

# ECO-CITY ALEXANDRIA

## City of Alexandria Energy and Climate Change Action Plan Executive Summary Local Actions to Save Energy, Reduce Greenhouse Gas Emissions, and Prepare for the Impacts of Climate Change 2012 – 2020



June 2011



Office of Environmental Quality  
Department of Transportation and Environmental Services



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### The Issue

Climate change is a phenomenon of critical concern. While there will always be climate-related questions researchers are attempting to answer, the overwhelming scientific consensus is that the world is warming, and that most of the warming is the result of emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases (GHG) from human activities. The impacts of climate change can already be observed in many places, from rising sea levels to melting ice to changing weather patterns. Climate change is already affecting ecosystems, water supplies, and human health. Although climate change cannot be avoided entirely, the most severe impacts of climate change can be avoided by substantially reducing the amount of GHG released into the atmosphere. A key strategy is the push to conserve energy – which reduces the demand of fossil fuels and lowers emissions of CO<sub>2</sub> emitted into our air. Even with emission reductions, however, some warming will still occur. Adaptation planning is needed to limit the damage caused by climate change and the long-term costs of responding to climate-related impacts.

All levels of government, the private sector, and ordinary citizens have roles to play in addressing climate change. Some aspects of the climate problem are best addressed at the local government level, such as greenhouse gas reductions through smart growth, transportation planning and conserving energy in government buildings. Other aspects are best addressed at higher levels of government, such as through increasing national vehicle fuel economy standards. A growing number of businesses are committed to reducing their GHG emissions and exploring emerging low-carbon market opportunities. We will all live in a carbon-constrained world, and businesses which adapt will fare better than those which do not. Citizens can take simple yet important actions such as changing light bulbs, auditing the energy usage in their homes to reduce energy consumption and reducing car travel to reduce GHG emissions. Many such steps pay for themselves by saving money while reducing emissions.

***“As Mayor and a lifelong resident of Alexandria, I am concerned about the potential impacts climate change may have on a coastal city like Alexandria and our 141,000 residents ... In Alexandria, we recognize the quantity and sources of energy used by local government, businesses and residents affect our environment and quality of life, and we have committed to managing our energy supply and usage in a sustainable manner ... Local governments play a critical role in improving energy efficiency, shifting the country to cleaner sources of energy, and reducing greenhouse gas emissions.”***

Mayor William Euille

Senate Hearing on Clean Energy Jobs, Climate Related Policies and Economic Growth

July 21, 2009

## The Plans

The City of Alexandria's Environmental Action Plan 2030 (EAP) serves as the broad road map for city leaders, staff, and citizens to implement the sustainability visions set forth in Alexandria's Eco-City Charter. It sets out principles, goals, targets and actions that explain how Alexandria can lead the new green economy, address the challenges of climate change, and continue its high quality of life while decreasing the city's carbon and ecological footprints.

The City of Alexandria Energy and Climate Change Action Plan 2012-2020 (ECCAP) builds on the work done in developing the EAP by providing information on policies and measures that the City is already undertaking, as well as possible new measures under consideration, to achieve the City's climate change goals.

## The Principle

*“Alexandria must be adaptive and responsive to emerging or unforeseen environmental threats – such as climate change – that could strain infrastructure, deplete natural resources, disrupt the economy, or threaten public health. Failure to respond quickly and appropriately to such threats will likely have severe consequences for the health and economy of Alexandria and its citizens.”*

Environmental Action Plan FY2009-2030

Principle 9: Global Climate Change and Emerging Threats

June 18, 2009

## The Goals

With respect to the Global Climate Change Principle, the goals are:

