

Senator Jamie Eldridge
Chair
Water Infrastructure Finance Commission
Massachusetts State Senate
Boston, MA

Dear Senator Eldridge:

Thank you again for inviting us to meet with the Water Infrastructure Finance Commission on March 1st. We very much enjoyed speaking with you and other members of the Commission and commend you all on seizing this unique opportunity to design a water financing system that promotes and supports sustainable water management.

I would like to summarize briefly, for the record, the main points of our presentation and then respond to specific questions put to us by Rep. Carolyn Dykema, and by Commission members Martin Pillsbury, Bruce Tobey and Bob Zimmerman.

Points in Our March 1st Presentation

Natural System Utilities (NSU): Mission and Approach

Natural Systems Utilities' mission is to meet human needs for safe, reliable water while preserving and protecting freshwater resources, habitat, and diversity.

Our aim is to develop and deploy innovative infrastructure modeled on natural systems and processes that minimizes net water extraction and energy consumption, contributes to water and soil health, and supports livable, healthy, and sustainable communities while delivering attractive, sustainable returns to investors consistent with our position as long-term asset managers and utility operators.

Financial Challenges in the Water Sector

Water and wastewater infrastructure built since passage of the 1972 Clean Water Act and the 1974 Safe Drinking Water Act has brought substantial progress in protecting public health and the environment. However, as the science and economics have evolved, it has become apparent that large, conventional systems – the dominant model among the installed water infrastructure systems – represent an economically and environmentally unsustainable approach into the future. Underfunding is estimated at \$20-30 Billion per year. Municipal bonds are now a higher risk because of underlying financial stresses upon local and state governments. In addition, pollution, infiltration, and scarcity are increasing concerns that require new innovations and capital to resolve.

The solution is a hybrid approach to optimize new and existing water infrastructure. Stakeholders of municipal and private facilities can “unleash” layers of resource value in the system, by recovering reuse water, energy, and nutrients. Such retrofit optimization helps stabilize the finances and lighten the water and energy footprint of the current infrastructure, and create jobs within those same communities. Stakeholders who need new infrastructure can be served with integrated water-centric systems that supply and treat water within a more resilient and efficient decentralized district area, and manage all of the related natural resources as benign by-products that serve local needs.

This technological innovation should be matched with financial innovation. A “public/private risk/reward” model can shift risk from the public to the private sector and promote cycles of creativity and fit-to-purpose functional solutions. These modular solutions will be installed using private financing, while water rate reductions, as in New York City, or “impact investing” from foundations can provide incentives. A private or non-profit (cooperative) utility is willing to be held accountable for meeting performance standards, as long as the utility is the responsible party for installation, operation and maintenance. The underlying asset may later be returned to the community.

Opportunities to Recover Value

Private capital investments in these innovative projects are an opportunity for the community to benefit without needing to make the initial public investments or carry risks. Problems with earlier efforts to privatize the water and wastewater system would be avoided. In these cases, private investment would be targeted at the creative, leading-edge.

Technologies are currently available for resource recovery. What is new is the deployment at building and neighborhood scales.

Green Building projects are a significant opportunity for streaming in new technologies in reuse and in energy and nutrient recovery, along with natural systems approaches. The LEED program has shown the potential for projects to exceed the performance of conventional technologies and designs, by streaming in innovative approaches that save money initially or over time, or otherwise increase the value of the property. These projects provide the opportunity for “proof of concept” of new technologies.

Cities as diverse as Milwaukee, New York, , Philadelphia Portland and Seattle are also beginning to sponsor green development “zones” or “eco-districts”, where various “proofs of concept” in water, stormwater, wastewater, energy, transportation, etc. can be compounded at the neighborhood scale. Many of these projects are in brownfields. The role of city government is to observe, regulate, and provide incentives, as in a reduction in water rates for those buildings in Battery Park, NY, that incorporate reuse for toilet flushing, cooling towers, irrigation, laundry, etc.

Benefits

Benefits -- In addition to cost-savings and revenues from resource recovery, benefits to communities might include reduced energy expenditures for pumping and treatment, avoided capital projects to provide additional water supply or nutrient removal, reductions in CSO problems, efficient modular service to outlying unsewered areas, greater control over growth and development patterns, and others.

