Clusters: Overcoming Barriers to Water innovation in the US

We, the undersigned members of the EPA Water Technology Cluster Leaders, commit to identify, engage, and mitigate barriers and limitations to innovation, entrepreneurship, and breakthrough technology deployment within and across our individual regions. Our commitment to the Water Innovation Summit and thereafter is to strengthen the connectivity of traditional and non-traditional stakeholders in addressing challenges to the sourcing and management of water for current and future demand of communities, industries, and the public.

As a collective voice of the leadership and members of the water innovation cluster organizations throughout North America, we commend the White House Office of Science and Technology Policy for the goal of fostering innovation to address the critical challenges of both water sustainability and breakthrough research and development targeted to reduce the price and energy costs of new water supply technology[i]. We support the perspective that the Federal government has a unique role to play in sharing some of the risk in the development, demonstration and implementation of new solutions. To that end, after dialogue within our regional clusters and throughout our larger network, we present this paper as guidance addressing key barriers to water innovation in the United States of America.

Water innovators in the United States face regulated utilities and water businesses that have traditionally refrained from assuming innovation risk[ii]. From ideation through commercial impact, the timeline for water innovation within public versus private markets is measured in decades[iii]. The United States faces a critical issue of water supply-demand imbalance and an unsustainable funding gap in both developing new technology and replacing our aging infrastructure[iv]. **These challenges require the Federal government to strengthen the water innovation ecosystem by accelerating the creation, assessment and adoption of innovations in technology, finance and regulation**.

Water innovation cluster organizations stimulate collaboration between firms supporting organizations, and academic researchers in regional economies, increasing innovation throughput and higher-wage employment[v]. Strategic investments and ongoing support to regional water clusters are required to effectively develop and marshal the resources of our innovators and remove the barriers impacting their innovation.

<u>Herein we present two core actions:</u>

1. Develop regulation and policy to increase the available market-pull rather than technology-push for water-innovation
2. Create and fund a national program to support, drive, and communicate the continuing success of regional water-clusters

Increase the market-pull of water innovation

Global leaders in water technology and policy innovation include Israel, Singapore, the Netherlands and the United Kingdom. In response to regional challenges, these countries have driven technology and policy innovation that exemplify both local and global impact. By contrast, water innovators in the United States struggle to deliver disruptive impacts. Water innovation in the United States is mired with road-blocks that delay time to market and increase product development cost. Fragmentation of the water sector across geographies, jurisdictions, and technical standards is a critical barrier that significantly impacts the quality, quantity and efficiency of water innovation[vi].

Disaggregation in the market is a key barrier to water technology innovation and adoption. Israel's national water and sanitation company, Mekorot, operates 120 wastewater treatment plants servicing the needs of 8.3 million people. In the United States, American Water is the largest investor-owned water and wastewater utility company; they service only 5% of the population, distributed across 47 states. The United States has 16,000 wastewater treatment plants that service the needs of 319 million people. Disaggregation in our domestic market results in approximately 3.5 times more wastewater treatment plants per capita than that of Israel. Further analysis of the United States 52,000 water systems illustrates that just 8% of these systems service 82% of the population. The geographic distribution and disaggregation of the water and wastewater utilities in the US results in a skewed market distribution with a few large customers and a long tail of many small community water utilities that have poor economic viability and limited buying power to create the market-pull for adoption of innovative technologies.

Innovators in the water sector have difficulty establishing viable business strategies to support investments. The state-by-state regulation for technology testing, certification and approval limits the size and attractiveness of beachhead markets for new technologies. The cost of developing diverse products, distribution channels and technical support required to serve state level markets disincentivizes innovators to address critical challenges of regional and national importance. However, as demonstrated in both the Chesapeake region and the midwestern states of Ohio, Kentucky and Indiana, regional water clusters have helped to remove these barriers, by enabling collaboration between state regulators to develop cooperative agreements, allowing for reciprocity of new technology testing across multiple states. Innovation in regulation at the regional level will substantially increase market attractiveness and accelerate innovation through increased market-pull.