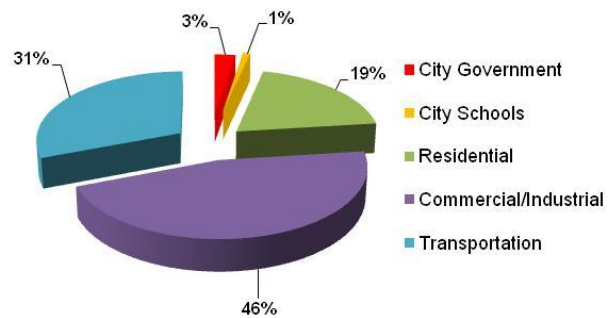
- Goal 1:** Adopt targets and establish implementation framework for reducing GHG emission reductions for 2012, 2020 and 2050
- Goal 2:** Institutionalize the consideration of the effects of possible climate changes into long-term planning
- Goal 3:** Prepare and educate city residents and business owners for a carbon-constrained economy and other climate change impacts
- Goal 4:** Increase the City's preparedness to respond to the possible effects of climate change and environmental emergencies

Some of the short-term actions described in the EAP to support these goals are already underway, as the City has already taken many voluntary GHG reduction actions and implemented various energy savings programs over the past several years. The measures described in this report build on the City's continuing GHG reduction actions and suggests additional measures to reduce GHG emissions and prepare for the potential impacts of climate change.

## The Greenhouse Gas Emission Inventory

The City prepared a GHG emission inventory that shows the carbon footprint of the City government's operations as well as the footprint of the residents, businesses and commuters. City government and school operations account for only 4% of the total emissions (City government operations account for 3% and City Schools account for 1% of the total). Most of the GHG emissions are generated by the commercial / industrial, transportation, and residential sectors.

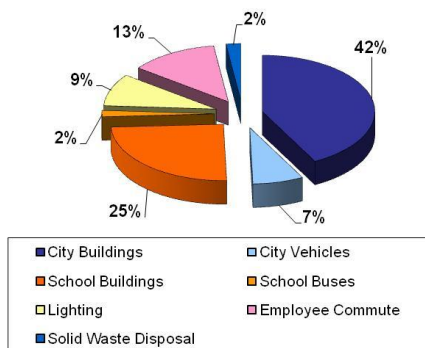
GHG Emissions by Sector (% of total)



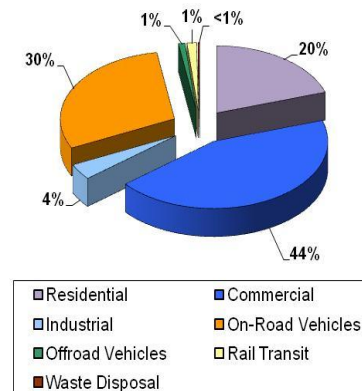
GHG emissions from city government operations totaled 79,820 metric tons (tonnes) of carbon dioxide equivalents (CO<sub>2</sub>e) in fiscal year 2006. 42% of the emissions are from the operation of City government buildings, 25% from City school buildings, and 13% from employees commuting to work.

GHG emissions from community-wide activities totaled 2.2 million tonnes of CO<sub>2</sub>e in calendar year 2005. 30% of the emissions are from vehicle traffic in the city, while the operation of commercial and residential buildings accounts for 44% and 20% of the total, respectively. The per capita emissions for 2005 were about 16.0 tonnes. The BAU per capita emissions are projected to increase slightly to 16.4 tonnes per person by 2020, with a further increase to 18.1 tonnes by 2050. Achieving the 2050 GHG emission reduction target of 80% reduction compared to 2005, would bring the per capita emission level to 3.2 tonnes.

FY06 Government CO<sub>2</sub>e Emissions by Sector (80,000 tonnes)



