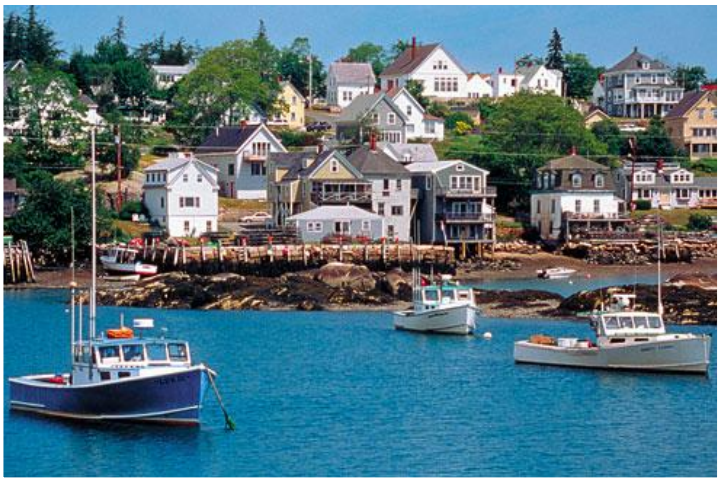
Preserving Assets in At-Risk Municipalities

Financial Strategies for Climate Change Adaptation



Maine Coast: Saltbox houses cascade down to the water's edge at Blue Hill Peninsula (courtesy of *Readers Digest*).

America's Coastal Make-up and Risk

A large share of America's population, businesses and economic activity now occurs in coastal areas. At the same time, during this century many coastal communities are likely to be severely impacted by sea level rise and increased storm surge and tidal flooding.

"What to do" about this vulnerability is the subject of this brief. It is intended to help municipalities identify courses of action and steps they might take toward increasing their resilience, especially regarding financial resources that will need to be allocated toward the various strategies identified.

A Startling Forecast

The frequency and intensity of coastal storms and flooding will escalate as sea levels rise and other climate changes occur. For example, by the year 2050 today's 100-year floods will likely become 10-year floods for Boston, Massachusetts. Coastal towns in the entire Eastern and Western seaboards are expected to see economic, environmental, and social effects as a result.

Municipal officials, planners, local residents, and business owners will have choices to make about how to address the rising frequency and intensity of coastal storms and associated damages. Planning must also occur to respond to higher tidal floods. In conjunction with tools that model town-specific sea level rise scenarios and related economic impacts, municipalities must equip themselves with knowledge of financial strategies for local climate adaptation.

Different Ways to Respond

The U.S. Environmental Protection Agency has outlined four ways to respond to climate change:

1. *Deferred Action*: Solutions are known but not required until the problem arises. (Example: Levee construction).

2. *Anticipatory Action*: The costs of immediate action are outweighed by the short- and long-term benefits, with or without the impact of climate change. Most "no regrets" strategies fall in this category (Example: Upgrade of aging storm water infrastructure).

3. *Planning*: The rules of the game are changed in the present in order to reflect potential future conditions and avoid future costs. (Example: Adoption of structure setback requirements that reflect projections accelerated sea level rise and erosion).

4. *Education and Research*: Scientific research on climate change adaptation is ongoing, and a broad coalition of professionals and citizens are engaged. (Example: Municipal vulnerability assessments).

This ICLEI Supplemental Brief was prepared by the New England Environmental Finance Center, a University of Southern Maine and US EPA cooperative. Produced July 2009.

Where to Begin?

1. *Collect and analyze geographic and hydrologic data regularly.* The best planning decisions will be made when the most accurate and up-to-date information is used to inform the process. Critical information includes elevation data, the extent of vertical land movement ("subsidence"), characteristics of storm and stream water flows, and capacities of water management systems.

2. *Determine at-risk asset vulnerability*. Tools exist through the EPA, FEMA, the Environmental Finance Center Network, and many state and university extension offices to model impacts to economic assets at the municipal level under various storm surge and sea level rise scenarios. These technologies are evolving rapidly, so prospective users are advised to research current options.

