# Mitigating Climate Change **Through Environmental Management**



High Demand For Fossil Fuels and Fire Wood **Threaten Environmental Sustainability** 

The Philippines is highly affected by climate change – intensifying tropical cyclones, increasing rainfall, rising temperatures and sea level rise Although on the global scale the Philippines is not a major contributor to climate change, greenhouse gas emissions that cause climate change are on the rise in the country to a large extent as elsewhere due to high dependence on fossil fuel use in the transport sector and for electricity generation. Increasing demands are results of growing automobile use, more lighting and electrical equipment requirements and rising temperature requiring more power for better indoor thermal comfort especially in urban

In Sorsogon City an assessment of the energy related greenhouse gas emissions was conducted. This assessment did not factor in emissions related to agriculture or solid waste management which are assumed to be significant. Population growth in the city and new tourism facilities also add to the increasing power demand. According to the assessment, residentia consumers contributed to the greenhouse gas emission (GHG) followed by transportation. As costs for fossil fuel based energy increases, households are forced to look for alternatives, such as wood or charcoal, threatening mangrove areas and forests adding to air pollution. Forty percent of the registered vehicles in the city are 2-stroke tricycles that are energy inefficient because of higher fuel emission. In addition, the tricycles are also a main source of local air pollution

Lowering energy demand using energy-saving practices and tapping various alternative and clean energy systems and technology can help protect the environment and mitigate factors contributing to climate change,



Tricyles are primary means of transportation in Sorsogon City that contribute to high greenhouse gas emissions.



Business center of Sorsogon City

Reduction of Energy Consumption Using Clean and Efficient Energy Systems







Philippine government policies promote efficient use of The Environmental Issues Working Group (IWG) was formed energy resources using cost-effective options and shift from fossil fuel to renewable energy sources. Laws such as the Clean Air Act also mandate the reduction of air pollution that contributes to GHG accumulation.

The city is committed to reduce its energy consumption and greenhouse gas emissions as part of its comprehensive approach to climate change. The city has realized that this strategy will also reduce local air pollution and improve the overall environment.

to lead the implementation of demonstration projects in the 5 most vulnerable barangays in Sorsogon City.

The city developed policies on utilizing energy-efficient lighting technologies. City legislative office is finalizing the policy of converting tricycle engines to emission-reducing motors. The Environmental IWG demonstrated the efficient use of energy efficient technologies for street lighting, piloted the use of heat reducing technology for buildings and implemented communication strategies for climate change and environmental awareness.

# **Environmental Processes to Mitigate Greenhouse Gas Emissions**



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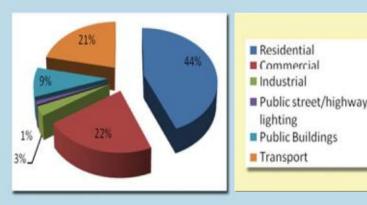
on GHG

valuate impacts and gather

Replicate successful

Climate change mitigation actions at the city level are very vital. This follows the fact that cities highly contribute to greenhouse gases given its activities and highly densed population. GHG mitigation actions could be identified as cities go through steps 3 and 4 in the figure above. In Sorsogon City, community acceptance of the need to do mitigation actions was of paramount interest to the local government hence the conduct of IEC and advocacy initiatives.

#### **Greenhouse Gas Emission Profiling in Sorsogon City**



The city government of Sorsogon conducted a GHG emission profiling exercise to determine how and which sector of the local society is highly contributing to its greenhouse gas emissions. Based on the assessment, the three main sectors of the main contributors are the residential energy users with 44% contribution. followed by commercial at 22% and third is transport sector contributing 21%. Due to city government's direct influence on public facilities, specific GHG reduction initially implemented on public street and public building lighting. This is followed by efforts to reduce GHG emissions in

Inventory of types of energy use and energy consumers

**Identification of** energy resources (non-renewable and renewable) in the area

**Identification of** alternative energy technologies and applications available

Inventory of Local Energy Use, Local Renewable Energy Sources and Technologies

**Determination of** 

amount of greenhouse

gas emission and their

sources

## **Environmental Strategies and Demonstration Projects**



#### **Reduce Energy Use by Replacing High Consuming** Lamps with LED Lamps

Following the Energy Efficient Lighting concept, Sorsogon City replaced CFL street lights of higher wattages with 100 pieces of 9.5 Watt LED lamps on the roads of 5 most vulnerable barangays.