2005 Community CO<sub>2</sub>e Emissions by Sector (2.2 million tonnes)

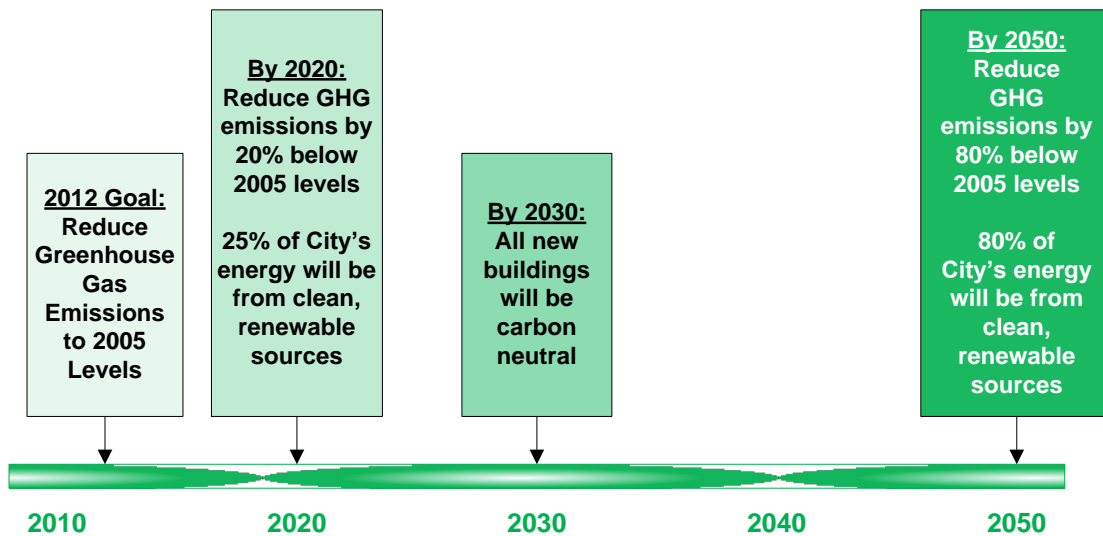


The GHG inventory summarized above is based on fossil fuel and electricity *consumption*. Electricity is also *generated* in the city by GenON Energy facility (formerly Potomac River Generating Station {PRGS}) and the Covanta Energy-from-Waste plant. The GHG emissions from electricity generation totaled 1.8 million tonnes in 2005. Based on guidance from the International Council on Local

Environmental Initiatives (ICLEI), we have subtracted grid-based generation emissions from the City’s total emissions to avoid double counting and to assign responsibility for electricity usage to the end-user, which will help in targeting policies to reduce emissions. The inventory does not include emissions associated with the embodied energy of goods consumed by Alexandria residents and businesses but produced elsewhere.

## The Targets

The EAP sets out the following targets to accelerate the commitment and level of activity necessary to meet the critical challenges of reducing emissions and preparing for climate change impacts:



## Significant Mitigation Measures Are Already Underway

The City already has in place a number of progressive policies and programs that are reducing energy use, promoting renewable energy and alternative transportation, and lowering GHG emissions. The City’s EAP identifies a number of principles, goals, and actions governing climate change, transportation, energy, waste management and other environmental issues in the City. While many of the EAP actions were not developed explicitly to address climate change, they will help reduce GHG emissions by reducing fossil fuel consumption. In addition, the City’s “constellation of plans” (e.g., Transportation Master Plan, Urban Forestry Plan, Pedestrian and Mobility Plan, Land Use Plan, Open Space Plan, Water Quality Plan, Solid Waste Management Plan, Capital Improvement Plan) include specific activities that help reduce GHG emissions.

For example, the City's Green Building Policy sets the stage for greening the city's buildings, which account for 67% of the City's GHG emissions. The City's recycling program and the Covanta Energy-from-Waste facility divert millions of tons of trash from landfills, reducing the amount of harmful methane gas released into the atmosphere. The City is using \$1.37 million under the federal Energy Efficiency and Conservation Block Grant (EECBG) program to assist residents and businesses begin to develop and implement sustainable energy efficiency and conservation programs. These programs will lower GHG emissions by decreasing dependence on energy generated from fossil fuels. The City has identified a number of proposed transportation investments and priorities that will reduce vehicle traffic and promote public transit. And the Eco-City Challenge on the City's web site is a tool for encouraging citizens to make individual lifestyle changes and take actions to reduce their carbon footprint. These and other on-going climate change mitigation measures are described in this report.