3. *Inform and engage the public*. Coastal changes can be frightening, especially when the impacts directly affect land areas where people live and work. The city must assume the responsibility of educating the public about the causes and implications of sea level rise, communicating scientific data in clear and easily understood terminology. Reports or maps that demonstrate potential climate change impacts should always be accompanied by information about what the city is doing to protect its citizens and assets.

4. *Join ICLEI's Climate Resilient Communities program*. The Climate Resilient Communities program is designed to help local governments develop tools to protect their communities from the impacts and costs of climate change.

Planning, Education, and Research: Taxes

Energy taxes are surcharges on bills for utilities such as electricity, heating oil, and gas. Many U.S. states and municipalities require utilities within their borders to charge energy taxes to their customers. When these taxes are levied only on energy sources that emit carbon dioxide into the atmosphere, they are called carbon taxes. Carbon taxes make polluting energy sources such as coal and oil more expensive than renewable, non-polluting energy sources such as wind and solar. This creates an incentive for consumers, power companies, and utilities to switch to renewable energy sources. Carbon taxes are not yet charged at any location in the U.S. The State of Vermont is considering implementation of a carbon tax. The debate over whether to adopt a carbon tax is currently most active in the European Union. New Zealand seriously considered adopting a carbon tax in 2005.

Next Step: Prepare a Capital Investment Plan

A Capital Investment Plan contains projects that have been identified in the municipal comprehensive plan as important to achieve the "visions" of a municipality by a certain year. Some of the projects are State mandates; others are to accommodate growth; while others are to enhance quality of life. All projects are expected to occur during the planning period; however, refinement will likely occur as the plan is routinely reviewed and updated. These plans are developed regularly, and can easily be modified to include costs for climate change adaptation measures.

Each project contained in the Capital Investment Plan identifies its estimated cost, potential funding source, and its priority. Cost estimates are very general at this stage. Most data will be derived from known estimates for the various upgrades, such as for resizing culverts or building levees.

Some Financing Tools for Climate Adaptation

1. *General Taxes and Fees*. Revenues from taxes typically go into the general funds for state and local governments. Revenues from fees are often deposited into special funds related to the product or service upon which the fees are levied, such as fees on fertilizer and pesticide sales being deposited into a fund for pesticide and fertilizer regulation. Some taxes and fees have dual purposes in that they raise revenue in addition to acting as market devices to alter polluting behavior, by requiring the polluter to pay for engaging in that behavior. The process of

gaining voter approval for dedication or earmarking of general funds for environmental protection initiatives is often difficult, considering that government-funded programs vigorously compete for monies and the popularity of environmental issues rises and falls over time. Therefore, the best approach to securing general funds for sea level rise preparation may be to not present it as an environmental application. Costs of sea level rise are to be incurred in infrastructure, emergency preparedness, and many other areas not typically termed "environmental" concerns. Presenting these categories of avoided costs will help secure general funds.

2. *General Revenue Bonding*. Bonds are a primary way in which governments and the private sector acquire capital to invest in environmental protection initiatives including pollution prevention. Bonds entail repayments of principal and interest, although interest rates may be governmentally subsidized. A bond is a written promise to repay borrowed money on a definite schedule, and usually at a fixed rate of interest, for the life of the bond. Some types of bonds are tax exempt. Bonds represent a large source of capital, but can be a complex and more expensive way to borrow. The high expense results from legal and other fees and administrative time required for issuing bonds. In some cases voter approval is required for issuing bonds.

Revenue Bonds: Storm Water Infrastructure

Much existing storm water infrastructure across the country was built long enough ago that that it already requires improvement and modernization, thus falling under the anticipatory action category. Since waste water services are fee-based, revenue bonds are most often used to fund these projects. It is important to know your municipality's specific waste water problems, including community needs, and to be familiar with the multiple federal, state, and local funding sources for this type of project.