Natural systems -- Distributed natural systems can also create ecosystem benefits. For example, constructed wetlands for wastewater treatment can provide multiple functions, including nitrogen uptake, carbon capture, bird habitat, etc.

Help from State Government

State government can support “proof of concept” projects at both building and district scales, through incentives and funding of demonstration projects.

Procurement contracts should be changed to adopt performance standards and specifications, along with life-cycle costing methods that include operations and maintenance charges as well as initial construction costs.

Questions from Rep. Dykema and Commissioners Pillsbury, Tobey, and Zimmerman

Case Studies of Cost-Savings and Multiple Benefits

Rep. Carolyn Dykema asked for examples or case studies of this approach and its financial benefits.

In the March 1st presentation, slides were shown of a wastewater source thermal energy heat pump in Beijing, of water reuse in Battery Park residential units in Manhattan, Gillette Stadium in Foxboro and Co-Op City in the Bronx, and of natural wetlands treatment and wet weather storage. Additional information on these projects is available on the Natural Systems Utilities website.

Yesler Terrace is a proposed redevelopment project in Seattle. This “district” would incorporate district energy, utilizing a geo-exchange/solar hot water source, a water reuse system, and yard waste composting. The project would include 4,000 new public housing units and 1 million square feet of office and commercial space, as well as parks and open space. NSU produced an Integrated Water Strategy (IWS) Assessment for the project in 2010.

In particular, NSU’s Yesler Terrace reuse system of treated wastewater would cut potable water demand by up to 59.2% and sewer flows by 71.6%. A combined total wastewater reuse program providing reuse water for flushwater, laundry, irrigation and Combined Cooling, Heating and Power make-up is projected to reduce annual potable water and sewer charges to \$1,096,359, with an annual net savings of \$384,830 using an amortized reuse treatment cost of \$0.014 per galls. This represents an approximate

savings of 14% based on current economic information and rate structure. It is anticipated that this savings may improve as water reuse system technology continues to advance and as regional sewer and water charges continue to increase.

The use of treated wastewater for landscape irrigation will also supply some of the nutrients, especially nitrogen and phosphorus, needed by the landscaping, thus helping to reduce the amount of fertilizer needed for landscape maintenance.

Reuse of treated wastewater will have positive environmental impacts beyond Yesler Terrace. The significant reduction on potable water demand will serve to help increase flows in the Cedar and Tolf Rivers due to the reduced need for water extraction, thus leading to improved stream ecology, especially during the summer. The County may also realize some benefits from flow reductions and CSO control facility cost reductions as flows from Yesler Terrace are decreased.

The proposal also suggests that sewer heat mining and a biogas digester should also be studied. The Yesler Terrace Sustainable District Study will be made available upon request.

The Decentralized Water Resources Collaborative has also funded a series of case studies and guidance documents on decentralized and integrated water management. See www.decentralizedwater.org.

Nutrient Treatment and Recovery

Commissioner Martin Pillsbury suggested that closed-loop thinking for wastewater and stormwater reuse and for energy recovery is fairly well-understood in Massachusetts and asked if there are examples of nutrient recovery.

NSU's experience is that the low-hanging fruits are reuse and heat recovery projects. However, Cape Cod, Southern Louisiana and Chesapeake Bay are sites where natural systems approaches are being explored to replace chemical approaches in removing nitrogen through evaporation and plant uptake. Wetlands have multiple functions, including nitrogen and carbon uptake. In Louisiana, the Army Corps of Engineers is assigning credits for natural assimilation, while in Chesapeake Bay, credit exchanges are being created for nutrient trading.

Regulatory Flexibility and Adaptive Management

Commissioner Bruce Tobey suggested that the water and wastewater field dominated by "concrete and steel" approaches is locked-in by regulatory paradigms and vested interests, and asked for suggestions to deal with regulatory impediments to innovation and resource recovery.