## Long-Term Solutions Are Needed

The short- and mid-term measures can help the City achieve stabilization of GHG emissions with currently available technology. Meeting the long-term GHG emission reduction targets set for 2020 and beyond will likely require accelerated development of new, affordable technologies and beneficial behavioral changes. Programs and policies related to district energy, alternative transportation fuel infrastructure, and affordable renewable energy technologies can have positive climate and energy results to meet the long-term goal of reducing GHG emissions by 80% by 2050.

However, most of these long-term measures are not quantifiable under currently available standard emission reduction protocols. Long-term measures will need continuing evaluation in order to design programs and policies that remove barriers to implementation of climate-friendly, commercially viable technologies, and consider the feasibility of prospective technologies that are not yet commercially viable.

A key role of the City leadership will be to encourage regional, state, and federal officials to support long-term measures and practices, and to engage the community in mitigation. Given the scale of the challenge, responding to climate change will require action at all levels. Implementation of this plan should allow the City to meet its mitigation goals, but the City government does not have the resources to/cannot by itself guide community-wide reductions sufficient to meet the emission reduction targets established in the Environmental Action Plan. Nevertheless, it will require leadership at both the state and federal levels and participation by the entire community to meet these emission reduction targets. The actions described in this plan will not only accelerate the deployment of desirable measures across the City, it will also enhance Alexandria's leadership.

## Adapting to Climate Change

Although climate scientists think that the pace of climate change can be slowed by substantially reducing GHG emissions, they also agree that some climate change will occur and will, therefore, require adaptation. Adaptation presents a complementary approach to mitigation. While mitigation measures can help reduce the likelihood of adverse conditions, adaptation strategies may be able to reduce the severity of many potential impacts if adverse conditions prevail.

City staff has begun to take a preliminary look at potential climate change risks and vulnerabilities in Alexandria. They have also begun identifying common adaptation goals and suggestions for preparedness actions. Sea-level rise and the likely increase in hurricane intensity and associated storm surge will be among the most serious consequences of climate change. Decreased water availability is very likely to affect the City's economy as well as its natural systems. Increases in air and water temperatures will cause heat-related stresses for people, plants, and animals. Quality of life will be affected by increasing heat stress, water scarcity, severe weather events, and reduced availability of insurance for at-risk properties. These impacts, some of which are already being observed, will likely have a significant effect on Alexandria's ecosystems, infrastructure, residents and economy.

Potential adaptation strategies currently being evaluated include measures to reduce the potential impacts of rising sea level and flooding in Alexandria, reducing water demand and increasing water conservation, reduce impacts of extreme heat events, and mitigating damage to natural ecosystems. For example, the City's Waterfront Small Area Plan addresses the need to improve the condition of Alexandria's shoreline: to naturalize it where possible, to improve the condition and function of seawalls, and to reduce the need for dredging and debris removal. The City would also monitor climate change and explore consensus science to help address sea-level rise issues in order to protect against the most extreme flood events.

## Challenges and Uncertainties

The City of Alexandria will face many challenges and uncertainties in mitigating and adapting to climate change. They can be classified as economic, institutional, psychological, and informational. They include, but are not limited to, the following:

- Mitigation and adaptation efforts are hampered by a lack of solid information about the benefits, costs, and effectiveness of various strategies, and by uncertainty about increases in the risk of future climate impacts.
- Meeting the previously discussed goals and targets will require a major departure from business-as-usual (BAU). For example, energy efficiency may reduce short-term energy consumption from specific appliances or other infrastructure; such measures are not likely to realize the longer-term need for a very large reduction in energy generated by fossil fuels.
- The City must make a coordinated effort to reduce GHG-producing activities across all levels of government. For example, the City must coordinate regional transportation issues that involve dozens of local governments. Likewise, national policies will be necessary to encourage large-scale switching to cleaner fuels.
- City budgets may constrain the flexibility of officials to invest in GHG reduction projects, which sometimes require upfront capital costs to finance long-term energy cost savings.

Despite the challenges and uncertainties, many critical actions can be successfully initiated locally to begin to address GHG emissions. These same climate change mitigation and adaptation measures generate broader non-climate related benefits, such as saving on energy costs, reducing local air pollution, enhancing alternative transportation and increasing the "livability" and "sustainability" of the City.