"Revenue bond" is a broad term used to describe bonds on which the debt service is payable mainly from revenue generated through the operation of the project being financed, or from other non-property tax sources. They may be issued by state and local governments, or by an authority, commission, special district, or other unit created by a legislative body for the purpose of issuing bonds for facility construction. Revenue bonds now account for the majority of municipal bonds used to finance water, sewer, and solid waste infrastructure in the United States. Revenue bonds are usually tax-exempt. Bond interest rates may be higher for revenue bonds compared to general obligation bonds, and even higher for taxable revenue bonds. Revenue bonds do not count against debt ceilings, but the national rating agencies take them into account in financial capability analyses. Examples include State Revolving Fund (SRF) bonds, private-activity industrial development bonds, and mortgage lease-backed bonds.

3. *Sink Funds*. Sink funding is a method by which an organization 1) periodically sets aside money to retire financial obligations (e.g. bond agreements) or 2) prepares for large anticipated expenses. In the first case, bond agreements typically require making periodic interest payments to bondholders throughout the life of the bond, and then the principal is repaid at the end of the bond's life. In the second case, sink funds serve as savings accounts. Dollars invested in the fund can be used for purchasing larger assets when they need replacement, or preserved for "rainy day" purposes. In either event the accounts need to be carefully safeguarded from other uses.

Sink Funds: Levee Construction

As climatic changes become more pronounced along coasts and river ways, it is likely that municipalities will have to build structures to prevent significant public infrastructure assets from flooding. Where little worry currently exists, municipalities can use sink funds for levee construction as a deferred action strategy, tapping a known and effective solution.

Mississippi River Improvement, 1890 (U.S. Army Corps of Engineers)

Politics is Key, Proper Preparation is a Must

For local climate adaptation purposes, general fund support, revenue bonds, and sink funding should be carefully considered as sources for capital to fund infrastructure upgrades. Of course, political process associated with such activities must be treated carefully. Chances of securing required funds will be enhanced to the degree that accurate information can be provided on 1) costs of various adaptation approaches to be considered; 2) probabilities of inundation events that can be expected; and 3) costs to infrastructure, real estate, local economic activity, and natural system function that may result from inaction. Tools are in development through NOAA, the EPA, the EFCN, and others to provide this type of information and help launch viable local public processes around financing the adaptation strategies selected. Also see the case study below, describing how funds can be secured through normal processes, without ever needing to initiate a public process around climate change or sea level rise.

Lessons Learned: Olympia, Washington

In June 1993, the Olympia Public Works Department, with assistance from the National Oceanic and Atmospheric Administration and the Washington State Department of Ecology, published its first report on the implications of sea level rise for the city. The report identified geographical areas of Olympia that would be affected by sea level rise, including the downtown district and the Port of Olympia, much of which has been constructed on land established through dredge and fill projects undertaken 1909-1911 and again from 1968-1982.

These areas of the city were also those receiving significant investments in the decade preceding the 1993 report. These investments, designed to reinvent the downtown as an inviting economic and cultural district, had included a waterfront boardwalk, buildings for public gatherings, upgraded Port facilities, and a regional wastewater treatment plant. The city gave no indication that the threat of sea level rise would halt the progress of these investment strategies, highlighting the dilemma that cities face in balancing their plans for economic growth with the long-term impacts of climate change.

The Olympia Public Works Department identified increased flooding in downtown Olympia as the most significant impact of sea level rise, resulting from a combination of higher water levels during storm events and a rising water table. In many areas of the downtown, the water table was measured at 1 foot below ground, increasing the risk that rising sea levels would reduce capacity for surface and subsurface drainage. Another area of concern was the ability of the wastewater treatment system to function when sea levels continued to rise.

Although the mechanism for sewage collection would most likely remain intact, higher water levels would require additional pumping capacity to discharge the treated wastewater into the body of water surrounding Olympia. Higher water levels might also worsen problems already present in the aging infrastructure, taxing the system's capacity to handle both storm and wastewater flows and increasing chances of saltwater intrusion.

