aims at developing an adequate financial package from various available sources, including World Bank and public and private financial institutions as well as carbon finance, to leverage enough resources to achieve the program's ambitious objective. Special attention would be given to avoid double counting with any existing carbon finance project/program in these sectors.

Implementation Readiness

10. The proposed CTF program is part of the ongoing dialogue with SENER and the explicit request from SENER for World Bank support for the design and implementation of energy efficiency interventions, in accordance to the recently approved Energy Efficiency Law. Given its high impact and readiness, SENER is seeking CTF resources blended with government funding, IBRD lending and carbon finance to develop a large-scale energy efficiency transformational program leading for efficient lighting (residential, commercial, street and public lighting) and efficient domestic appliances (refrigerators and air conditioners). SENER, as Head of the Energy Sector in the country, would lead this program and would coordinate the execution of its various components with the relevant energy agencies, as well as with SEDESOL (Secretariat of Social Development), SEMARNAT (Secretariat of Environment and Natural Resources), CONAE (National Commission for Efficient Energy Use), CFE (Federal Commission of Electricity), FIDE (Trust Fund for Energy Savings), and other strategic partners including public and private institutions and Banks.

11. The successful partnership between the government of Mexico and the World Bank in cutting-edge mitigation activities through innovative financing and technical schemes in the energy sector, is the development of a solid platform for expanding into a large scale transformational program, such as the one proposed. Regarding the development status of the proposed technologies, these are commercially available and there is adequate technical capacity in Mexico to ensure a successful implementation of the program.

Rationale for CTF Financing

12. The proposed large-scale transformational program faces a number of barriers, *inter alia*:

Information Barriers:

- *Energy Market Information:* There is a lack of systemic and fully reliable market information available on the potential of energy efficiency initiatives within the Mexican economy.
- *Lack of awareness on behalf of banks:* Lenders are unfamiliar with energy efficiency technologies and require technical support to appraise and manage loans for efficiency projects.
- *Scale of information dissemination:* As a large country with dispersed population, the task of disseminating information about energy efficiency is huge.
- *Low priority of energy efficiency investments:* Energy efficiency investments are often undervalued given the lack of information about its benefits.

Financial Barriers:

- *High upfront investments*: Efficient L&DA, while typically render significant electricity savings in relative short periods of time, still require high initial investments which are not readily available by lower income consumers. So far, investment in more efficient technologies remains a non-commercial activity in Mexico given the high upfront investment cost and technical constraints. Without financial benefits and incentives provided by the CTF's concessional financing for the program, end-users covered under the program would not choose to buy more efficient L&DA unless the cost is equal or less than the cost of conventional equipment.
- *Ageing equipment stock in municipalities and public offices:* Capital restraints in municipalities and public agencies reduce potential to replace large stock of inefficient street and office lighting systems.
- *Limitations in bank appraisal methods:* Lenders lack capacity to measure financial feasibility of efficiency projects by analyzing how increased productivity and energy savings affect cash flow.
- *Environmental Management:* To ensure an environmentally sound and socially accepted market transformation of these sectors, the program would ensure that scrapping programs for domestic appliances and recycling programs for lighting devices are developed and in place. The implementation of such programs is also capital intensive, involving the recovery, handling and recycling/disposal of old appliances, with large transaction costs.

Other barriers

- A market transformation such as the one proposed also faces strong institutional and organizational barriers requiring strong coordination and hard implementation measures that would not prove effective in the absence of financial and regulatory incentives for the executing agencies.

13. Concessional financing through appropriately designed instruments is necessary to help buy-down high up-front capital costs in markets where technologies exhibit cost effectiveness over the lifetime of the investment. Specific approaches need to be structured to ensure lower income groups can benefit from such programs. Experience has demonstrated that information and awareness-raising are important, yet on its own, it may be insufficient, and specific incentives and financing products are necessary to stimulate market transformation. Decision making and quick start-up of investments would significantly be accelerated if concessional financing blended with IBRD lending were available, particularly in the current constraint financial markets. Therefore, without CTF co-financing, there would be no reduction in the existing emissions and the current program would not redirect business-as-usual.

Financing Plan

14. The financing for the first ten years of the program is shown in the table below

Source	Local	Foreign	Total
GoM	50		50
IBRD		400	400
Carbon Finance		150	150
CTF		50	50
Total	50	600	650

Program Preparation Timetable

15. The project is expected to be prepared along the following timeframe:

Milestones	Dates
Government concept approval/ Bank concept review	March 2009
Project preparation	March – October 2009
Regional Operations Committee	November 2009
Appraisal/ Negotiations	December 2009 – January 2010
Approval	March 2010
Project Completion	June 2015

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ANNEX 5: PRIVATE SECTOR ENERGY PROGRAM (IFC)

Problem Statement

1. The Mexican Investment Plan has identified several areas where the use of CTF funded interventions can have a transformational impact on the carbon footprint of the country. Annexes 1 through 3 discuss the initiatives to be undertaken by the IBRD and IADB to address GHG emissions growth in power generation and energy demand. This annex outlines where IFC would leverage its skills, relationships and financing through direct interventions with private sector stakeholders to fast-track and support these initiatives in a combined effort to transform Mexico's energy sector.

