# ANNAPOLIS, MARYLAND RESILIENCE FINANCING ASSESSMENT

December 2018



# EXECUTIVE SUMMARY

## INTRODUCTION

Annapolis, Maryland, like many other coastal communities, is grappling with the impacts of increased sea levels, storm surge, nuisance flooding, and other climate-related changes on the City's future. Annapolis finalized a first-in-the-nation Cultural Resources Hazard Mitigation Plan in 2018 to address the threats that a changing climate pose to its historic waterfront areas and cultural landmarks. Also in 2018, the City took part in a pilot Coastal Resilience Financing Assessment that was funded by the Maryland Department of Natural Resources (DNR) Coast Smart Program. The purpose was to identify the elements and processes necessary for communities like Annapolis to develop comprehensive, local resilience implementation and financing strategies. Four program management mechanisms were assessed:

- The presence of a well-articulated and shared vision in Annapolis, with priorities specific enough to shape investments;
- A clear understanding of the risks and opportunities associated with desired adaptation and mitigation outcomes;
- The existence of established revenue streams and effective procurement systems; and,
- Well-conceived project that are in sync with resilience planning efforts.

# KEY FINDINGS – CITY OF ANNAPOLIS

## 1. The Resilience Financing Challenge is Real and Immediate.

And so is the Opportunity. The risks and impacts of climate change are no longer the concern of future generations; they are acute, likely very costly, and certain to increase in intensity over time. The risks associated with climate change impacts are balanced by potential reward and return on investment. Investment in a more resilient Annapolis, if executed with efficiency and innovation, can and almost certainly will result in a more vibrant and sustainable local and regional economy.

## 2. A City Defined by Resilience.

How Annapolis responds to the risks and realities of climate change and other physical, economic, and societal stressors will be determined by its capacity to implement and finance resilience infrastructure projects and programs. There has been significant discussion and activity in Annapolis associated with certain aspects of the resilience planning and implementation process, but these efforts have not yet resulted in a comprehensive resilience implementation and financing plan.

## 3. There are Essential Enabling Conditions for Financing and Investment.

Investment in community infrastructure does not happen by chance. Communities that create the right conditions for investment and sustainable growth put themselves in a more advantageous position for attracting investment and ensuring the positive returns on those investments. Community leaders should move quickly to put financing systems in place. A new study indicates that significant impacts will be felt by 2040, which means the financing processes necessary for making communities more resilient to impacts are within traditional infrastructure financing time horizons.[1] The associated urgency will require putting in place the conditions necessary for facilitating significant investment, including:

[1] IPCC, 2018: Global warming of 1.5°C. An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts toeradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, Y.Chen, S. Connors, M. Gomis, E. Lonnoy, J. B. R. Matthews, W. Moufouma-Okia, C. Péan, R. Pidcock, N. Reay,M. Tignor, T. Waterfield, X. Zhou (eds.)]. https://www.ipcc.ch/sr15/.

- ***Leadership***: Annapolis needs strong, effective, and visionary leadership to realize a resilient and vibrant future in the face of climate change. Strong leadership from elected officials and City institutions is necessary, but City leaders must nurture and cultivate leadership within multiple public, private, and non-profit institutions.
- ***Broad and active coalitions***: Strong leadership requires equally strong followers. The resilience implementation and financing effort will require active coalitions across a broad spectrum of civic institutions including business, education, and cultural arts. Resilience must become part of the City's fabric. This is especially important in regard to financing. Success will require innovative private sector partnerships. These partnerships will assume a variety of forms and functions, and will require engagement from across the community.
- ***Institutional coordination and capacity***: Broad-scale leadership and coalitions necessitate effective coordination and implementation capacity. The resilience effort will require City agencies, institutions, and programs to have sufficient implementation capacity and to be coordinated internally and externally. This includes consistent and coordinated regulations and policies; innovative procurement systems and policies; and economic development policies and programs that are consistent with resilience efforts.
- ***Sufficient and sustainable revenue streams***: The opportunities to incentivize new, innovative investment partnerships from outside City government are real and potentially very significant. However, private investment will not supplant public infrastructure investment. It is important for City leaders to establish sustainable, sufficient, and innovative revenue streams to support resilience infrastructure investment.

## 4. Key Financing Components Already Exist.

Annapolis has an established foundation from which to create a resilience financing system. Key financing components are already in place. These include institutional capacity; a sufficient tax base; well-run enterprise programs; an appropriate level of debt relative to revenue; and the scale of the City's budget. The City is well positioned to take advantage of key economic assets to expand investment and diversify its economic base. The impact of the Naval Academy, the proximity to the Chesapeake Bay, historic and cultural resources, boating and marine-based recreation, and a vibrant restaurant and music scene have all been and will continue to be

essential to the City's economic base. The City's long-term economic prosperity will rely on two elemental outcomes: 1) making existing economic assets more resilient in regard to climate change impacts; and, 2) establishing a resilience-based economy.

These two outcomes are inextricably linked but are in many ways mutually exclusive. Both are essential in the long-term. The economic system that got us here will not be sufficient to get us to a more resilient future.

### 5. Resilience Requires Broad and Diverse Leadership.

Planning for resilience requires communities like Annapolis to do something that is politically very difficult: making financing and policy decisions that go beyond traditional political time horizons. Resilience implementation and financing system should be apolitical and multi-sectoral in nature, comprising a broad coalition of participants and actors. Establishing, implementing, and financing a sustainable resilience vision and plan of action requires public sector leadership. The scale, complexity, and timing of this particular challenge will require cooperation and engagement beyond anything City leaders have experienced in the past.

### 6. The Climate Adaptation and Mitigation Connection.

The policies and programs addressing climate change focus on two issues: mitigating and reducing greenhouse gases that cause climate change, and implementing the infrastructure and processes necessary to adapt to and thrive within a changing climate. This separation between mitigation and resilience is often very necessary for targeting investment to those places where the risk is most significant. The scale and complexity of the entire climate change challenge is matched only by the urgency in taking immediate and sustained action on both fronts. The best and most efficient path forward is to link mitigation and resilience financing efforts when possible. Doing so will be essential for Annapolis to achieve its resilience goals.

# KEY RECOMMENDATIONS

The project team identified a variety of options available to the City of Annapolis for expanding its financing system to achieve a resilient future.

### RECOMMENDATION #1: Create a Clear Vision and Plan of Action.

The City should consider establishing a clear and actionable resilience plan and financing strategy. The purpose of the vision and plan is threefold:

- To create a broad coalition of constituency groups and civic organizations dedicated to addressing climate change resilience and mitigation throughout the community;
- To identify specific short, mid, and long-term infrastructure projects and the estimated fiscal resources critical for addressing climate change threats and achieving resilience goals; and,
- Create a framework for transforming the City's economy in an effort to leverage the benefits and opportunities provided by investment in resilience infrastructure.

Long-term success will require a resilience vision that the entire community can embrace. There have been very effective local efforts to advance resilience issues related to historic preservation, downtown flooding and economic development. Annapolis should establish a holistic vision and plan for protecting the City's cultural, and economic, and environmental resources. Without this, it will be difficult for the community to finance and implement necessary infrastructure improvements.

### RECOMMENDATION #2: Institutionalize Resilience Within the City's Leadership and Decision-Making Structures.

The risks and impacts associated with climate change and the investments necessary to mitigate those impacts will require the City to establish a financing and infrastructure system that is well beyond the capacity of the current system. The City should consider institutionalizing resilience financing and implementation functions. Three options are recommended for joint implementation:

- Develop codified resilience goals and outcomes within each City agency. Resilience represents one of those rare public priorities that will require virtually every agency and public employee to engage at least to some degree. Some agencies have a very direct connection to resilience: public safety and emergency preparedness; public works; planning; environmental programs

- Establish a Director of Resilience position within City government to ensure the coordination and efficiency of resilience programs across City government.
- Create a Resilience Financing Authority. City leaders should consider establishing a resilience financing authority charged with facilitating and expanding investment in key infrastructure, economic development, and social impact projects. The authority can be structured as a City agency or as an independent entity charged with connecting public and private investment.

### RECOMMENDATION #3: Prioritize Resilience Projects in the CIP Process.

The capital improvement plan (CIP) process in Annapolis provides the City with a financial and implementation guide for infrastructure projects and programs. The City should consider explicitly including and prioritizing projects that will advance the City's resilience goals in the CIP:

- Adjust the CIP project evaluation criteria to include key resilience issues and threats;
- Focus on projects that are specifically identified in the resilience planning process;
- Improve the capacity to leverage private capital, not just in the form of grants; and,
- Ensure that the CIP process mirrors a broader effort to transform how resilience is advanced in the City, as well as how infrastructure and resilience finance is implemented.