The Public Works Department also expressed concern about long-term viability of the city's drinking water supply. At that time (1993), water was drawn from a spring source, at an elevation of 3 feet above the average low tide, and protected from saltwater intrusion by groundwater pressure. The exposed surface pool, however, could be at risk for intrusion with a minimum 1 foot rise in sea level

With these impacts in mind, the city adopted a long-term vision for its response to climate change impacts and specifically to sea level rise. In the 1993 report and in subsequent publications, the city has relied upon the response framework initially developed by U.S. EPA (above).

In the decade following the 1993 report, adaptation efforts in Olympia have primarily taken the form of anticipatory action. These are strategies of no regrets, where actions are justified by motivations that exist outside of considerations of sea level rise. From a short-term financial perspective, these types of actions make the most sense: projects in this category do not require governments to make infrastructure investments above and beyond

what would normally be budgeted, and do not require mobilization of public support for climate change initiatives.

One example of anticipatory action involves Olympia's drinking water. Olympia currently draws 84% of its water supply from a spring source, with an exposed surface pool. Although sea level rise was identified as a potential threat to the surface pool in the 1993 report, more immediate impacts also threatened safety of this water supply, including chemical spills and other contamination.

In 2004, the city drinking water utility initiated work on replacing the spring source with more protected well-field source, further up-gradient from the shoreline to ensure safety from encroaching sea levels. This replacement is intended to be completed by 2012 and falls within the larger vision of the utility to meet long-term community needs. Regardless of future findings regarding the risks of saltwater intrusion and sea level rise on the current spring source, the improved water supply source offers independent benefits to the city. In late 2006, Olympia city staff, led by the Public Works department, decided to formally revisit climate change impacts.

In September 2007 the Public Works department released Olympia's "Response to the Challenge of Climate Change: Background Report and Preliminary Recommendations." (Part 1 at: http://www.olympiawa.gov/documents/PublicWorks/Climate_Change/Climate_%20Change_1.pdf, and Part 2 at: http://www.olympiawa.gov/documents/PublicWorks/Climate_Change/Climate_%20Change_%202.pdf). These documents evaluated the science of climate change, the risks faced by Olympia, mitigation and adaptation actions currently being pursued, and proposed next steps for the city. Without placing blame or sounding alarms, the report communicated the pressing need for education, planning, behavioral change, and adaptation actions. It grounded the reader in the issues at hand; including the great risk posed by sea level rise to the downtown district, but also reassured the reader that the city was committed to research and action. As municipalities look to Olympia for best practices regarding planning and finance, they will also have to determine their own vulnerable assets and most viable means of financing their adaptation alternatives.

The Future: Reducing or Spreading Climate Risk Through Insurance

The Association of British Insurers (ABI) conducted research in 2005 concluding that with 6% increase in wind speed, losses to current U.S. properties would rise from $5.5bn to $9.5bn annually from hurricane damage alone, and 1-in-250 year losses would rise from $85bn to $150bn. With losses reported in a number of studies as startling as these, the National Association of Insurance Commissioners (NAIC) began in 2009 to require that the largest U.S. insurance companies disclose to the NAIC regulatory body and to the public the financial risks they face from climate change, including actions to address these risks. In essence, this new requirement will help guide municipalities in understanding specific risks companies are insuring as businesses face increased liability from current and anticipated climate changes this century. Indeed, climate change could threaten the widespread accessibility of insurance for people and their property. Proactive planning and actions taken to reduce risks such as those described in this brief will likely be necessary to maintain affordability for municipalities and individuals citizens alike.

Finding More Information

More information about approaches described here can be found in the EPA's Guidebook on Financial Tools (http://www.epa.gov/efinpage/guidebook.htm). Local planning tools referenced here and in development include COAST (Coastal Adaptation to Sea Level Rise Tool, produced by EPA and the New England Environmental Finance Center, http://efc.muskie.usm.maine.edu) and others that will be available through local university extension agents, coastal zone management offices, ICLEI, and others. A good summary website for related tools is through NOAA's Coastal Services Center, at http://community.csc.noaa.gov/climateadaptation/index.php?option=com_docman&task=cat_view&gid=52&Itemid=32.