Proposed Transformation

2. *Renewable Energy*. Annex 1 outlines the IADB's initiatives to support the scale-up of renewable energy power generation in Mexico including working with the government to develop regulations to encourage public and private generation and the creation of an Energy Transition Fund. IFC would work whenever possible with IADB's private sector group to provide appropriate incentives for qualified developers to fast-track the implementation of renewable energy projects. These initial projects, in addition to having an immediate GHG impact, would provide valuable information on the types and amounts of incentives required to catalyze renewable energy development in the country. This information would be used by the government and IADB to help design the Energy Transition Fund and develop the new regulations. The Energy Transition Fund would then be positioned to scale-up renewable energy development in the country.

3. IFC would work with private sector renewable energy developers, and when necessary equipment manufacturers, interested in entering the Mexican power sector, but who need additional incentives or risk mitigation to make their projects feasible/palatable. IFC has already been approached by several credible developers that want to enter Mexico's wind market but who require non-market based financing to make their projects feasible. The financing challenge is made worse by the current financial crisis and the disappearance of traditional funding sources. It is expected that financing plans for wind projects under this program, especially those submitted within the first twelve months, would require leverage not only from multiple MDBs, but also from bilateral and other like minded institutions. Each CTF project proposal would discuss the barriers to be addressed with CTF funds, the role of the carbon market in helping to move the sector and direct GHG impact from the project. The program would address the question of additionality (supporting the lowest cost, qualified, producer) by either supporting successful bidders of an RFP or by supporting all developers that meet specified, transparent, credit criteria established by IFC.

4. *Energy Efficiency*. IFC would complement the IBRD and IADB initiatives with energy efficiency programs targeted towards transforming high GHG emitting sectors such as cement, steel, iron, chemicals/petrochemicals and sugar. The program would provide financial incentives or risk products to market leaders to encourage them to implement new low carbon technologies and establish new standards and benchmarks for such technologies in their respective industries. By working with companies that have significant market share or market influence, the program would have the largest impact, both by capturing a large share of the industry's emissions reduction potential through one sponsor, and by catalyzing competition and a need for other market players to follow suit. Smaller players would be incentivized indirectly through programs with financial institutions. To ensure a comprehensive approach to market development IFC would, when necessary, also support equipment manufacturers and vendors of low carbon technology.

5. An example of an energy efficiency program would be the transformation of Mexico's cement sector. The market is supplied by six cement companies, all privately owned; the three largest companies together comprise 83% of the market. Assuming GHG emissions of 0.8 t CO_2e per ton of clinker, the cement industry emits approximately 40 Mt CO_2e per year. In this example IFC would engage directly with Mexico's top three companies to identify opportunities to reduce GHG emissions within the sector (e.g., by implementing waste heat recovery systems (WHR)). While WHR technology is widely used in other industrial sectors, it has not gained strong traction in the cement industry. Technology risks are still perceived to exist and payback periods are considered too long, especially in current market conditions where capital is scarce and there are many competing demands for funds. Through such a project IFC might work with each company to structure an appropriate financing package including CTF incentives and MDB financing to mitigate both actual barriers and perceived risks. An alternative would be to work with a technology supplier to provide a financing option that meets the clients' objectives and which would be available to all market players. Replication potential of such a program is high given that many of the technology benefits are also applicable in sectors such as steel, glass and metals. In addition to expected GHG impact, project proposals would outline the barriers being addressed in the given sector and describe how the CTF funds will be structured to address these barriers.

Implementation Readiness

6. There are currently a number of private sector wind projects that have been developed and could be implemented during 2009 with the appropriate financial / risk incentives. One of these companies has already approached IFC for help in obtaining financing on terms that would make the project feasible. IFC believes it could support two renewable energy projects in the short term if the requested CTF resources were available.

7. The rate of implementation of the energy efficiency programs will be impacted by the severity and duration of the financial crisis. On the positive side, companies are looking for ways to reduce costs and rationalize their operations, making energy efficient equipment more attractive. On the other side many companies are focused on funding their ongoing operations and meeting their immediate debt obligations with little appetite or ability to make new investments. The implementation potential of these programs is enhanced by IFC's established relationships with market players and its technical expertise in the topic (IFC has a core team focused on sustainable energy and a ten-year history of financing such projects directly and through financial intermediaries). Accordingly, the likelihood of IFC being able to structure appropriate incentives and implement an initial program during the first six months of 2009 is high.

Rationale for CTF Financing

8. In renewable energy CTF financing will be needed to provide appropriate financing (including to cover the gap that has resulted from the financial crisis) and risk incentives for private developers to enter Mexico's wind sector. While there is interest in entering the market, private developers will be unwilling and unable to do so without some concessional support.

9. In energy efficiency, CTF funds are needed to incentivize industries to undertake investments in lower carbon emitting technologies. Without CTF funds, companies will not have the focus or ability to undertake such investments in the first place. Many companies have recently found themselves unable to borrow, even at high interest rates, for any type of investment. CTF funding, and its flexible application, can provide the liquidity needed to undertake the investment and security to ensure that the client is no worse off financially than if they had not made the investment. With effective financial structuring, CTF funds can address the specific barriers for each company and catalyze the sector's transition to a lower carbon base.

Financing Plan

10. Financing plans will be developed at the proposal stage. The following is a conceptual financing plan for indicative purposes.

Source	RE	EE	Total
Sponsors / Other lenders / Carbon Finance	270	95	365
IFC	100	35	135
CTF	30	20	50
Total	400	150	550

Program Preparation Timetable

11. The project is expected to be prepared along the following timeframe:

Milestones	Dates
Government concept approval/ Bank concept review	March 2009
Project preparation	March – August 2009
Appraisal/ Negotiations	September 2009
Approval	September 2009
Project Completion	