Initial cost of installing LED lamps is much higher than CFL lamps. However, due to savings from monthly power rates, investments can be recovered in 3 years.

#### Benefits of using LED lamps:

- Low operating temperature and energy use
- Soft light
- Durable (50,000 hours, approximately 11 years)
- Less GHG emissions
- Safe (no mercury vapor unlike CFL and fluorescent



### Formulation of City **Ordinance for Tricycle Engine Upgrading**

The city is formulating City Ordinance No. 29 which uses tricycle franchising and permitting processes to regulate tricycle operations in the city. Highlights of the ordinance include regulations on the number of tricycles that will operate in specific areas and times schedules, and non renewal of franchise for motorbike units with two-stroke engine. These policies were guided by lessons learned by the city from their study visit in Palawan.



### **Use Renewable Energy by Switching to Solar-Powered Street Lighting**

Thirty units of solar-powered stand alone lamps were installed along Sorsogon City's diversion road and in the cityhall's complex. The solar powered 40W LED lamps are alternate to the 150W high pressure sodium lamps. This alternative street light has 2 sets of 17.5Volt solar panels and a battery.

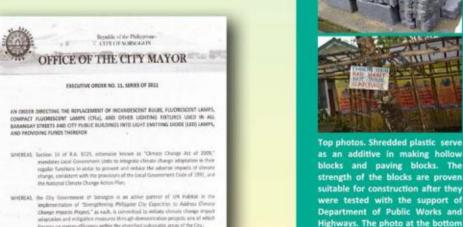
### Benefits of using solar powered LED-lamps:

- Lower operational costs because the solar cells produce the same amount energy used for lighting
- No carbon emission due to use of solar power, a renewable energy resource
- Lighting is unaffected by blackout because it is not connected to the power grid



# Formulation of City Ordinance for **Lighting Fixture Replacement**

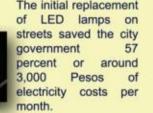
A City Executive Order No.11 was passed to mandate the replacement of high energy consuming lighting fixtures such as incandescent, fluorescent, and compact fluorescent (CFL) to light emitting diode (LED) lamps in all city public buildings and barangay streets.



#### Pilot projects - application of insulating paint on roofs to reduce interior heat Formulation of City Ordinances - replacement of low efficient light bulbs to LED lamps in public buildings and streets Reinforcement of Sorsogon City government's initiatives - community-based solid waste management program

# The initial replacement

Impacts of Climate Change Environmental Mitigation Efforts



The demonstration projects on energy efficiency and GHG reduction led to other efforts such as:

#### **Environmental Communications Plan**



Use of LED Lamps

Save Electricity

to LED lights

Switch to better and energy efficient Promote reduction of carbon emissions

Convert CFL and incandescent lamps



- Heads of national agencies with provincial offices
- Building administrators in the city School Principals and households
- Private establishment owners
- Mass media radio and TV
- Group learning activities lectures and meetings
- Posters and flyers

#### Use of Heat Insulating Paint



A heat insulating paint called Miracool Paint was tested in selected establishments in the city; one school building in Barangay Buhatan, 3 core shelters in Barangay Caricaran and a Barangay Hall in Barangay Burabod. After application, roof surfaces became 18 degrees cooler. Students felt more comfortable inside to school building.



The city plans to apply the paint on more establishments. The Japanese manufacturer of this paint is exploring the possibility that it can be locally produced for easier access and lower purchasing costs.

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Top photos. Shredded plastic serve

Department of Public Works and

Highways. The photo at the bottom

shows posters used by the barangay

Increased Community Awareness and Participation in Climate Change Activities

More individuals as well as communities became more aware of climate change concepts and practiced mitigation measures through two Sosogon Festivals with themes that focused on the city's commitment to climate change adaptation and mitigation.

Reduction of solid waste reduce the production of methane gas which harms the atmosphere. This was promoted through holding a search for model barangay. Barangay Tugos won this

Other contests were on recycling and the search for model barangay for energy conservation.





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