### RECOMMENDATION #4: Establish Innovative Procurement Processes.

City leaders can increase resilience investments by modifying its procurement process. The current system is largely sufficient for addressing existing infrastructure needs, but the scale and complexity of climate change adaptation and resilience projects requires changes in procurement processes. City leaders should consider adopting procurement policies and processes that enable more effective private interaction and engagement. This includes consolidating contracts when available, establishing data driven project tracking, and promoting performance financing and delivery.

### RECOMMENDATION #5: Conduct a Thorough Regulatory Review.

City leaders should conduct a in-depth regulatory review to ensure that policies, laws, and regulations work in concert with each other and the City's resilience goals and priorities. The review should be horizontally and vertically broad in nature and include clear recommendations for regulatory changes.

# COASTAL RESILIENCE FINANCING ASSESSMENT PROCESS

The Coastal Resilience Financing Assessment was designed to enable communities to identify the conditions that are necessary for effectively financing critical infrastructure needs. It is designed to help communities identify the "enabling conditions" necessary for attracting and incentivizing public and private investment. The enabling conditions are as varied and unique as the potential projects themselves; however, there are key processes and capacities that are common to virtually all economic development and infrastructure financing systems. These enabling conditions are addressed in two broad categories and steps: community planning, goal setting, and visioning; and, efficient and effective financing systems. These serve as the foundation for the Stress Test process and this assessment of the resilience financing systems in Annapolis. Each section provides a description of that part of the assessment process and the impact on the City's financing system.

One unique aspects of resilience is that the impacts associated with climate change will evolve and intensify over time. As a result, the risks to the community, the infrastructure and services necessary to mitigate that risk, and the required financing process will also need to evolve over time. This of course means that the resilience systems and processes, including financing processes must be dynamic and resilient in and of themselves. This assessment considers three time horizons: short-, mid-, and long-term:

- *Short-term risks and infrastructure needs*. Short-term risks and infrastructure needs are those present in 0-10 years. Essentially, these represent immediate infrastructure and financing needs. The assumption is that infrastructure and programmatic needs that fall within the time horizon have been identified and addressed in existing planning documents and processes, for example, the City has identified addressing and mitigating existing nuisance flooding in the downtown area as an immediate need. The financing components necessary for addressing short-term infrastructure needs includes:
  - Codified, stable funding streams, whether they be supported by general obligation bonds and general funds or through enterprise programs and dedicated fees

  - A clear understanding of the project's useful life, i.e., how long the project will sufficiently address changing resilience needs

- *Mid-term risks and infrastructure needs*. Mid-term risks and infrastructure needs are associated with impacts that will occur within 10-20 years. These are the infrastructure systems that will replace or augment existing short-term infrastructure. Given the increase in climate change impacts over time, it is likely that the scale of infrastructure needs and financing resources necessary to meet those needs will grow over time. Revenue streams in support of mid-term infrastructure needs are not necessarily required immediately, but efforts should be made to establish the processes necessary for generating revenue and investment in the future.
- *Long-term risks and infrastructure needs*. Long-term risks and infrastructure needs, i.e. those that will occur 20 years and beyond, will be required to address the most significant impacts associated with climate change. This includes major infrastructure projects required to address sea level rise, changes in temperature and precipitation patterns, and catastrophic storm events. Given the anticipated scale of the need, it is important for community leaders to begin establishing the necessary financing systems and processes in the short-term. This includes establishing the conditions necessary for investment, identifying anticipated revenue streams, and building capacity by establishing appropriate financing institutions.

# ASSESSMENT PART I: DEFINING RESILIENCE, ASSESSING RISK, AND PLANNING FOR THE FUTURE

The resilience financing process must begin with a clear vision for the future. A comprehensive, consensus-driven resilience vision and implementation strategy provides a framework for a financing strategy and investment system. Local and regional leadership is essential to attract and deploy investments in resilience efforts. Advancing resilience priorities, including embedding those priorities into the economic fabric of the community will require establishing community leaders that are charged with moving resilience initiatives forward. The first step in the resilience assessment process is to understand what resilience is, what the threats to the community are, and the appropriateness of plans for becoming more resilient in the future.[2]

## DEFINING RESILIENCE

The first step in the planning process is to define resilience in a way that is community-specific and reflects the anticipated risks, future goals, and expected outcomes of its citizens. This process focuses on three key questions: what is needed, what is valued, and what are the necessary systems.

### Community Assessment Questions

*Is there an existing community-based definition of resilience?*

- There is no codified definition of resilience in the community, nor does Annapolis have a defined vision for resilience into the future. There are, however, elements of resilience and adaptation included in a variety of planning documents and efforts including the City's Hazard Mitigation Plan, the City Dock Master Plan, and the Comprehensive Plan. As a result, the City has the resources in place to establish a resilience vision and implementation plan.

[2] Island Press and The Kresge Foundation. 2015. Bounce Forward: Urban Resilience in the Era of Climate Change. https://kresge.org/sites/default/files/Bounce-Forward-Urban-Resilience-in-Era-of-Climate-Change-2015.pdf.

*Have community leaders effectively addressed or identified what will be needed to more resilient to climate change, what is valued in the community, and the systems that will need to be in place to achieve both?*

- Because Annapolis has no codified resilience plan in place, there are, for the most part, no associated assessments in regard to what will be needed to make the City more resilient and what will be needed to protect what is valued in the City. There are of course exceptions; the *Weather it Together* program focused a significant amount of attention to historic and cultural resources, as well as downtown infrastructure and resources.

# ASSESSING RISK

Key to the resilience planning process is assessing the risks the community will face into the future. A major component of this project is to enable communities to be more resilient to the impacts of climate change. Resilience requires addressing risk and potential impacts across multiple media and potential community needs, including:

- *Climate change impacts:* The impacts of climate change will be varied. In coastal communities these changes will likely include coastal flooding; sea-level rise; intensified storms; drought; heat waves; changes in distribution of disease vectors; and displacement and migration.[3]
- *Other environmental crises:* Part of the financing challenge facing coastal communities is the interaction between climate change adaptation and other environmental needs, specifically as it relates to water quality restoration and protection. For example, stormwater management in Annapolis will have tremendous impacts on the community in the future, both physically and financially. In turn, climate change will have a tremendous impact on stormwater management efforts. This means the two issues must be addressed collectively.[4]
- *Economic changes:* Much of the focus on mitigating the impacts of climate change has focused on the infrastructure necessary to address physical threats to coastal and urban communities. The potential economic changes— good and bad—must also be understood and addressed. For example, the rise or collapse of key industries; changes in financial or regulatory systems; and changes in wealth distribution can have tremendous impacts on local economies. While these

[3] Ibid

[4] Ibid

impacts will often occur outside the framework of climate change, the reality of a changing climate will almost certainly be an influencing factor.[5]

## Community Assessment Questions

*Has the community completed a comprehensive risk assessment? Are the potential impacts of climate change on cultural, economic, social, environmental, and physical infrastructure assets well understood?*

- The City identified nine hazard types through its hazard mitigation planning process. This plan was most recently updated in 2018. City officials have focused additional energy and resources on evaluating the impacts of flood risks and sea level rise on Annapolis' important historic and cultural resources. The City has made great strides in evaluating the impact of climate change risk to its historic properties and setting goals and objectives to mitigate these impacts. There is less understanding of the impacts these risks will have on the broader spectrum of community assets. In addition, there does not appear to be a thorough understanding of how the City's long-term infrastructure needs will address anticipated risks and climate change impacts.

*Is there an understanding of the infrastructure, economic, and social systems that will need to be put in place to realize the community's resilience vision?*

- The City's existing planning processes reflect an understanding of the need for developing and maintaining *current* infrastructure, social, and economic systems. It is unclear if community leaders have an understanding of how these existing systems would need to be modified and adjusted to address the long-term impacts of climate change. This is a critical issue moving into the future. For example, the City places a high priority on existing economic drivers, including cultural and historic resources, retail, and tourism. This is a sound policy, at least in the short term. However, there are two weaknesses to the existing approach. First, policies and programs designed to grow existing economic assets have not accounted for impacts from climate change. Second, the process of creating a more resilient community will provide new economic opportunities. Without an understanding of these risks and the opportunities, the City will be unable to effectively take advantage of those opportunities.