Enable innovation success through the support of regional water clusters

Water clusters are dense regional networks of companies, universities, research institutions, and other stakeholders involved in a single industry[vii]. Cluster organizations foster collaboration between many different groups and supporting innovation that builds on the geographic area’s needs, strengths and interest[viii]. Limited development and uptake of water innovations today shows that innovators, innovations and inventions all require support. Cluster organizations enable supply chains, as well as drive policy, technical and financial innovation[ix]. The Environmental Protection Agency (EPA) encourages water innovation by supporting the development of regional water clusters.

Across the nation, the complexity and nuance of critical barriers to innovation is most effectively addressed at the regional level. Water clusters are a key resource to ensure that federal funds supporting water innovation will have successful market impact. To address the needs of water clusters in the United States, we need to develop, support and expand the EPA's role in coordinating and mentoring our nation's water clusters. The federal government should fund a process of collecting and benchmarking performance metrics in addition to providing mentoring and financial support for regional water cluster organizations.

We urge the federal government to implement a program akin to that developed by the European Secretariat of Cluster Analysis, ESCA. ESCA advises cluster managers and policy makers on cluster development. Since 2008, more than 800 cluster management organizations have been benchmarked according to this methodology[x]. The ESCA presents a set of tools and methodologies that enable cluster organization to improve their work and demonstrate excellences in cluster management. These processes help identify needs for improvement projects that build the capacity of the clusters. Frequent analysis and benchmarking combined with structured mentoring and strategic financial investments result in long-term positive impacts for water-innovation and economic development in the region.

Summary:

Regional water clusters are central to unlocking greater efficiency in water innovation, yielding successful impact in federally funded research, demonstration and deployment projects. The fragmented framework governing the water sector in the United States constrains innovation by creating barriers to entry and reducing the economic value of viable beachhead markets. The critical needs for water innovation is severely challenged by regionally specific issues that are most efficiently addressed with support of high-performing regional cluster organizations. To ensure the effective commercialization of the federal government's investments in water sustainability and new water supply technology, effort should be applied through water clusters to overcome entry barriers and thereby increase the market-pull for new innovation.

The following people contributed to this report:

- Accelerate H2O – Richard Seline
- Cleveland Water Alliance - Bryan Stubbs
- Global Water Technologies – Erik Hromadka
- H20TECH- Daniel M. Deocampo
- H20TECH / Xomix – Clarisse Croteau Chonka
- H20TECH / Xomix – Gary Keller
- Louisiana Water Network - Steve Picou
- The Maritime Alliance – Michael B. Jones
- MassCEC – Michael Murphy
- NEWIN – Karen Golmer
- NEWIN – Marcus Oliver Gay
- Urban Clean Water Technology Zone – Egils Milbergs

- Water Environment Federation – Marisa Tricas
- WaterTAP – Jon Grant
- Water Technology Innovation Ecosystem – Rominder Suri

---

[i] The White House - Water resource challenges and opportunities for water technology innovation (https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/Water_Resource_Challenges_and_Technology_Innovation_12_14.pdf)

[ii] Ernst & Young – The US water sector on the verge of transformation (http://www.ey.com/Publication/vwLUAssets/Cleantech_Water_Whitepaper/$FILE/Cleantech-Water-Whitepaper.pdf)

[iii] Water Environment Research - Introduction of new process technology into the wastewater treatment sector (http://clearcovesystems.com/downloads/related-articles/Introduction-of-New-Process-Technology.pdf)

[iv] Ernst & Young – The US water sector on the verge of transformation

[v] EPA - Building a successful technology cluster (https://www.epa.gov/clusters-program/building-successful-technology-cluster)

[vi] Ernst & Young – The US water sector on the verge of transformation

[vii] EPA - Building a successful technology cluster

[viii] EPA – Promoting technology innovation for clean and safe water (http://www.epa.gov/sites/production/files/2014-04/documents/clean_water_blueprint_final.pdf)

[ix] McKinsey – Charting our water future (http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/charting-our-water-future)

[x] ESCA – Clusters are individuals (http://www.cluster-analysis.org/downloads/ClustersareIndividualsVolumeIIAnnex.pdf)