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SEA for touristic and urban planning in Mexico

Land use planning for urban development in Escuinapa, Sinaloa

Type of impact assessment	Voluntary Strategic Environmental Assessment (SEA)
Type of project/plan	Land use planning and bioclimatic design for touristic and residential planning
Climate change related issues	Climate change mitigation actions by reducing CO_2 emissions and increasing carbon sinks
Influence of the SEA	Guidance for investors to choose cost-efficient measures for emissions reduction that meet legal requirements

For urban development planning in Mexico, alternatives for carbon emission reduction and carbon sequestration were assessed in an SEA. After identification of the most energy consuming elements, 'energy efficiency' options were investigated. This resulted in guidance for investors.

Climate mitigation in Mexico

In order to meet international climate change conventions, Mexico's government has decreed binding policies including for the tourism sector. As a result, the National Fund

for the Development of Tourism (FONATUR) has been promoting the first Mexican urban (residential, commercial and touristic) development which takes into account different alternatives for climate change mitigation. It combines reduction of carbon emissions with carbon sequestration. Alternatives were investigated in a voluntary SEA.

Assessing carbon emissions balance in the SEA

Carbon emissions were quantified while taking into consideration energy consumption under two scenarios: (1) Business as usual (BAU), and (2) Energy efficiency (EE). The BAU assumes no further action to reduce energy consumption and vegetation loss. Carbon emissions were estimated by using information from the master plan on design of buildings.

By analysing each type of land use, elements of major energy consumption were identified. For each, options for EE scenarios were investigated. These considered reduction of carbon emissions through:

- reduction in energy consumption by bioclimatic architecture and construction materials;
- alternatives for lighting, air conditioning and electric appliances;
- allocation of buildings considering the situation of vegetation;
- production of renewable energy such as biogas, photovoltaic panels and water heaters on roofs.

Fuel savings were proposed by:

- encouraging the use of public transport instead of cars, by locating parking lots in the outer ring of the tourism complex;
- promoting walking and biking by creating separate lanes.

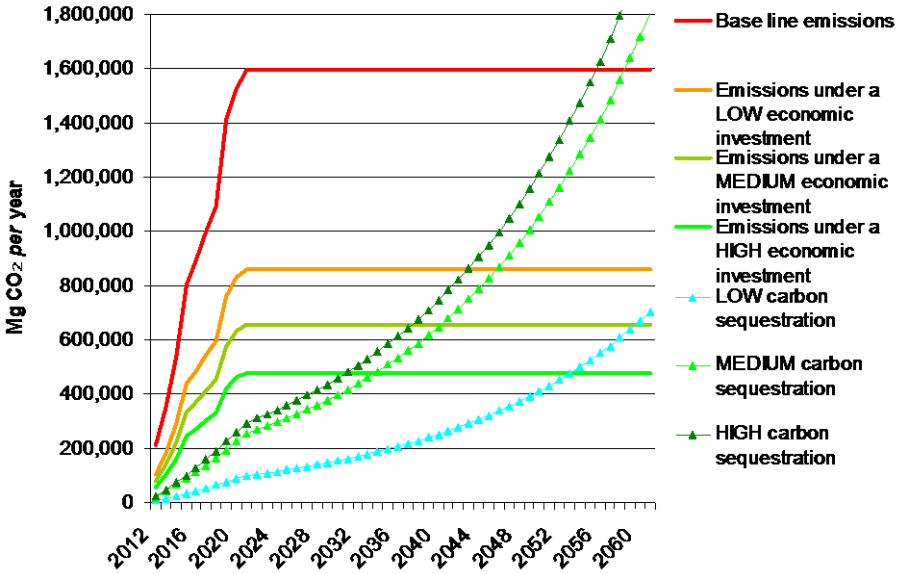
For carbon sequestration, reforestation plans considered plant density, species growth and shading effects. Moreover, from field inventory and satellite imagery, carbon stocks were estimated. This helped to identify suitable spots for carbon conservation and for compensation by reforestation with native species. Finally, carbon emissions and carbon sequestration were formulated into the same CO_2 equivalent units, to facilitate comparison (see figure).

Carbon emission trends

Carbon emissions were projected for different stages in urban planning. Projections show an increase be-

tween 2012 and 2022 when urban development is expected to be finished. Energy consumption will be more stable after 2022. Carbon emission estimates in the BAU scenario showed a maximum consumption of non-renewable energy of 2,053 GWh per year. Air conditioning and lighting are the main sources of consumption. Nearly 50% of the energy consumption can be reduced by proper bioclimatic designs, shading effects and energy efficient appliances. About 30% reduction can be obtained by renewable sources, and the rest can be compensated by sequestering carbon on vegetation biomass.

Carbon sequestration shows an exponential growth over the planning period. Carbon stocks in vegetation were estimated between 20 and 54 GgC), with an increment of storage on 1.5 GgC through green façades and roofs. The use of vegetation plays an important role, not only in carbon sequestration but also in reduction of solar heat in buildings.



CO_2 equivalent estimations of BAU and under three different EE scenarios of energy consumption and carbon sequestration. Where carbon emissions are equal to carbon sequestration, the project is carbon neutral.

Climate smart alternatives

The main elements that drive carbon emission reductions are:

- Reducing internal heat in buildings through heat proof layers and shading, spatial organisation of buildings, and use of specific construction materials.
- Reducing air conditioning use through a proposed technology to avoid low temperatures.
- Using natural light to partially replace artificial light.
- Generating renewable energy (biogas and photovoltaic).

Conclusion: Climate smart design of urban development

The final design of the master plan considered the recommendations done in the SEA. Though there is no legislation in Mexico to enforce the private sector to implement these recommendations, they were incorporated as guidance. A monitoring report system via sustainability indexes was developed. With these, the master plan allows the investors to choose the most economical investment for carbon emissions and carbon sequestration as long as they fulfil the minimum standards established. Even with a minimum investment, a reduction of about 50% of carbon emissions is possible and another 10% through carbon sequestration by the year 2025.

Characteristics of climate smart(er) plan:

- Three-step approach applied ✓
- Climate smart(er) plan design ✓
- SEA increased commitment for plan ✓

Climate smart(er) because:

- The master plan considered zones to reduce carbon emissions and promote sequestration.
- Investors are encouraged to reduce emissions.
- Main energy/fuel use sources were identified and alternatives selected to reduce emissions.

This case is part of the publication 'Environmental Assessment for Climate Smart Decision Making: Good practice cases', published by the NCEA in 2017. See www.eia.nl for the other cases.