[5] Ibid

# PLANNING FOR THE FUTURE

It is necessary to have a resilience plan in place that focuses on anticipated infrastructure needs before a financing plan can be developed. As with resilience financing, the resilience planning process is unique to each community and must enable local leaders to address their unique resilience issues. The planning process is founded on an analysis of existing community systems. Key planning assessment processes include:

- *Creating diversity and redundancy.* A community with many different planning components and processes will have a wide range of responses to change and stress. For example, a City with a diverse economic base is less vulnerable to economic upheaval than one that relies on a single industry. In governance and decision-making, a collaborative process that incorporates a variety of actors and perspectives is likely to produce better outcomes.[6] Similarly, a resilient community will have planned redundancies as a way to perform basic functions so that the failure of any one component does not cause the entire system to crash. This is important when addressing climate change impacts such as flooding, sea level rise, and catastrophic storm events. Planned redundancy is important and leads to more resilient systems. Unplanned redundancy can lead to inefficiencies and increased costs.
- *Promoting equity and inclusiveness.* The planning process is typically associated with guiding land use and infrastructure development needs and issues. While this is important, especially in the context of financing climate change resilience, long-term resilience will also require an equitable, inclusive planning process. Planners must be acutely aware of spreading anticipated risks and opportunities equally.
- *Proactively planning for innovation.* Resilient communities must develop new and innovative responses to risk and changing conditions. The capacity to innovate derives from many of the qualities just described. Diverse systems generate more opportunities innovation than uniform ones. In social systems, innovation often comes from the margins. An inclusive society is better able to engage the agency and creativity of all of its citizens.[7]

[6] See Intersector Project: www.intersector.com

[7] Bounce Forward report produced by the Kresge Foundation and Island Press. Citation: *Bounce Forward: Urban Resilience in an Era of Climate Change.* A Strategy Paper From Island Press and Kresge Foundation

## Community Assessment Questions

*Has the community produced a comprehensive resilience plan?*

- The City has not produced a resilience plan. However, there are elements of desired resilience outcomes included in other planning documents. The need for a comprehensive resilience plan in regard to the resilience financing and implementation process cannot be overstated. It will provide City leaders with a much clearer understanding of the risks the City is facing in regard to climate change, and the actions necessary to mitigate those risks. This in turn provides an implementation strategy and a plan of action. Certainly City officials can identify key projects that, at least in the short-term, are necessary to achieve resilience goals. As important as short-term infrastructure needs are to the quality of life in Annapolis, the most pressing infrastructure needs and associated financing challenges are approaching quickly, and a well-designed plan and financing strategy are essential moving forward.

*Does the plan accurately reflect the community's resilience vision?*

- Some resilience issues and the impacts of climate change on specific resources have been addressed in existing planning documents. Historic resources provides a good example, as does nuisance flooding in the Downtown and City Dock sections of the City. Programs such as *Weather it Together* have provided opportunities to address the impacts of climate change on specific areas of the City and specific cultural resources. These efforts have yet to result in a codified vision for the future or plan for achieving that vision. Ultimately, the vision needed to advance resilience planning, implementation, and financing will come from leadership within the City government specifically in the form of a resilience director. Resilience itself is a very dynamic and fluid issue that will require creativity, flexibility, and sustained commitment moving forward requiring dedicated leadership.

*Do planning documents and processes provide short-, mid-, and long-term strategies to address resilience and desired outcomes?*

- Existing planning documents, specifically the Hazard Mitigation plan, do address many short-term infrastructure needs related to climate change in regard to emergency services and nuisance flooding in the downtown area. Because the issues being addressed are acute in nature,

there is at least an understanding of the financing and implementation needs involved, though it can still be a challenge to move short-term infrastructure needs through the financing process. What is missing is an understanding of their comprehensiveness in addressing even short-term resilience needs. Nor is there a clear understanding of how these projects will address more significant mid- and long-term risks into the future. Correspondingly, there does not appear to be an understanding of how short-term projects, such as addressing nuisance flooding, will be transitioned to longer-term interventions that will be necessary in the relatively near future.

*Do plans address the diverse nature of resilience, thereby encompassing environmental, social, and economic issues? In addition, do the plans explicitly address the connections between these three issues?*

- Existing City plans do address the diverse nature on resilience to some degree in that these plans are relatively comprehensive in nature. As a result, the environmental, social, and economic needs of the community, at least in the short-term, are addressed in existing planning documents. Because specific attention has not been given to climate change resilience, there is no understanding of how existing plans will enable the City to thrive in the future as climate change impacts are felt more acutely in all part of the community. In other words, if resilience goals are achieved in the short-term, it will happen as an indirect or collateral benefit of existing planning processes.

*Are the plans visionary while at the same time specific in regard to infrastructure needs, projects, and actions? In addition, do local plans clearly identify the systems and infrastructure projects needed to mitigate risk and achieve resilience plans and goals?*

- Again, the City has not developed either a resilience vision for the future or a corresponding plan for achieving that vision. It should be noted that the specificity of specific projects or engineering solutions may be less important at this point then establishing the planning, financing, and implementation systems that will be necessary for moving forward.

*Has the community inventoried community assets?*

- The City has not yet inventoried assets especially as they relate to infrastructure needs and long-term resilience. As we discuss below, this process is essential for incentivizing investment in City's resilience infrastructure. In addition, it is essential for clearly understanding the City's climate change risk moving forward.

# ASSESSMENT PART II: CREATING A RESILIENT FINANCING SYSTEM

The assessment approach is intended to provide local leaders with a process for identifying and creating the conditions necessary for investment and financing to occur at scale. The planning and visioning processes described above provide a foundation for developing and implementing a financing system that directs capital and investment in the most efficient, effective, and sustainable manner possible. The challenge for financing large-scale infrastructure efforts are clear, especially in coastal communities. The potential scale of achieving resilient infrastructure implementation goals can appear overwhelming. This is exacerbated by the comprehensiveness and breadth of the infrastructure needs themselves. Retrofitting communities to be more resilient and adaptive to climate change as well as other social, economic, and environmental stressors, requires significant investment above and beyond existing infrastructure financing needs. As of result of the complexity of the resilience financing challenge, it is essential that communities develop innovative and scalable resilience financing institutions and systems.

## TAX BASE AND REVENUE STREAMS

Infrastructure finance is a local responsibility, and having a sufficient revenue stream is the foundation of a local resilience financing systems. The majority of infrastructure investments are the responsibility of the public sector in general and local government specifically. The social and economic development programs and processes essential for long-term resilience make local and state investment responsibilities even greater. Therefore, sufficient, sustainable, and codified revenue streams are essential for advancing resilience programs and priorities. Generating revenue flow in support of public infrastructure and resilience programs is only the first essential part of the financing process. How that revenue is invested and allocated is equally important.

## Community Assessment Questions

*Does the community have codified and sustainable revenue streams in support of resilience infrastructure and financing?*

- The City relies almost exclusively on its general fund to support infrastructure projects. While this is not unusual, this will have to change as the impacts of climate change become more significant. In Annapolis, there are multiple revenue streams that are generated by specific infrastructure resources such as parking/transportation and stormwater fees. However, these revenues are diverted to the general fund, which then supports, at least indirectly, infrastructure programs. Through the general fund will always be a primary mechanism for financing infrastructure needs, it is limited in capacity and effectiveness. The general fund is not sufficient to finance necessary short-term resilience infrastructure. This revenue deficiency is magnified when considering longer-term project needs.

*Are there existing infrastructure enterprise funds and programs that are self-sufficient, solvent, and stable?*

- The City of Annapolis has several enterprise programs that support the management and construction of critical infrastructure projects and programs. The City's water and wastewater management and delivery systems are implemented in partnership with Anne Arundel County. These systems are well managed, self-sufficient, and stable. There are other infrastructure programs that are managed with various elements of enterprise systems. The stormwater and transportation programs generate revenue either directly from the infrastructure resource itself (i.e. parking revenue and bus fees), or through fees that are established in support of the infrastructure itself, in this case stormwater management. These revenues are not used to support an enterprise program; rather, the funds are diverted to the general fund and then redistributed, removing much of the efficiency and effectiveness from the process.

*Does a link exist between anticipated resilient infrastructure, program costs, and associated revenue?*

- This represents one of the most significant areas of concern in regard to the City's efforts to address the impacts of climate change. The City's current financing system, though structurally sound, has sufficient revenue and resources only to finance infrastructure projects and programs that are currently in the system. This does not include necessary short-term resilience projects. In addition, the anticipated increase in infrastructure needs in the City will require a significant

increase in public investment. In addition, current research indicates that climate change impacts can be expected earlier than originally anticipated which will require revenue streams to be established sooner and at a greater scale. Again, the City has yet to put plans in place for identifying, establishing, and leveraging those revenue streams.

# EFFICIENT PROCUREMENT PROJECT DELIVERY

Local resilience infrastructure and implementation strategies are intended to address needs and characteristics unique to that community. The need to accomplish more with less has become universal. Better procurement processes can advance community resilience priorities. Innovative procurement policies are especially important in regard to resilience and associated financing policies and processes. The scale of resilience activities and investments requires more effective private sector engagement. This can only occur with effective procurement systems designed to facilitate and advance more innovative private sector and contractor activity within the community.

