



A Clear Commitment to America's Waters

A 2020 Vision for Clean Water...The Transformational Role of Public Agency Leadership

Draft NACWA Concept Paper

Introduction and Roadmap

Discussions in the Nation's Capital regarding clean water agencies often center around specific regulatory compliance issues under the Clean Water Act or how to best fund or finance an aging network of pipes and systems. These discussions, however, often neglect — and sometimes even serve to overshadow — the fact that a significant, transformational shift in how utilities are managing their systems is well underway.

The drivers behind this shift were not entirely foreseeable when the Clean Water Act was passed, including population growth, climate change, a push toward energy independence, an ongoing economic downturn that rivals the Great Depression, awareness of multi-source pollution challenges, the rapidity of technological change and progress, as well as the way utility leaders are making increasingly complex decisions at the local level. Due to these shifts, wastewater treatment plants are becoming agents of resource recovery using cutting-edge techniques and technologies. They are engaged in the capture and reuse of energy; the reuse of wastewater to bend the curve on the hydrologic cycle; capturing phosphorus and other beneficial and vital resources from a constantly replenishing waste stream; using their solids as fertilizer and energy sources; becoming stormwater harvesters, green infrastructure innovators, water quality credit traders, and sustainable community advocates.

The shift itself can be seen in the words used to describe the agencies over time. Under the Clean Water Act, the term of art was “publicly owned treatment works” or POTWs that captured the work mandated under the Clean Water Act. More recently, the term clean water agencies has become more common, with the Association of Metropolitan Sewerage Agencies (AMSA) changing its name to the National Association of Clean Water Agencies (NACWA) to capture the focus on the beneficial end-product leaving the plant rather than the influent coming into the plant. Today, these clean water agencies are evolving into even more — resource recovery agencies.

This concept paper argues that utility leaders are embracing new techniques and approaches in a manner that reflects how the U.S. as a country — and the world — has changed and will continue to change. Furthermore, this paper views this transformational shift as a positive development that is already, and increasingly will, result in significant benefits to U.S. communities and their ratepayers. As utility leaders embrace this broader, more dynamic role, a vision for the *Water Resources Utility of the Future* is beginning to emerge.

As utility leaders have grown more sophisticated over the 40 years since the Clean Water Act became law, a key question has arisen. Whether, and to what degree is the concept of the *Water Resources Utility of the Future* compatible with the Clean Water Act in its current form, or do changes need to be made to the Act to incorporate this new direction? Some argue that transformational leadership and change will provide new ways to comply with the Act at less cost and in a manner that can be incentivized through policy and financial means. Some, however, will argue that the prescriptive, “command-and-control” construct of the Clean Water Act cannot account for the multi-faceted and complex roles utilities are playing within their communities. Either way, this evolution will continue to demand a serious re-appraisal of the Clean Water Act and its ongoing relevance in the 21st century.

In line with this, NACWA is seeking to develop an advocacy-based *2020 Vision for the Water Resources Utility of the Future*. In 2020, NACWA will celebrate its 50th anniversary, and the CWA will be nearing 50 years old, as well. In line with these milestones, it is vital to recognize that our sector is at a crossroads and to get out ahead of the curve and shape the next decade's clean water agenda. This means determining how this shift impacts not only individual utilities, and how they manage their systems, but also how it impacts NACWA's advocacy agenda and initiatives.

It is important to note that NACWA is hardly alone in thinking about these issues – other research and education-based associations in the water sector and other infrastructure sectors have done, and are doing, important work in this arena. NACWA plans to work collaboratively with these groups and avoid duplication by focusing on its unique mission in the advocacy arena to add value to a broader sector-wide effort.

Advantages, Consequences and Impacts of the Utility of the Future Concept

In order to determine to what degree public agencies can and should embrace this shift, it is important to determine whether the shift as a whole is “good” or “positive”. The impacts of this transformational shift are profound both for clean water agencies at the local level and at the national level. At the local level, key questions include: How to prioritize opportunities to become more sustainable when facing enormous existing infrastructure needs/costs and increasingly costly regulations? How would priorities be set differently by the utility if sustainability and community benefit were truly the overriding considerations? Although these questions clearly go beyond the resource recovery realm, resource recovery initiatives offer a strong example of how market-based approaches may provide at least some of the answers — if the type of resource recovery activity itself can raise revenue or save significant funds, then decisions to move in a more sustainable direction become easier.