Proof of Concept -- New York City Standards Board -- Waivers

Buildings Sustainability Board -- a panel of technical experts, appointed by the Commissioner of Buildings for terms of one year, which will advise the Commissioner regarding the conditions under which sustainable technologies not yet addressed by the New York City Construction codes might safely and reasonably be permitted for use in the City.

Wastewater and stormwater reuse and co-generation within the building have already been permitted. Wind generation on buildings is currently being considered.

Source:

http://www.nyc.gov/html/dob/html/sustainability/sustainability_advisory_board.shtml

Districts -- Portland, Oregon

EcoDISTRICTS FRAMEWORK -- EcoDISTRICTS are “triple bottom line” neighborhoods with the lowest possible environmental impact and highest long-term economic and community returns. The objective is to test and eventually codify the next generation of best practices and commercialization opportunities in green development and infrastructure that can be scaled to create neighborhoods with the lowest environmental impact and highest economic and social resiliency in the United States.

Clean and Safe Water: Priorities include district-scaled water efficiency and reuse, district-scaled greywater management and reuse, and district-scaled storm water management practices ... These technologies will look to reduce the life cycle costs and environmental impacts of pumping and treatment, enhance urban watershed and estuary health, and provide flexibility and redundancy in the City’s water distribution system.

Source: <http://www.portlandonline.com/shared/cfm/image.cfm?id=246720>

Adaptive Management

EPA is developing a framework for supporting innovation, which balances assurances that penalties for failure of pilot projects will not be excessive, with continued pressures for compliance. Recent enforcement actions allowing a demonstration phase for green infrastructure to control and eliminate sewer overflows include: Cincinnati, OH, where an amended consent decree in 2010 provides for a three-year study and design period to monitor green projects in the Lick Run watershed and to submit proposals for “green for gray” substitutes by 2012; Cleveland, OH, where a 2010 consent decree allows the City to submit plans for additional green infrastructure controls, based on the results of initial projects; and Louisville, KY, where an agreement was reached to allow construction of 19 initial green infrastructure demonstration projects and, after six years of study and monitoring, to propose additional green infrastructure controls.

Source: http://www.epa.gov/npdes/pubs/gi_memo_protectingwaterquality.pdf

Similar adaptive management approaches can be utilized in Massachusetts to support innovations in stormwater and wastewater treatment, in particular in support of pilot projects on Cape Cod.

Low Income Housing Tax Credit

Commissioner Tobey also asked if other states had developed state funding streams for water and for reactions to the potential applicability of the Massachusetts Community Preservation Act as a source of funding for water projects.

NSU is not aware of the Community Preservation Funding approach in other states. However, the Low Income Housing Tax Credit (LIHTC) Program may be a useful model for stimulating private investment in resource recovery and natural systems designs.

Section 42 of the Internal Revenue Code was enacted by Congress in 1986 to provide the private market with an incentive to invest in affordable rental housing. Federal housing tax credits are awarded to developers of qualified projects. Developers then sell these credits to investors to raise capital (or equity) for their projects, which reduces the debt that the developer would otherwise have to borrow. Because the debt is lower, a tax credit property can in turn offer lower, more affordable rents. Provided the property maintains compliance with the program requirements, investors receive a dollar-for-dollar credit against their Federal tax liability each year over ten years.

This program provided incentives for public, non-profit, and private partnerships and \$46 Billion in community investments. A next-generation LIHTC program could include “green” components in water and energy.

Source: <http://www.hud.gov/offices/cpd/affordablehousing/training/web/lihtc/basics/>

Integrated Water Management and Sustainability Innovation

Commissioner Bob Zimmerman suggested that most conversations start and end “in the middle” of siloed concerns, such as green infrastructure alternatives for dealing with CSOs in Philadelphia, and should instead start with a broader “A to Z” or “mimicking nature” perspective. An “A to Z” approach would consider the larger water balance, and would inventory all assets, optimize natural assets, search for multiple benefits, consider watershed and global concerns. In the Boston metro area, water managers need to look at stranded infrastructure and costs, how economy and environment will co-evolve over time, and consider alternative transition strategies away from unsustainable approaches.

Zimmerman questioned whether other states have adopted this “A to Z” approach and transition strategies.