## Community Assessment Questions

*Does the community have codifies procurement policies and processes including the selection of competition, contract type, payment structure, and requirements?*

- The City Code contains no provisions governing procurement or the disposition of surplus property. When goods and services are purchased with taxpayer rather than private funds, regulations are necessary to ensure procurements and dispositions of public property are conducted in a fair and impartial manner using methods applied consistently and with transparency.[8] The City does have policies in place that provide a basic level of assurance that procurement and purchasing are taking place fairly and consistently.[9] These policies provide a foundation for moving forward but are not sufficient for addressing more complex investment process and private sector relationships that will define resilience financing into the future.

[8] Sutherland, Teresa, Dan Nees, and Richard Melnick. 2018. City of Annapolis Report of the Finance Transition Team. January 22, 2018.

[9] See *City of Annapolis Procurement Policy and Procedure Statement.* https://www.annapolis.gov/796/Policies-Procedures

*Has the community created systems to measure project and procurement outcomes, impacts and/or cost-effectiveness? Does the community use performance data to actively manage ongoing contracts, including monitoring progress, detecting issues in the real-time, and implementing mid-course corrections?*

- The City's procurement policies are designed to ensure purchasing and vendor relations are managed in a way that is ethical and within the City's fiscal interests. The policies are primarily focused on guiding the project solicitation process as well as to ensure City employees are managing that process correctly. Little attention is given to the actual performance of private contractors especially as it relates to the quality of work and the capacity to advance City resilience goals and objectives. City leaders and agencies such as Public Works directly engage vendors to ensure that work is done as contracted; this includes both meeting agreed upon timelines and performing quality work. The procurement policies themselves do not stipulate this type of interaction.

*Has the community established a portfolio of key procurements and strategically managing these procurements to continuously improve outcomes?*

- The City does maintain a portfolio of vendors, with a stable of firms on call and available for engagement when needed. It is unclear if City agencies manage a portfolio of procured projects with the goal of improving the performance of approved vendors and their associated projects.

# FINANCIAL POLICIES AND SYSTEMS

Establishing revenue streams is the first part of establishing an efficient, sufficient, and effective local resilience financing system. The next step is to ensure that resources are invested appropriately. Financing policies and systems should ensure that projects are well conceived and in sync with resilience planning efforts. Project approval processes must be efficient, and financing processes must incentivize innovative delivery processes while making the most of existing community assets.

The connection between project planning and implementation financing – specifically through the CIP process – is typically the initial intervention point in the resilience financing process. This planning/financing connection is important because it requires addressing key issues such as cost and necessary revenue flows upfront. Analysis of best practices indicates that one of the most powerful ways to reduce the overall cost of infrastructure is to optimize infrastructure portfolios by

selecting the right combination of projects. It is often more efficient to address some infrastructure needs by getting more out of existing capacity or assets rather than invest in costly new projects.

Much of the analysis to this point has focused on identifying the conditions necessary to develop a resilience plan and associated financing strategy. In addition, the project team assessed the capacity of the pilot communities to establish those conditions. The resources necessary to incentivize investment and create a more resilient community exists in many cases within the community and are therefore assets in regard to attracting capital, financing, and economic development and investment. These assets can be:

- Physical, such as natural resources and man-made infrastructure;
- Cultural, often in the form of unique institutions, or in the form of a particularly skilled labor force; and/or,
- An established industry that is uniquely appropriate for a particular region.

What is important is that these assets are directly embedded in the financing process, specifically as mechanisms for incentivizing investment.

## Community Assessment Questions

*Are the planning processes and project prioritization interrelated?*

- The City does not have a codified resilience plan; therefore, there is no direct connection among various planning processes and resilience goals and priorities, where they exist. In regard to infrastructure financing more generally, there are processes in place designed to identify and implement the most pressing and strategically important infrastructure projects. Project selection is the result of essentially three steps, each designed to address various city priorities and needs: (1) specific infrastructure projects that have been identified in various planning efforts are assessed and weighted for importance by a working group of city officials, led by the Department of Planning; (2) projects that are identified as priorities by the working group are then reassessed by a steering committee; it is here that annual budget priorities are considered: and, (3) from here projects are considered by the City Council for funding and financing. There appears to be little connection between infrastructure priorities as addressed in City planning documents and

the official financing process. Implementation and financing decisions appear to be based on political priorities and realities. This can be an appropriate approach when political realities are informed by planning processes.

*Are infrastructure projects in synch with one another?*

- Because the City does not have a resilience plan in place, there is no definitive understanding of the projects that will be needed moving forward to make the City more resilient. Achieving resilience will require ensuring that infrastructure projects work in sync; if this is in fact occurring in Annapolis, it is the result of ad hoc processes rather than implementation design.

*Is the project selection process set up in a way to optimize infrastructure portfolios?*

- From the perspective of achieving desired resilience outcomes, infrastructure portfolios are not currently being optimized, making achieving long-term resilience almost impossible.

*Are existing infrastructure assets optimized?*

- The City does effective identify essential infrastructure assets and then plan for and ensure the protection of those assets. This is certainly an important aspect of a long-term resilience strategy. The City has no program or agency in place to assess the economic and fiscal value of its asset inventory. As a result, there is no commensurate effort in place to use those assets as a mechanism for incentivizing investment in support of City infrastructure and resilience needs.

# REGULATORY EFFECTIVENESS

Regulations are an important component of the resilience financing and economic development process. Regulatory procedures, policymaking, and code enforcement provide local governments with an opportunity to directly impact the infrastructure and resilience financing process. Perhaps the most important regulatory task faced by local leaders is to ensure consistency.

The connection and consistency of regulations to resilience and economic development efforts is especially important in regard to the financing process. Contrary to the widely held position that regulations suppress economic development and fiscal processes, regulations are often the first line of efficiency in the financing process. Regulatory consistency applies across communities. It is not the absence of regulation that facilitates economic development, but rather the assurance that

regulations will stay consistent across the region. This is especially important for regional economic development and planning efforts. Resilience implementation in communities like Annapolis must be founded on local vision and priorities, but implementation efforts require regional engagement in the long-term. Consistency among regulations is essential.

There are multiple regulatory issues related to building codes, land use and zoning, and stormwater management that are necessary to ensure a resilient community. Regulatory issues related to these and other identified elements and the processes and institutions necessary for ensuring regulatory consistency must be part of any comprehensive long-term resilience plan. One example is the increasingly stringent stormwater management regulatory process. As with planning capacity, there are multiple regulatory layers—local, regional, and state—that impact key resilience issues such as stormwater management regulations, which are implemented primarily through state and county level regulatory processes. Stormwater regulations are quickly evolving from local flood control mechanisms to more comprehensive water quality restoration and protection systems. This evolution closely mirrors the connection between stormwater quality, quantity, and resilience within coastal communities.[10]

## Community Assessment Questions

*Are local regulations and regulatory programs in sync with resilience planning goals?*

- City regulations are not in sync with resilience planning goals, due largely to the fact that the City does not yet have a resilience plan in place. The creation of a resilience plan should include a review of the effectiveness of regulatory processes in advancing resilience priorities. This process has already been initiated through the work of the Weather it Together planning initiative.

*Are regulations working in concert with each other to facilitate implementation of resilience goals?*

- That there are many City regulations and permitting processes that will have a direct impact on achieving resilience goals and priorities. These regulations do not appear to be well-aligned with

[10] Advancing Resilience-Supportive Economic Development on Virginia's Eastern Shore. September 2017. A Report by the Environmental Finance Center, University of Maryland.

each other and/or with what is understood in regard to the steps necessary to achieve resilience. For example, existing water quality and stormwater regulations do not in and of themselves directly or indirectly advance resilience and tidal flooding within the city. This does not mean that the stormwater program is implemented incorrectly. The program itself reflects state permitting requirements, but opportunities remain to address that water quality and tidal flooding issues in a less mutually exclusive manner.

Another example relates to historic and cultural resources. The City of Annapolis has a model program in regards to restoring and protecting its historic buildings and resources. These structures serve as a significant component of the City's economy and culture. However, the efforts to protect historic resources often run counter to efforts to protect those same resources from the impacts of climate change, and as a result, regulations at times can appear to run counter to each other.

*Is the connection between local regulations and local financing obligations understood and a central component of local policy and regulatory enforcement and implementation?*

- This is the case in regard to implementing and enforcing regulation, but it is unclear whether this is true in regard to using regulation as a mechanism for advancing long-term resilience issues.

# ENGAGING AND LEVERAGING THE PRIVATE SECTOR

Retrofitting communities to be more resilient and adaptive to climate change and other social, economic, and environmental stressors will require significant additional infrastructure investments. A report produced by McKenzie Global Institute estimates that in order to support projected economic growth between now and 2030, global infrastructure investment will need to increase by nearly 60 percent from the $36 trillion spent on infrastructure over the past 18 years to $57 trillion over the next 18 years.[11] These projections do not take into account the impacts of climate change, which could add nearly an additional 30% to infrastructure costs.[12] Institutional investors specifically

[11] Infrastructure productivity: How to save $1 trillion a year. Page 2.

