



Roundtable on Investing in Resiliency

June 27, 2018 | 8:30am-2:00pm | Texas Association of Counties
Central Texas Conference Room | 1210 San Antonio St, Austin Texas

Notes, Findings & Recommendations

Purpose of the Roundtable:

To capture insights and guidance from various public and private sector experts on “converting lessons learned to innovation and after-action reports to investment,” and therefore overcome barriers and limitations to addressing water-focused resiliency across citizens, communities, and industries. To identify federal-state-local existing tools and technological applications that need further exposure, and capture gaps and demands for alternative and integrated solutions, investment programs, and best practices. To generate content and program development for the InvestH2O 2018 “Investing in Resiliency” Forum, including impactful speakers, panels, and interaction among attendees leading to measurable outcomes for resiliency-driven investment and product deployment. And to finally advance actions that have plagued response, rebuild, repurpose and/or redesign from several emergencies and crises in Texas, the Southwest US, the Gulf Coast – and national, global experiences.

Summary Highlights of Presentations:

While the Roundtable process was intentionally organized for dialogue, discussion and even debate, a handful of presentations were given to spark new ideas and review lessons learned.

- **Edgar Westerhof and Arcadis:** *Leverage nearly 400 years of storm and flood insight from the Netherlands, Arcadis has been affiliated with post disaster water events including hurricanes and surge incidents (e.g. Louisiana, Florida, New York, California). “Living with flooding” is not a new experience for Dutch communities and industries; and is a non-political issue for its citizens as co-investors in infrastructure, facilities, and mitigation projects. Over the past 40 years, the focus has been to design for resiliency by capitalizing on urban planning for expected and persistent flood since a majority of the country is below sea-level. From parking garages to city parks, from data-driven alerts to maximizing engineered smart-infrastructure, the adaptation of these solutions is just now of interest to the US due to repeated and costly weather events, demand for risk mitigation by insurance carriers and investors, and the necessity for community and business continuity. The challenge identified from Arcadis’ work in various regions is the lack of sharing lessons-learned versus lessons-applied, and the inability to consider longer term solutions that would reduce overall mitigation and costs to ratepayers, taxpayers, citizens, industries and therefore the economic engines of impacted communities. The Netherlands spends approximately 1.5% of its GDP and has over 45 years used nearly 50 billion euro-equivalent as a commitment to national resiliency – and as a result have two of the largest ports in the world and an economy that is competitive because they do not let flooding diminish their productivity*
- **Texas General Land Office – Community Redevelopment:** *Designated as the coordinator of the State’s federally-funded allocations, and in alignment with its role for managing state lands especially along the Gulf Coast, the GLO has conducted extensive inventory of opportunities through its Coastal Resiliency Study and identified projects and investments that could assist in providing long-term protection of impacted communities and industries. Over the past five storms and floods, a total of \$10 billion has been appropriated to Texas – all of which require environmental analyses and procurement policies anew!*

From the recent Harvey recovery funds, some \$137 million is available for university-provided 'impact studies' which support planning, packaging of regional perspectives, and seek to collect all sources of data into one platform or knowledge-sharing system.

- **AccelerateH2O:** *Based on its "Call to Action" in the days before the land-fall of Hurricane Harvey and through its creation of Houston Water's Innovative Demonstration Hub, AccelerateH2O identified several lessons-learned and challenges that plague water managers, public sector leadership, and industry facilities. From the inability to deliver just-in-time necessary equipment and technologies provided by private sector-vendor supply chains to the failure to find adjacent fuel and chemical sources for urgent operations...and a host of other experiences that seem to be similar stories from previous after-action reports and responses from Roundtable participants. The reliance only upon public sector emergency response has recognized short-comings from industry and business representatives, and often the expectation the public sector will make industry, corporate facilities and campuses a priority during a water-related event or emergency requires reminding that such expectations cannot be met effectively and efficiently when citizens are the greatest priority. However, industry and corporations often will provide access to generators, equipment, fuel, and alternative water supply through informal networks and relationships, and not through processes that could put them in liability or additional risk exposure.*

Note: all presentations and materials are available online:

<https://www.accelerateh2o.org/resiliency-emergency-response>

Discussion from Global, National, Texas Lessons Learned and Industry-Business Perspectives