NSU suggests that one transition strategy is targeted proof of concept technology projects, which are then compounded into eco-district scale projects. These models will

over time “self-propagate” and address larger sustainability concerns in the watershed. Performance standards can be designed to reflect specific water quality or quantity, financial, and other concerns in the watershed.

Models of Statewide Innovation -- Plans and Funding

These six states provide models for integrated water management and sustainability innovation. (This list is not comprehensive. Other states may also have adopted sustainability innovations.)

California -- Integrated Regional Water Management (IRWM)

Integrated Regional Water Management (IRWM) is a collaborative effort to manage all aspects of water resources in a region. IRWM crosses jurisdictional, watershed, and political boundaries; involves multiple agencies, stakeholders, individuals, and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions.

*"Integrated regional **water** management plan" means a comprehensive plan for a defined geographic area, the specific development, content, and adoption of which shall satisfy requirements developed pursuant to this part. At a minimum, an integrated regional **water** management plan describes the major **water**-related objectives and conflicts within a region, considers a broad variety of **water** management strategies, identifies the appropriate mix of **water** demand and supply management alternatives, **water** quality protections, and environmental stewardship actions to provide long-term, reliable, and high-quality **water** supply and protect the environment, and identifies disadvantaged communities in the region and takes the **water**-related needs of those communities into consideration."*

http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/highlights_cwp2009_page.pdf

Hawaii -- Integrated Resource Planning (IRP)

The Framework recommends integration at the county level and advocates the use of an integrated resource planning (IRP) approach. IRP can best be described as a comprehensive form of planning that encompasses least-cost analyses of resource management options, as well as a participatory decision-making process. It involves the development of water resource alternatives that take into consideration communities and environments that may be affected, the numerous institutions concerned with water resource development and protection, and the potential for competing policy goals.

IRP attempts to consider all direct and indirect costs and benefits of demand-side and supply-side management, and augmentation of supply. This is achieved by using alternative planning scenarios, analyses across disciplines, evaluation of social and environmental impacts, and community involvement in the planning, decision-making, and implementation processes.

Source:

http://www.state.hi.us/dlnr/cwrm/planning_statewideframework.htm

<http://www.environmental-expert.com/Files%5C5306%5Carticles%5C13882%5C511.pdf>

New Jersey -- Sustainability Certification and Incentives

SUSTAINABLE JERSEY™ is a certification program for municipalities in New Jersey that want to go green, save money, and take steps to sustain their quality of life over the long term.

Sustainable Jersey:

- Identifies concrete actions that municipalities can implement to become "certified" and be considered leaders on the path to sustainable communities
- Provides clear "how to" guidance and tools to enable communities to make progress on each action
- Provides access to grants, and identifies existing and new funding opportunities for municipalities to make progress toward the actions
- Encompasses the 3 equal, interrelated components of sustainability:
- Prosperity-support your local economy and use community resources
- Planet-practice responsible environmental management and conservation
- People-embrace social equity and fairness

New Jersey is the first state in the nation to have a comprehensive sustainability program for communities that links certification with strong state and private financial incentives, and a fully resourced program of technical support and training. Sustainable Jersey has streamlined, incentivized and guided the process

Source: <http://sustainablejersey.com/about.php>

<http://www.state.nj.us/dep/opsc/sdtguide.html>

Minnesota -- Water Sustainability Framework

In fall of 2008, Minnesotans passed The Clean Water, Land and Legacy Act, an amendment to the state's constitution that created a three-eighths of a percent sales tax to fund, among other things, the protection and preservation of Minnesota's freshwater. The amendment has the potential to raise more than \$275 million a year – of which roughly one third—about \$85 million a year—will go toward protecting and preserving Minnesota's surface and ground water.

In spring 2009, the legislature took the first step in investing that money, appropriating \$750,000 to the University of Minnesota's Water Resources Center to create a comprehensive, 25-year framework for the sustainable management of Minnesota's

water resources. The framework is intended to serve as a roadmap—with clear signposts on how and when to spend the money and on what initiatives—based on scientific research, expert opinion, and input from citizens around the state.