[12] http://www.worldbank.org/en/news/feature/2016/10/11/how-can-we-finance-the-resilient-cities-of-the-future.

represent more than $120 trillion in assets under management. Given the scale of the investment challenge, local communities should strongly consider leveraging the capital resources, ingenuity, and efficiency of the private sector to find solutions to the infrastructure financing problem.[13]

The process of engaging, leveraging, and incentivizing the performance of the private sector is in many ways embedded throughout the resilience planning and financing process. For example, the procurement process described previously is entirely associated with improving the connections between local government and the private sector. The nature of the interactions between the public and private sectors will be diverse and varied. However, there are three interactions and processes that are foundational for establishing effective local resilience financing systems: focusing procurement and local investments on performance rather than outputs; establishing market-based financing systems; and, facilitating effective public/private partnerships.

## Paying for performance and outcomes

Performance-based financing focuses on achieving desired outcome rather than the means for getting there. If infrastructure investments can be evaluated based on desired environmental, economic or social outcomes, investors would be able to target funds to projects that achieve those outcomes at the lowest cost. Paying for results rather than infrastructure projects provides incentive to private firms to find the most cost-effective and highest-performing technologies and practices.

Paying for performance represents a new way of doing business for many public revenue programs. Performance should supplement other funding criteria in order to ensure multiple project needs are addressed without sacrificing financial efficiency. One common concern about the cost effectiveness of restoration investments is that getting projects to the point of investment and implementation can require a variety of interventions that are not directly associated with them. Overcoming cultural barriers through education and outreach or providing technical assistance are often "off balance sheet" in that they do not show up in project proposals or cost assessments and therefore are not accounted for in the credit generation process. This need not be the case. The power of performance-based based financing is that the funding organization can require the seller of credits, i.e. the project implementer, to be responsible for all project costs, including outreach, evaluation

[13] Private Matters: Systematically Assessing Private vs. Public Investment in Infrastructure. Page 1.

and monitoring, and long-term technical assistance. Including these activities in the marketplace provides incentive to ensure that they are accomplished efficiently.

## Reducing costs through markets and credit-based financing systems

Credit-based financing systems provide local governments with very unique mechanisms for reducing costs associated with environmental restoration, protection, and mitigation, especially as it relates to climate change. Credit-based financing systems tie resilience infrastructure investments with desired environmental outcomes. By structuring restoration and resilience transactions in terms of credits, the marketplace will have a consistent protocol for evaluating each proposed restoration project (i.e. in terms of how many credits it generates), and community leaders will have a clear metric by which restoration progress can be measured. This supports enhanced transparency in how state and local governments finance environmental restoration and resilience investment activity. It also requires private sector project implementers to be more transparent in accounting for performance, which ultimately improves the efficiency ratio and results in greater success per dollar spent. When this system is designed correctly, it will incorporate all the costs associated with a desired outcome. This includes not only its design and construction but also its lifetime operations and maintenance, which over time can exceed the costs of construction.

Demand for credits may come from a variety of buyers, such as: local governments seeking to comply with environmental and water quality permits; wastewater treatment plants needing to achieve regulated pollution reduction requirements; or state or federal governments investing subsidy monies in resilience and restoration activities. Credits could similarly be generated by a range of sources: private firms or NGOs aggregating water restoration or flooding best management practices; or municipalities or states constructing green infrastructure on vacant land.

The potential benefit of credit and market-based financing systems will increase significantly as the need to mitigate the impacts of climate change and the associated costs increase. A credit-based accounting system coordinated across multiple jurisdictions would provide broad-scale consistency in how restoration and resilience investments are made and reduce transaction costs. Such a system would lend itself to be folded into a larger, watershed-wide water quality trading market, which could leverage the success of current functioning environmental market programs in the watershed.

### Community Assessment Questions

*Has the community evaluated the potential benefit of credit and market-based financing systems?*

- The City has not evaluated the effectiveness of market systems, specifically within the framework of environmental services and stormwater management. The City has also not considered innovative applications of these finance tools in regards to flooding, parking, or transportation.[14]

*Has the community incorporated pay-for-performance metrics and processes into procurement systems, project evaluation, and infrastructure planning processes?*

- The City of Annapolis has not explicitly included pay-for-performance systems into its infrastructure financing processes. However, the City has taken the first steps towards a more performance-based system, specifically as it relates to stormwater management. In addition, there are other resilience-based infrastructure needs that may be uniquely appropriate for this type of financing process.

  The City's stormwater management program is implemented primarily in response to the Clean Water Act's Municipally Separate Storm Sewer System requirements. Specifically, as a Phase 2 community, which are essentially smaller urban jurisdictions, the City is required to treat around 20% of existing untreated impervious surfaces. These types of regulated programs, where levels of treatment or even performance are mandated, provide a unique opportunity to focus financing and investments on the performance of projects and vendors creating an opportunity to move local financing systems in this direction.

# FACILITATING PUBLIC-PRIVATE PARTNERSHIPS

The potential use of public-private partnerships (P3s) for environmental and water quality mitigation has recently generated a great deal of attention throughout the region. As local governments increasingly struggle to meet flooding and stormwater requirements and needs, many are considering P3 structures to augment local capacity and reduce risk.

[14] We recognize that these evaluations may have occurred informally; there are no available codified reports addressing these issues, however.

A P3 is a "contractual arrangement between a public agency (federal, state or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public."[15] The two parties share resources in delivering the good or service, and they also share the potential risks and rewards. P3s can be used for various aspects of a project, including financing, design, construction, operations and maintenance, and/or monitoring and evaluation.

The application of P3s for environmental and resilience needs such as stormwater is a relatively new practice, but these structures have been used extensively in other utility and infrastructure contexts, including water, wastewater, transportation, and military housing. Public sector benefits vary from project to project, but some of the more universal benefits that are also transferrable to the stormwater sector include:

- Lower costs: One of the biggest benefits of P3s is their potential to reduce the overall cost of a project by finding efficiencies that may not be available to the public sector.
- Expedited projects: In many cases, P3s allow projects to get off the ground faster and to be completed sooner, because of efficient project management and the ability to bypass some of the administrative slowdowns than can happen when a public agency is managing the project.[16]
  - Improved asset management: Asset management is a systematic method for evaluating the life-cycle costs of infrastructure assets. A private company tasked with not only construction responsibilities, but also ongoing maintenance, is more likely to be motivated to undertake strategic, long-term planning to maximize the life span of installed infrastructure.
  - Development of innovative strategies and technologies: Because P3s include built-in incentives for achieving outcomes more cheaply or quickly, these arrangements can catalyze the development and implementation of newer and/or more effective technologies or mechanisms for achieving desired impact.

[15] The National Council for Public-Private Partnerships. "7 Keys to Success." Accessed 7/20/14: http://www.ncppp.org/ppp-basics/7-keys/

[16] Investopedia. "Public-Private Partnerships." Accessed 7/20/14: http://www.investopedia.com/terms/p/public-private-partnerships.asp

- Economic development: When a P3 makes it possible for a city to renew aging infrastructure, the city may be able to attract new or expanded business development.[17] In the case of stormwater infrastructure, benefits such as flood mitigation and improve aesthetics in public spaces are a boon for economic vitality. P3s can be structured to achieve ancillary economic development goals, such as Prince George's County stormwater P3, which requires that 30-40% of project activities be conducted by small, local, and minority-owned businesses.

P3s offer the opportunity to harness many of the advantages offered by private sector engagement. Just as with publicly-managed projects, stormwater managed by a private firm require local governments to establish a dedicated, reliable funding stream via one or more revenue sources such as taxes, fees, grants, and state revolving loan funds. Communities considering a P3 structure should first clearly understand their infrastructure financing requirements over the next 10-20 years and their capacity to meet these needs. This will inform whether a P3 is needed and how it should be structured. Knowing what fundamental gap(s) need filling – administration, permitting, construction, etc. – will better position a community to design a P3 program that meets that need.

## Community Assessment Questions

*Are P3 systems explicitly enabled in the community's procurement processes?*

- The state of Maryland has enacted legislation allowing broad authority to implement P3 systems in support of infrastructure projects. Therefore, there are generally no legal restrictions preventing the City of Annapolis from establishing P3 relationships in turn. Currently, P3's are not explicitly mentioned in the City's procurement policies; however, it is not clear whether this would hinder or prevent the establishment of P3's.