If a utility, for example, can become energy-independent and can save potentially 1/3 of its operations and management (O&M) budget through energy conservation and recovery activities then the investment pays for itself over time. If the utility can create more energy than it needs it may be able to not only save money but to sell excess energy and actually raise revenue — all while helping advance the goal of energy independence. The same construct holds true in other resource recovery and new technology contexts as well.

Of course, the market benefits of resource recovery may not always be so clear but an argument can be made that the community benefit from such a non-traditional program outweighs other programs that have more traditional and even a level of measurable water quality benefits. There is also value added when a utility acts in a visible and tangible way to benefit its community and ratepayers. Where the work of a utility is often out of sight and out of mind, these types of projects — renewable energy production, green infrastructure, land conservation, etc. — can show a very real, visible activity that creates a stronger relationship between the utility, its community, and its customers.

The Business Case for the *Water Resources Utility of the Future*

The *Water Resources Utility of the Future* contemplates a new business model. Instead of simply collecting, treating, and disposing of municipal and industrial wastewater, the utility of the future re-imagines itself as an integral component of the local economy, ecology, and social community.

Its objectives are to separate, extract, or convert valuable commodities from wastewater to reduce costs to households and businesses, improve the quality of surrounding ecosystem, and deliver value to the local economy.

This is not a future aspiration. With the help of technology developers, innovative municipal leaders are beginning to take these steps today. They are becoming more energy efficient, recovering energy from biosolids, reusing effluent and biosolids, recovering a wide range of commodities, transforming waste streams into valuable new commodities, and taking steps to support economic expansion by setting capital investment priorities to meet the needs of industry. In so doing, utilities are reducing costs and finding new sources of revenue. Savings are passed back to the community in the form of mitigated rate increases and investments in community welfare. The environment also is a net beneficiary. And so is the local and, in many cases, the national economy. Reduced costs and increased revenues passed back to households and businesses create more disposable income, which can be reinvested in local goods and services. Capital can be freed up for reinvestment in the plant and equipment, as well as research and development. Part of this investment ends up creating new jobs in the technology and manufacturing sectors, which creates demand for new housing and other goods. As a result, governments enjoy growing tax receipts. Nationally, energy savings reduce imports and support a healthier balance of trade.

The logic of this approach is compelling and NACWA should play a unique role in advancing — with Capitol Hill, as well as the Environmental Protection Agency (EPA) and other key agencies such as the Department of the Interior, the Department of Agriculture and the Department of Energy — the availability of pilot and incentive-based programs to make this transformation a reality. Similarly, there will also be a vital role for identifying, and seeking the removal of, any barriers that stand in the way of the Nation's utilities doing the right thing for their communities and ratepayers.

Please see the graph at the end of this concept paper which provides a visual of the business case for moving in the direction of the water resources utility of the future.

Innovation and Risk

As clean water agencies seek to move more aggressively into the arena of transformational change, additional investment in new technologies and approaches is often perceived as more risky than traditional technologies. Many of the technologies used in resource recovery efforts are newer, have less of a long-term track record in meeting CWA or other national or state statutory requirements, and are offered in markets that are subject to extreme fluctuations and unforeseeable external pressures. This is true, for example, in the arenas of reuse, green infrastructure, and energy recapture methods.

For these reasons, it can be difficult to get the array of interests — the municipality, manufacturers, consulting engineers, insurers/underwriters, investors, etc. — to share the risk associated with these projects. While there are examples of how this can be done successfully in both the international and domestic arenas, the role of the federal government in embracing such a shift through incentivizing these projects -- and ensuring sound demonstration and pilot projects to help move more broadly in this direction -- is also critical.

