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Greenhouse Gas Emission Baselines and Reduction Potentials from Buildings in Mexico

A Discussion Document

United Nations Environment Programme

Sustainable United Nations

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Chapter 1

Key Outcomes: Summary for Decision-Makers

Key Outcomes: Summary for Decision-Makers

This report represents the first comprehensive description of the factors that determine the present and future impacts of residential and commercial buildings in México on climate change.

1.1. PROCESS

The elaboration of the present document involved a process of information gathering on built space and energy use in Mexico´s residential and commercial sectors. It also involved the development of a model to estimate greenhouse gas emissions of those sectors based on the available information.

It is important to note that there is a systematic lack of data on these matters in Mexico, particularly for the commercial sector but also on more specific issues (like energy end use information) for both sectors. To deal with this lack of data, many assumptions were made by the author, most of them based on other related data but sometimes on his personal judgment.

1.2. ESTIMATED EMISSIONS

The present exercise estimates residential and commercial buildings emissions of close to 75 MTon in 2006. This means that buildings represented about 12% of total present CO_2 eqv. emissions in Mexico in that year.

To have reference values for the year 2000, a simple backwards extrapolation was performed based of the 2006 to 2007 growth rate. A total of 70,250 KTon in GHG emissions was estimated. A potential growth to up to close to 500 MTon for 2050 has been estimated. Therefore there would be an increase of GHG emissions by a factor of 6.7 if nothing is done.

1.3. A ZERO GROWTH SCENARIO

All of the assumptions for the parameters considered in the model use for this report were made to reach a zero growth target, that is, that total emissions have a constant value over the 2006-2050 period. To reflect this, two important assumptions are made: (1) that the average intensity of electricity use in households in temperate climate does not grow and (2) that the average energy intensity for space cooling in households in hot climate also remains constant.

1.4. OVERALL GHG REDUCTIONS

In general, measures in the residential sector are reflected in the average end use intensities of five end uses (lighting, space cooling, refrigeration, "other electrical" and water heating). In the commercial sector, reductions are reflected by energy end use intensities by building type. In the residential sector, the proposed measures would reduce the growth of CO_2 eqv. emissions from the residential sector to 63% of the baseline in 2050. Most of the reductions come from measures related to electricity (96%) and, by end uses, the largest fraction of the reductions come from greater efficiency in "other electrical" uses (50%), space cooling (42%), refrigeration (3%) water heating (3%), and lighting (2%). In the commercial sector, technology improvements would result in reductions in the energy intensities

of space cooling, lighting and auxiliary equipment by 75%, and of 60% in energy intensity for water heating, and auxiliary motors.

1.5. COST OF GHG REDUCTIONS

In the residential sector, the estimated cost of the measures, at 2008 values, would be close to 103 billion US$. In terms of unit costs per Ton of CO_2 eqv. avoided (under very general assumptions) the cheapest measure involves "other electrical" while water heating (which involves the use of solar energy) has the higher cost. In the commercial sector, the cost of the mitigation measures was estimated as a general percentage (3%) of the unit global construction costs of the buildings, so estimated cost is close to 21 billion US$ by 2050.

1.6. RECOMMENDATIONS

Short-term

- Establish the building sector as a priority in mitigation policy. To date, there are no specific laws involving sustainable development priorities for buildings in Mexico. There are, though, a number of policies and programs involving both the government and the private sector that have direct and indirect impacts on the CO_2 eqv. emissions that result from residential and commercial buildings operations. These policies and programs have mixed results, and lack coordination and a steady effort. Making buildings a stated by the federal government priority (be it for energy efficiency in particular or for GHG mitigation in general) could help solidify the efforts.
- Reinforce the Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT) Green Mortgage program and go ahead with Consejo Nacional de Vivienda (CONAVI) sustainable housing program. The Green Mortgage program by INFONAVIT and the use of subsidies by CONAVI to increase the sustainability aspects of new housing are key programs to reach a zero emissions growth in the residential sector.
- Increase the intensity and broaden the scope of Comisión federal de Electricidad (CFE) Demand Side Management (DSM) programs. CFE has been operating (directly or through the Fideicomiso para el Ahorro de Energía Eléctrica-FIDE) a number of successful DSM programs, mainly aimed at lighting and space cooling in the residential sector. These programs should recover their wide scale scope.
- Start a formal, integrated and coordinated effort of data gathering to have a better idea of the size and the energy use characteristics of commercial buildings. Recognize, in the government's data collection system, the importance of buildings as a specific category of energy use and integrate