*Has the City created an evaluation system for determining when P3's would be appropriate and beneficial to the infrastructure financing processes?*

- The City has not yet established an evaluation system for considering P3 projects; however, the first steps in creating an evaluation system were developed through the stormwater management program. P3's should be considered when the financing and implementation

[17] Black & Veatch. 12 Ways the Public Benefits in a Public-Private Partnership. Accessed 7/20/14: http://bv.com/Home/news/solutions/water/12-ways-the-public-benefits-in-a-public-private-partnership

benefits exceed the costs. This occurs when the private sector can implement the financing, construction, and maintenance processes more efficiently than the public sector. There are four components that should serve as the foundation for evaluating P3 effectiveness:

- Risk management: As local infrastructure projects become larger and more complex the risk associated with financing and implementing those projects will increase. A primary function of P3 financing structures is the transfer of financing risk from the public to the private sector.
- Financial viability: Project evaluation should include an analysis of Financial Viability and Value for Money (VfM). Financial Viability Analysis evaluates the feasibility of the project on the basis of all the financial cash flows, including the ability to pay for the project through existing or potential new revenue streams. This may initially be done assuming conventional delivery. If a decision is made to consider P3 delivery, the analysis may again be undertaken assuming P3 delivery.[18] The best value for money is defined as the most advantageous combination of cost, quality and sustainability to meet community requirements.[19]
- Efficiency: Transferring risk to the private sector comes at a cost; therefore, the cost of reducing risk must be weighed against the cost savings of the City implementing the infrastructure financing, construction, and maintenance process. The City needs to establish a benefit-cost analysis process to determine whether or not a project is appropriate for a P3, and, whether or not a P3 proposal from the private sector is in the City's best interest.
- Benefit-cost: A benefit-cost analysis should be designed to assess a project's net costs and net benefits to society, comparing the "build" alternative to the "no build." Included would be an analysis of the relative benefit-costs of the P3 approach vs. the traditional project and financing approach.

[18] https://www.fhwa.dot.gov/ipd/p3/toolkit/publications/guidebooks/bca/ch_3.aspx

[19] https://www.finance-ni.gov.uk/articles/definition-best-value-money

# OPTIONS AND RECOMMENDATIONS FOR MOVING FORWARD

The City of Annapolis has a foundation in place for developing and advancing a strategic resilience vision and plan moving into the future. The City's financing processes have the capacity to address existing and short-term infrastructure, social, and environmental needs. However, the anticipated scale and complexity of addressing future climate change impacts will require the City to make some significant changes and augmentations to its financing processes. This section of the assessment provides recommendations and options for implementing those changes.

### Create a Clear Vision and Plan of Action.

This first recommendation provides the foundation for subsequent recommendations as well as the City's resilience programs and infrastructure implementation into the future. It is recommended that the City establish a clear and actionable resilience vision and associated implementation plan and financing strategy. The purpose of the resilience vision and plan is threefold:

1. Create a broad coalition of constituency groups and civic organizations dedicated to addressing climate change resilience and mitigation throughout the community;
2. Identify the specific short-, mid-, and long-term infrastructure projects that are critical for addressing climate change threats and achieving resilience goals and the estimated fiscal resources necessary for implementation; and,
3. Create a framework for transforming the City's economy in an effort to leverage the benefits and opportunities provided by investment in resilience infrastructure.

Financing and fiscal capacity are essential to achieving resilience goals; yet, because long-term success will require a resilience vision for the future that the entire community can embrace, a broad base of support and effective leadership is needed. Annapolis has yet to establish a codified and unifying vision and plan for protecting the City's cultural, economic, and environmental resources into the future. Without clear short- and long-term objectives, it will be virtually impossible for Annapolis to successfully finance and implement necessary infrastructure improvements.

The effectiveness of the City's efforts to become more resilient to climate change will rely in large part on its success in mobilizing and incentivizing the citizens of Annapolis to action. As a coastal City, Annapolis is already directly feeling climate change impacts, specifically in regard to tidal flooding. In spite of the increasingly common occurrence of flooding in the City's downtown area, there continues to be a misunderstanding of the severity of the problem and the measures that will be necessary to mitigate the problem. The City's resilience vision must be founded an informed citizenry, which will require City leaders to be a primary mechanism for education and information.

### Establish a Resilience Financing Authority.

A second recommendation is perhaps the most significant and potentially impactful. The Mayor should convene a task force or advisory committee to investigate the viability and potential efficacy of establishing a resilience finance authority. The purpose would be to streamline and scale the resilience financing process to make City processes more efficient and effective. Infrastructure financing authorities serve a multitude of functions. The structure of these organizations and how they accomplish their missions depends on the resource need they are addressing within the communities they serve. What is consistent with all financing authorities, however, is their overall purpose in the community: to facilitate investment for the public good.[20]

The purpose of an infrastructure financing authority would be to leverage fiscal resources by creating efficiencies, economies of scale, and political synergies for addressing resilience infrastructure needs. For a resilience financing authority to work, it must enhance the work of existing processes and systems within the City in one of two ways: (1) improve the capacity of the City's financing systems, and/or; (2) provide access to additional capital that otherwise would not be available to the City in support of infrastructure development. If either of these needs exists, then an appropriately designed financing authority would be beneficial.[21] A resilience authority would provide Annapolis with a variety of benefits, including:

- Prioritizing resilience infrastructure projects within the financing system: The targeted nature of a financing authority would enable it to focus fiscal resources on those projects that are most critical to the resilience implementation and planning process. The project prioritization process

[20] *Chesapeake Bay Financing Authority Organizational Template*. A White Paper From the Financing Authority Committee, Chesapeake Bay Program. July, 2005. Page 2.

[21] Ibid. Page 3.

would not necessarily be implemented outside of existing processes, but would provide a necessary focus to the financing process.

- Accelerating and scaling the financing process by leveraging public and private revenue streams: A financing authority would have the focus and capacity to target investments in projects identified in the resilience plan. If structured appropriately, the authority would be able to incentivize private investment in support of infrastructure and resilience projects.
- Establishing more effective partnerships with the private sector: Public-private partnerships are the foundation of local resilience design, implementation, maintenance, and financing. These partnerships will need to expand in scale, sophistication, and impact as the impacts from climate change intensify. A financing authority would have the capacity to develop and advance innovative relationships with a broad spectrum of private firms and actors.
- Reducing stress on City budgets: A financing authority does not eliminate the need for public investment in resilience infrastructure. Local infrastructure will always require local government leadership and investment. However, a financing authority would reduce pressure on local budgets by creating efficiencies, leveraging private investment, and reducing the cost of capital.
- Stimulating and advancing innovation and economic growth: The effectiveness of the financing authority will be directly related to how it is designed and structured. In addition to streamlining and scaling financing processes, the authority can also be charged with incentivizing investment in those industries and businesses that will be integral to the City's resilience efforts. This dual economic development/financing role will place the authority in a position to ensure that infrastructure investments serve multiple roles and provide multiple community benefits.
- Creating more effective connections between climate change mitigation and adaptation activities and projects: finally, establishing a resilience financing authority would enable the City to link climate change resilience and adaptation efforts with climate change and carbon mitigation efforts, which is important for several reasons. First, the City of Annapolis is being directly impacted by climate change; therefore, it has a unique responsibility remain resilient to those impacts, as well as take aggressive efforts to reduce the pollution that is causing those impacts. Second, by linking adaptation and mitigation programs and strategies, the City will create more potential revenue streams, more investment opportunities, and greater community/business

engagement in the process. The role of the task force will be to investigate the viability of this type of financing institution and the anticipated processes and timelines for bringing it to fruition. In addition, the task force will:

- Assess the legal and political opportunities, constraints, and realities related to the authority development, implementation, and administration;
- Identify the potential financing mechanisms available to the authority including leveraging and debt financing, capital pooling, and equity investment; and,
- Develop potential institutional structures in regard to the authority's connection to City government.

# CREATING A RESILIENCE INVESTMENT PROGRAM

Most of the recommendations will require policy and/or regulatory changes for implementation, which take time to achieve. As community leaders move forward on the recommended policy changes, it is important to that processes be put in place immediately that can incentivize investment in many of the City's resilience infrastructure needs. It is recommend that City leaders establish a Resilience Infrastructure Investment Program. This program is designed to move capital and incentivize investment in critical civic infrastructure by utilizing and leveraging many of the City's most financially valuable assets. This program offers many benefits to the community, including:

- Attracting private capital and investment at scale;
- Enabling City leaders to allocate investment capital in those communities and projects that are generally left out of the investment process;
- Identifying for City leaders the most innovative approaches to resilience; and,
- Investing public dollars more efficiently and effectively as a result of private investment.

The model has two components:

1. Project identification. The first component is directly associated with the recommendation to create an actionable resilience plan. That plan should include a clear understanding of the

projects necessary to mitigate the impacts of climate change; it is these projects that serve as the foundation for the investment model. The City should identify two types of projects:

  - Those that are essential to the City's long-term resilience regardless of geographic location, cost, or anticipated investment or economic return. In effect, these projects have potentially low market value but very high community resilience value.
  - Those that have an anticipated economic and/or financial return to the City and potential investors. These are projects that have the highest potential economic and financial return and are therefore the most attractive to investors.