As NACWA contemplates its role in the *Water Resources Utility of the Future* arena, it must help address how to use existing statutory authorities, as well as existing federal programs at an array of government agencies, to help ease this process along. It must develop a strong understanding of what utilities are already doing, what programs they have taken advantage of to move forward with innovative projects, what roadblocks need to be removed, and how risk can be evenly spread among parties to make innovative approaches sufficiently safe and more broadly acceptable.

Impacts on NACWA and Next Steps

In an era where the “water quality game” has changed (even if the statutory rules of the game have not!), our national public outreach, advocacy and management/leadership agendas must change as well. The consequences of this line of thought means a dramatic shift in terms of how we brand NACWA – and its member agencies – with the public, the media, and to local, state and national elected and appointed officials. It necessitates a potentially dramatic realignment of our priorities on Capitol Hill, and with the Nation’s federal agencies, as our role in the utility management and sustainability arena evolves.

NACWA’s focus on certain key congressional committees with jurisdiction over EPA – and our advocacy focus on the Agency itself – would clearly remain a top focus. The Association, however, would have to continue to expand its advocacy efforts and outreach to other non-traditional audiences. While NACWA has begun to engage in energy-related and agricultural/nonpoint issues, our penetration into these Committees on Capitol Hill – and into the Department of Energy and Department of Agriculture -- would require a deeper dive. A more targeted advocacy focus on water reuse, for example, will require working more closely with the Department of Interior and its Bureau of Reclamation.

Furthermore, developing Capitol Hill and Federal Agency buy-in for programs that incentivize or support the types of resource recovery and innovations being contemplated or implemented by the Nation’s clean water agencies will be critical. This, in turn, will demand an expansion of NACWA’s contacts to key finance and appropriations committees that have jurisdiction over these issue areas and would call for a serious conversation about the additional resources needed to meet these goals, as well as a realignment of existing resources based on a potentially far-reaching re-prioritization of our agenda.

Momentum Already Exists: EPA’s Integrated Planning Initiative and NACWA’s *Money Matters. . . Smarter Investment to Advance Clean Water™* Campaign

EPA’s Clean Water Act integrated planning initiative, which was set in motion largely through efforts by NACWA pursuant to its *Money Matters. . . Smarter Investment to Advance Clean Water™* campaign, is an important first step toward a move in the direction of the *Water Resources Utility of the Future*.

In essence, EPA is saying that there must be a better way to do business under the Clean Water Act, with a focus on the municipality setting its own priorities based largely on maximizing net-environmental benefit and fully evaluating financial/affordability considerations. This effort seeks to underscore the need for innovative technologies and management approaches, though EPA has focused primarily on the arena of wet weather issues and green infrastructure. The

willingness of EPA, however, to begin to even explore such themes is a demonstration of how far clean water agencies have come.

And yet, the integrated planning effort has also been fairly narrowly circumscribed by EPA. The flexibility is entirely limited to the four corners of the CWA — a forty year old statute that could not have imagined the sophistication of today's utility leaders, and that had to be written with intentional myopia to address the pressing water quality challenges of the 1970s.

In many respects, NACWA has taken the steps needed to begin a broader discussion. NACWA has entered the Farm Bill discussion seeking creative ways to address nonpoint sources of nutrient pollution. NACWA has worked to ensure that energy from biogas is a part of federal energy legislation. NACWA has testified on the issue of pretreatment standards for wastewater from hydraulic fracturing for natural gas. NACWA has supported federal funding and pilot programs for green infrastructure initiatives and put pen to paper on much-needed watershed-based legislation. Through its conferences, NACWA has shed light on the issue of resource recovery and “cradle to cradle” sustainable management approaches. And via the *Money Matters...Smarter Investment to Advance Clean Water™* integrated planning effort, NACWA has opened the door to a broader discussion of how a municipality should develop water quality investment priorities that are driven by broader principles of environmental and financial sustainability.

These efforts constitute baby-steps. In an increasingly resource-constrained world, it is important to examine whether clean water agencies' top priority will continue to be the pursuit of infinitely cleaner water — or will this be balanced against the value these agencies can provide to society as an energy conserver and producer; a reusable water purveyor; a fertilizer and nutrient producer; tree planter; wetlands creator; job creator, and an investor in city livability improvement projects?