The Framework is comprehensive in its recommendations and at first glance may seem like a daunting challenge on many levels, including financial. The quality and diversity of knowledge and perspectives that contributed to the final form of these recommendations cannot be overemphasized and implementation of them in their entirety provides the best assurance of water sustainability. However, in the expert view of the Framework’s authors, there are 5 overall actions (encompassing eight recommendations) that are most critical, in fact are considered essential, to achieving water sustainability—implementing these five actions will take us closer to water sustainability than any other limited combination of actions. These five actions can be grouped into two parts: (i) Protect and restore water quantity and quality and (ii) address the interconnected nature of water. They are all Phase 1 actions, of high impact to water quality, and have multiple benefits.

- Protect and restore water quantity and quality through comprehensive, integrated, and informed management and policy:
- Revise water appropriations permitting (Recommendation A.1.b), and model the state’s water balance (A.1.a)
- Comply with water quality standards through implementation plans for reducing pollutants (B.1.a) and bring farmers to the table to be part of this solution (B.2.a)
- Address future contaminants (C.1.a, C.2.a)
- Address the interconnected nature of water by integrating and aligning planning and policies:
 - Integrate water and land use planning (D.1.a)
 - Align water, energy, land, transportation policies for sustainability (J.1.a)

Source: <http://wrc.umn.edu/watersustainabilityframework/index.htm>

Maryland -- Environmental Benefits Districts, CWSRF Incentives

Environmental Benefits Districts (EBD) are places where state government and other stakeholders, working with community residents, can focus their financial, technical, regulatory, administrative, policy, and other resources to conduct on-the-ground projects to benefit communities most in need.

<http://www.mde.state.md.us/programs/Water/QualityFinancing/Documents/www.mde.state.md.us/EBD%20combined.pdf>

Maryland’s Clean Water State Revolving Fund has been working with EPA, as one of three pilot states, to incorporate sustainability principles into CWSRF funding. The state’s priority system provides “Sustainability Benefit Scores” including for recycling or reuse, location in an Environmental Benefits District, or green elements (LEED,

WaterSense, EPA Score Card or 20% energy/H2O reduction), along with other measures for asset management and financial partnerships, etc.

Source: http://cwsrfrtraining.net/files/7_SRF_Sustainability_Policy.pdf

New York -- Green Innovation Grants

New York State Environmental Facilities Corporation (EFC) today announced \$15 million in grants for environmentally innovative projects through the Green Innovation Grant Program (GIGP). The funds were awarded to 40 municipalities, non-profits, and businesses throughout New York for clean water infrastructure projects that spur environmental innovation, build capacity for green infrastructure, and facilitate technology transfer.

“Green infrastructure saves precious taxpayer dollars, revitalizes communities, improves the quality of our waters, and makes our communities more economically competitive,” said EFC President and CEO Matthew J. Driscoll. “New York State has made green industry a priority and is quickly becoming the nation’s leader in green infrastructure. EFC is proud to provide the premier program to accomplish these goals.” The grants will assist communities with projects that encourage economic growth, community revitalization, and development of cost-cutting solutions for water quality projects. In addition, the program expands green collar job opportunities across the State and builds upon a legacy of green public works projects and entrepreneurship. EFC solicited projects to identify green infrastructure opportunities that were not only sustainable and innovative, but also those that were unique and educational prototypes for future projects. EFC received 96 applications for projects seeking approximately \$46 million in financial assistance. The \$15 million in grant awards leverages a \$75 million investment in green infrastructure for communities across New York State.

“Green infrastructure involves ingenious methods to treat polluted runoff by slowing it down, spreading it out, and soaking it into soils in a manner that mimics nature,” said Joe Martens, Commissioner of the New York State Department of Environmental Conservation and Chairman of EFC’s Board. “The grants we announce today will help our hard-pressed municipalities to improve water quality while beautifying and revitalizing urban areas -- a win-win.”

Source: <http://www.nysefc.org/GreenGrants.aspx>

Thank you again for the invitation to speak with you this Spring. If you would like more information on any of these topics, please let us know.

Sincerely,



Edward Clerico
CEO



Dominic Kulik
Chairman