2. Asset identification. The second component is to identify the community assets that can be included as part of a project bundle, thereby creating greater incentive for investment. This could include land, zoning and permitting considerations, land improvements, or exclusive rights to infrastructure-based revenue. These assets will be bundled with the priority projects and then offered to the investment community through and RFP process.

The results and potential benefits of the program will be significant:

- The program will attract private capital and investment in support of resilience projects by better balancing risk with return on investment. Cities like Annapolis cannot finance and implement resilience goals in a vacuum; success will require a collaborative effort and multiple sources of capital. Local governments will continue to have the primary responsibility for financing and implementing critical civic infrastructure. By incentivizing and scaling private investment the public sector will put local governments in a position to maximize every public dollar invested.
- This program will enable the City to identify those projects that can and should be moved into the marketplace; these are the projects that will facilitate the financing and investment process. There is often the assumption that certain infrastructure projects must remain the primary financing responsibility of the public sector. There are situations where this is not the case, and this program will enable City leaders to identify those projects.
- The program will enable the City to target capital and investment to those communities that are often left out of market-based investment opportunities. Because the infrastructure projects are bundled, without the option of disaggregating the bundles, capital is distributed in a way that will be most impactful to the entire community. In effect, it results in a more equitable distribution of

implementation benefits through community-based investment rather than project-based investment.

It should be noted that the Resilience Infrastructure Financing Program is not mutually exclusive from the previous recommendations. For example:

- The innovative nature of this type of investment and financing program will require equally innovative procurement policies and programs.
- The program's effectiveness is dependent entirely on the City's resilience vision and planning processes. Without a plan there is no clear way of understanding the importance and potential impact of specific projects.
- Fully and successfully implementing the program in the long-term will require capacity that does not currently exist within City government; therefore, a new institution such as a financing authority will be required.

# NEXT STEPS

The primary next step is to begin implementation of these recommendations, which could be initiated with the following process:

- *Prioritize infrastructure projects:* the project team assessed each of the City's relevant planning documents, including the Hazard Mitigation Plan, the Comprehensive Plan, and the City Dock Master Plan. From each of these documents the infrastructure projects that had a connection, either direct or indirect, to resilience were catalogued. This list of more than 250 projects is the starting point for prioritizing the City's resilience activities. The next step is to identify projects that are a priority in the City's resilience effort but may not be included in planning documents. The project identification component of the program will be essential to establishing the City's resilience plan and implementation strategy.
- *Identify and prioritize City assets:* the second step is to implement a parallel process in regard to the City's assets. The focus should be on those resources that either have market value or can directly influence market value.
- *Create the investment bundles:* finally, the City should convene a team of agency heads and market experts to create the investment bundles described earlier. This team will be responsible for identifying relevant projects and assets, and bundling them into investable products.
- *Institutionalize resilience within the City's leadership and decision-making structures:* The risks and likely impacts associated with climate change as well as the investments necessary to mitigate those impacts, will require the city of establish a financing and infrastructure system that is well beyond the capacity of the system that is currently in place. The City should consider institutionalizing resilience financing and implementation functions. Two options that can be implemented jointly include:
  - *Creating a Government Wide Resilience Response.* The City should develop codified resilience goals and outcomes within each City agency. Resilience represents one of those rare public priorities that will require virtually every agency and public employee to engage at least to some degree. Some agencies have a very direct connection to resilience. These include public safety and emergency preparedness; public works; planning; and environmental programs. Other agencies and programs have a less direct connection. The

scale, complexity, and comprehensive nature of resilience planning and implementation will require an equally comprehensive response from the entire government system.

  - *Establishing a Director of Resilience position within City government*. The City should elevate the importance of resilience decision-making by establishing a Resilience Director position. The position should report directly to the City Manager and the Mayor and be structured to ensure the coordination and efficiency of resilience programs across the entire city government. The resilience director would work directly with the resilience finance authority, thereby ensuring that infrastructure investments are meeting the goals and vision of the City itself.

- *Prioritize Resilience Infrastructure Projects in the Capital Improvement Plan Process.* One advantage of creating a financing authority designed to direct and manage the financing process is that it will result in more efficient and effective government processes in multiple areas. This includes the capital improvement plan (CIP) process. The CIP process is currently heavily influenced by political dynamics associated with general fund allocation. Moving this process to the financing authority would give the resilience finance professionals the capacity to prioritize and finance projects based on the environmental, economic, and cultural needs.

This recommendation would require establishment of the financing authority, which will take time and resources. Therefore, there are steps the City can take immediately to improve CIP effectiveness. As is the case in most communities, the CIP process in Annapolis provides the City with a financial and implementation guide for infrastructure projects and programs. Though the CIP can and usually does shift over time, inclusion in the process is essential for moving infrastructure projects to fruition. As a result, it is essential for the CIP and its associated project selection processes to explicitly include and in many cases prioritize those projects that will advance the City's resilience goals. To that end, we recommend that the City adjust the CIP project evaluation criteria to include key resilience issues and threats. The existing 10-point process provides an effective foundation for prioritizing resilience infrastructure projects. However, the prioritization checklist does not specifically address resilience. This change is essential in the short-term to ensure key projects are advanced through the financing system.

*Establish Innovative Procurement Processes.* In addition to improving the CIP process, perhaps the most direct option available to City leaders to improve the efficiency and effectiveness of resilience investments is to improve the procurement process. Though the City's procurement systems are generally sufficient for addressing existing infrastructure needs, the scale and complexity of climate change adaptation and resilience projects will require equally sophisticated procurement processes. To that end, City leaders should consider adopting procurement policies and processes that enable more effective private interaction and engagement. This includes consolidating contracts when available, establishing data driven project tracking, and promoting performance financing and delivery.

*Conduct a Thorough Regulatory Review.* Given the potential impact of regulations on the resilience effort in general and the resilience financing effort specifically, it is recommended that City leaders conduct a thorough review of existing regulations and regulatory programs. The goal should be twofold: identify gaps in the regulatory system that should be addressed through policy and/or enhanced regulations; and, identify potential conflicts among existing regulations and regulatory programs that my hamper achieving resilience goals.

## CONCLUSION

In the near future the City of Annapolis, Maryland, like many other coastal communities, will begin grappling with the myriad impacts of climate change including increased sea levels, storm surge, and nuisance flooding. The City's long-term success in addressing these risks and threats will depend entirely on the conditions it creates to incentivize investment, innovation, and collaborative action and engagement among City leaders, residents, and businesses. These conditions include effective leadership, civic engagement, institutional capacity, and sufficient public investment into critical infrastructure and social projects.

Our assessment indicates that the City has established much of the foundation that will be necessary achieve resilience into the future. However, it is essential that City leaders move forward quickly and aggressively to address infrastructure implementation and financing needs. Our hope is that this report and assessment process provides the first step in addressing these needs.

# APPENDIX 1: FINANCING AUTHORITIES CASE STUDIES

The 2017 Infrastructure Report card prepared by the American Society of Civil Engineers indicates that **Maryland's infrastructure is in desperate need of investment and renewal.** 20% of the state's public roads are in poor condition, and in the next 20 years, it is estimated that Maryland will need to spend over $16 billion to maintain its wastewater and drinking water infrastructure.[22] Climate change will only compound these existing infrastructure needs, while also creating new expenses due to increased stress, weather-related damages and rising water.[23] Maryland communities must prepared themselves for unprecedented infrastructure challenges and costs.

**Barriers for financing climate resilience projects:**

- *Decreasing funding supply.* The declining investment from the federal government and unpredictable funding from state governments has left local governments the majority of the infrastructure financing burden.[24]
- *Lack of sustainable revenue streams.* Resilience-focused projects often lack sustainable revenue streams and have difficulties repaying project costs. Moreover, it is challenging to monetize their benefits. For example, even if resilience efforts protect a business development center from being flooded, the impacts are not easily captured as a revenue stream.
- *Lack of upfront capital.* Unlike other projects, developing infrastructure often requires substantial upfront capital. Most organizations do not have access to enough capital all at once and struggle to find funding.
- *Limited ability to borrow funds*. Organizations normally have debt limitations because of legal restrictions, low credit rating, or limited ability to repay debt due to unsustainable revenue streams.[25]

A Resilience Financing Authority will address these constraints and help cash-strapped local government close the climate adaptation and mitigation financing deficit. It will address local

[22] American Society of Civil Engineers. 2017. "Maryland Infrastructure Overview." 2017 Infrastructure Report.

[23] Gilbert, Stanley, David Butry, Jennifer Helgeson, and Robert Chapman. 2015. 1197 NIST Special Publication Community Resilience Economic Decision Guide for Buildings and Infrastructure Systems. Washington DC.

[24] Ibid.

[25] O'Rourke, Shaun et al. 2018. "Resilient Rhody: An Actionable Vision for Addressing the Impacts of Climate Change in Rhode Island." : 1–85.

resilience infrastructure investment needs and promote sustainable economic development through innovative financial tools.