NACWA and its members will clearly play a leadership role in helping to shape the *Water Resources Utility of the Future*. The first step is to work with its members and key experts to determine what an advocacy agenda, with the *Water Resources Utility of the Future* as its centerpiece, would entail. This will demand a significant effort to gather information via a member survey, develop appropriate messaging, and target potentially significant new resources to the appropriate priorities.

This transformational shift will clearly have impacts beyond the advocacy arena. NACWA looks forward to engaging in this important discussion with the Water Environment Federation (WEF), the Water Environment Research Foundation (WERF), the Association of Metropolitan Water Agencies (AMWA), and a host of other organizations. This transformational shift will also have broad impacts on the consulting-engineering community, manufacturers and suppliers, academics, scientists, researchers, financial institutions, and all the organizations that represent these interests. The *Water Resources Utility of the Future* is an idea that will demand input and action from the entire sector and the time is clearly now for this important discussion to take place.

The Business Case for the Water Resources Utility of the Future

	Example Processes	Environmental Effects	Utility Effects	Regional Economic Effects
Reduce Cost	Energy Efficiency	<ul style="list-style-type: none"> • Energy efficient equipment & networks • Photovoltaic installations • Wind turbine installations 	<ul style="list-style-type: none"> • Reduced consumption of fossil fuels • Reduced greenhouse gas emissions • Reduced air pollution 	<ul style="list-style-type: none"> • Reduced imports/better trade balance • Enhanced investment in R&D
	Energy Recovery	<ul style="list-style-type: none"> • Methane production from biosolids • Hydrogen production from biosolids • Recovery of heat • Hydrkinetic energy recovery 	<ul style="list-style-type: none"> • Reduced consumption of fossil fuels • Reduced greenhouse gas emissions • Reduced air pollution 	<ul style="list-style-type: none"> • Creation of technology jobs • Increased household incomes • Increased local GDP • Increased local tax receipts
	Water Reuse	<ul style="list-style-type: none"> • Supply of treated effluent for cooling • Recharge of effluent to groundwater • Effluent for landscape, golf course irrigation 	<ul style="list-style-type: none"> • More fresh water for higher valued uses • Less salt water intrusion • Reduced discharges to cleaner waterways 	
	Materials Recovery	<ul style="list-style-type: none"> • Ammonia recovery • Phosphorus compounds recovery • Nitrogen compounds recovery • Metals recovery (Li, MN, ZN, AU, AG) 	<ul style="list-style-type: none"> • Reduced loadings to cleaner waterways • Healthier ecosystems 	<ul style="list-style-type: none"> • Reduced imports/better trade balance • Enhanced investment in R&D • Creation of technology jobs • Increased household incomes • Increased local GDP • Increased local tax receipts
Increase Revenue	Materials Conversion	<ul style="list-style-type: none"> • Bioplastics production from biosolids • Pyrolosis of biosolids to fuel oil • Algal biomass fuel production • Biosolids solid fuel to replace coal • Biosolids fertilizer pellets & soil conditioner 	<ul style="list-style-type: none"> • Less landfilling • Less mining and burning of fossil fuels • Reduced net carbon emissions 	<ul style="list-style-type: none"> • Creation of new revenues • Reduction of biosolids disposal costs • Increased household incomes • Increased local GDP • Increased local tax receipts
	Biosolids Reuse	<ul style="list-style-type: none"> • Use of biosolids slurries as liquid fertilizer 	<ul style="list-style-type: none"> • Less landfilling • Better absorption of nutrients, less runoff 	
Support Economic Growth		<ul style="list-style-type: none"> • Upgrades & expansions to handle new flows • Sewer extensions for industrial expansion • Managed package plants to replace septic systems 	<ul style="list-style-type: none"> • Less groundwater contamination • Less septage overflow to waterways 	<ul style="list-style-type: none"> • Stronger partnerships with communities • Creation of manufacturing jobs • Increased household incomes • Increased local GDP • Increased local tax receipts