**What is a Resilience Financing Authority?** A Resilience Financing Authority is an innovative financing intermediary that aims to develop public-private partnerships to increase investment on sustainable infrastructure and clean energy. It can "crowd-in" the private investment needed to meet the considerable capital demands required to build a resilience economy.[26]

**How do financing and capitalizing work with a Resilience Financing Authority? What impact can it generate?** A Resilience Financing Authority can attract a large amount of private capital with limited resources from local government through both traditional and innovative development finance tools, such as issuing bonds, co-lending with banks, and credit-enhancing private loans. Rhode Island Infrastructure Bank summarized the existing proven finance tools that can be leveraged to support resilience projects in the major sectors (water, power, and transportation) as follows (Figure 1 – See last page).

Emerging innovative financing mechanisms have also been explored and established in cities and states across the United States. These include resilience zones, resilience bonds, stormwater utilities, environmental impact bonds, property assessed resilience, and credit trading markets. For example an Environmental Impact Bond that follows the "Pay for Performance" or "Pay for Success" model is used by the District of Columbia Water and Sewer Authority (DC Water) to finance the green infrastructure construction and stormwater pollution. Rhode Island Infrastructure Bank developed the Stormwater Accelerator program, which allows for projects to be completed with loans that will be repayed using future utility fees. This works to speed up the completion of projects, ensuring that the benefits of the infrastructure will be enjoyed more quickly while also saving money.[27]

**Authority Example 1 - Rhode Island Infrastructure Bank and Resilient Rhody.** Rhode Island Infrastructure Bank was established in 1989 and aims to support and finance infrastructure investment by issuing bonds, loans, and grants.[28] It has facilitated widespread infrastructure

[26] Doug Sims (2016). Engaging private capital to drive clean energy finance. Retrieved from Natural Resources Defense Council's Center for Market Innovation.

[27] O'Rourke, Shaun et al. 2018. "Resilient Rhody: An Actionable Vision for Addressing the Impacts of Climate Change in Rhode Island." : 1–85.

[28] Rhode Island Infrastructure Bank. 2018. Rhode Island Infrastructure Bank Annual Report. Providence RI.

improvements, which will, in turn, create jobs, promote local economic development and protect the environment. In 2018, the Infrastructure Bank provided over $80 million in loans, and helped clients save more than $ 9 million in interest expenses. Altogether, it has created or supported more than 57,000 jobs by financing infrastructure projects.[29]

In 2018, Rhode Island prepared its first Climate Resilience Action Strategy to address the impacts of climate change in four key areas: critical infrastructure and utilities; natural systems; emergency preparedness; and community health and resilience. The Strategy proposed 61 recommended actions and under the leadership of the Infrastructure Bank, implementation is already underway.

**Authority Example 2 - Connecticut Green Bank.** The Connecticut Green Bank, (CGB) the first Green Bank in the United States, is a quasi-public corporation that was established in 2011 and aims to support the Governor's and Legislature's energy, local economic development and job creation strategies. The CGB is funded by electricity surcharges, proceeds from the Regional Greenhouse Gas Initiative carbon allowance sales, federal grants, and private sources. The CGB is a leader in its field and works to make the transition from financing resilience projects primarily through government sources towards a growing reliance on private capital. The bank incentivizes market investment by leading the transition of resilience finance from government grants, subsidies and rebates only to increasing private investment by offering "co-investment, credit support, warehousing, [and] marketing.[30]

Based on the latest impact evaluation report[31], the CGB has successfully increased investment in resilient infrastructure. By issuing bonds, CGB has lowered the cost of capital, mobilizing $1.1 billion of private investment into local economy with $219 million Green Bank investment. This means that for every $1 of Green Bank investment, $6 of private capital can be leveraged. Moreover, the CGB's activities have supported $66.4 million in tax generation, including $33.9 million in individual income tax, $17.8 million in corporate taxes, and $4.7 million in sales taxes.

The CGB has also made a substantial contribution to local economic development. Between FY2012 and 2018, the bank has had a band in creating approximately 16,000 direct, indirect, and induced

[29] Ibid.

[30] Green Bank Network. 2018. "Connecticut Green Bank." https://greenbanknetwork.org/connecticut-green-bank/.

[31] Connecticut Green Bank. 2018. Green Bank Impact Report. https://www.ctgreenbank.com/wp-content/uploads/2018/11/FY18-CGB-Impact.pdf.

jobs. Beyond job growth, it has helped Connecticut residents by increasing energy efficiency and reducing their energy burdents. In total, it has lowered energy costs for more than 30,000 households and 300 businesses. It has also increased the accessability and affordability of infrastructure such as solar panels.

Finally, the CGB has helped protect the environment. Since it was established in 2011, the bank has invested over $1 billion in clean energy initatives, and during this time solar power production in the state has had an annual growth rate of 50% and created over 450 gigawatt hours of electricity in the last year. This has had a substantial impact on emission volumes, resulting in a total reduction of 4.7 million pounds of SOx, 4.6 million tons of CO, and 5.5 million pounds of NOx. It has also generated $107.1 - $242.0 million in public health value reducing illness.

**Authority Example 3 - The New Jersey Energy Resilience Bank.** The State of New Jersey is ranked third in the nation in solar generation based on their New Jersey Clean Energy Program (NJCEP). A key feature of this program is the New Jersey Energy Resilience Bank (ERB) which is funded by a $200 million Community Development Block Grant – Disaster Recovery.The ERB was developed to address the challenges with implementing resilient energy systems: the technology is too complex; the financial arrangements do not work within existing capital budgets; and current incentives are insufficient. The New Jersey Economic Development Authority manages the ERB program with technical assistance and support from the New Jersey Board of Public Utilities.[32]

The ERB is presently focusing on existing commercially available and cost-effective distributed generation technologies, including CHP, fuel cells, battery storage and resilience upgrades for renewable technologies. Nevertheless, the ERB can adapt to the emergence of new markets and new technologies that are practical, cost-effective, and offer the same or greater resilience benefits as current distributed generation technologies. The ERB launched its first product in October 2014 that will provide financing of up to $65 million for public, nonprofit, or certain eligible for-profit wastewater treatment plants and water treatment plant operators. Extensive, sector-specific market research and stakeholder outreach following Hurricane Sandy was used to develop the program structure and financing terms.

[32] US Department of Energy. 2015. Energy Investment Partnerships: How State and Local Governments Are Engaging Private Capital to Drive Clean Energy Investment. https://www.energy.gov/sites/prod/files/2016/01/f28/Energy Investment Partnerships.pdf.

**Authority Example 4 - Energy Trust in OR.** Energy Trust is an independent nonprofit organization based in Oregon which is dedicated to providing customers with information, financial incentives and technical assistance in order to help them benefit from energy savings and renewable energy. Its services are available to ordinary residents as well as the public, agricultural, commercial and industrial sectors. Energy Trust helps customers to save energy by upgrading equipment and constructing new facilities and it provides services such making energy-efficiency upgrades and installing a renewable energy system for residents.[33] With more than 2300 independent trade ally contractors and program allies, it delivers services to qualified contractors. The Trust's primariy funding sourcess are several large-scale utility companies in the state of Oregon.[34] The Energy Trust's 2018 budget projected $187 million in revenue and $198 million in costs, most of which would be spent on energy efficiency. Since 2012, it has helped 1.6 million customers to save $3.2 billion on utility bills, which means that it reduced CO2 emissions by 22.8 billion tons.[35]

One prominent benefit of the Energy Trust that it builds resilient infrastructure in Oregon, which establishes a more sustainable energy future, so that cost-effective energy efficiency and clean renewable energy become the most important energy resources available to Oregon and Southwest Washington utility customers.[36] They have also successfully transformed the lighting market in Oregon by universalizing LED bulbs in targeted regions[37] and created effective connections between climate change mitigation and adaptation activities by promoting energy-efficiency appliances. In the future, they plan to collaborate with the Oregon Department of Energy to increase access to solar energy for low- and moderate-income communities, thereby continuing to advance innovation and economic growth in the renewable energy market.[38]

[33] NW Natural. 2018. "Energy Trust of Oregon." https://www.nwnatural.com/Residential/SaveEnergyAndMoney/EnergyTrustOfOregonServicesAndIncentives.

[34] Energy Trust of Oregon. 2018. "Explore Energy Trust." https://www.energytrust.org/about/explore-energy-trust/.

[35] Energy Trust of Oregon. 2017. "Annual Report 2017: Innovating for the Future." https://www.energytrust.org/annualreport2017/.

[36] NW Natural. 2018. "Energy Trust of Oregon." https://www.nwnatural.com/Residential/SaveEnergyAndMoney/EnergyTrustOfOregonServicesAndIncentives.

[37] Energy Trust of Oregon. 2017. "Annual Report 2017: Innovating for the Future." https://www.energytrust.org/annualreport2017/.

[38] Ibid.