Asset, Equipment, and Supply Management

- There is a lack of a real-time under-utilized assets inventory that could be applied to resiliency before, during and immediately after water-related incidents. Is there a mapping of these assets for application of technologies, project development, retention and redesign in the repeat impact zones of the State?
- We do not have a historical analysis of the appropriate location and staging areas for equipment, supplies, resources, and assume certain locations are better based on the last experience
- Private sector equipment providers have figured out how to serve their customers as outsourced emergency and resiliency partners, leaving the focus and asset management to third-parties. Why can't we apply this model and expertise to a unique project such as AccelerateH2O's suggested Regional Centers for Water Resiliency? Pre-deployment, asset mapping, matched need to supply, staffing and expert support, and repayment, purchase order management can easily be developed for public sector leadership based on how industry has successfully implemented this approach.
- Fuel and chemical supply chains often are identified from lessons-learned as a significant challenge for water managers, public systems. And yet the Energy Information Administration at US Department of Energy collects this information in real-time and has sought to provide it to emergency operations in the past with little uptake. Governor Perry actually created a solution when auto fuel supplies were negatively impacted and because the source-delivery systems are highly fragmented or competitive among suppliers, a collaborative program was instituted through Executive Order. We have examples from other situations and scenarios that can surely be adapted to water-related resiliency.

Approach to Innovative Resiliency Planning

- Resilience strategies and implementation planning is really a business management, business process, financial decision along an enterprise scenario, which means multiple participants and funding sources are necessary, and public-sector organization can be arduous and belabored, while private sector can be more

agile and less risk adverse. If we are to apply innovation, technologies, and integrated solutions to address resiliency in water, then we must use an “enterprise model” approach like industry does. We should even consider applying block-chain management tools.

Drivers for Resiliency in Water Technology and Investment

- After repeated droughts and floods, Texas’ region and local economic development interests must recognize the risk to corporate relocation and expansion, and therefore the vital promotion of resiliency and uninterrupted water supply as one of the most important assessments being conducted by site locators and advisors
- The insurance industry – government and commercial – are sending signals that resiliency plans much be more than what has been developed in the past. Insurance coverage – or the lack of obtaining it in the future – may be a driver for partnership among innovation and technology interests to address common concerns.

Funding, Financing Resilient Water Technologies, Integrated Solutions, Projects

- Often the public sector – and even the private sector – use financial modeling for investing in resiliency that is only over a 5 to 7-year horizon. We now know that drought and floods, as well as other threats, are not going away. We need to consider 25 to 30-year financial models to spread costs, investment and risks into our capital projects, upgrades, and new infrastructure needs. If we spread out investment by reality of continuous threats, we can sell the financing and investment to taxpayers, ratepayers, citizens, industries, and the private equity, public finance sectors. This includes an extensive deployment of technologies that would minimize risk and mitigate threats.
- We should consider new financial and investment scenarios that include ‘co-ops’ and similar multiple participant buying solutions, as well as improve tax credits and incentives for adopting resiliency as a part of community and economic continuity
- GLO has identified over 900 sources of emergency funding, driven by different causes and uses, applied in different areas of housing, community development, infrastructure, and tens of additional variables. We have resources to solve certain problems in place, but the maze by which we organize resources – funds, people, assets, technologies, equipment – is even challenging to public sector staff that have to monitor our own programs much less determine what everyone else may have. If we have persistent drought and flooding, surely by now we should know what resources are in place and which are needed to be resilient.

Redesign, Repurpose of Assets, Land, Operations for Water Resiliency

- As we assess the future of cities and the realization that certain historical assets may become unnecessary or under-utilized – such as roads and highways if advance delivery includes drones and alternative transit – then we must consider how to use those assets for increased retention or detention in new designs
- Rotterdam is the global model and now New York City is adopting the use of “urban flood plains” that are designed into public spaces including parks, multi-family housing zones, garages and storage.
- Critical infrastructure in water is often more than public systems, reservoirs, detention and redirection, even ponds and related surface supply for industry. The Texas Department of Transportation is more into the “water business” than it desires or expected. But with the number of bridges, overpasses, below-grade roads, and adjacent landholdings to highways often become temporary reservoirs, we should take into account other partners that can develop a resiliency strategy for innovation, technology, and investment. When an airport is surrounded by water or access is limited, we often expect the local airport authority or TSA to respond, but water-related issues are not their responsibility.

Addressing Barriers and Limitations to Resiliency: Rules, Regulations

- Unless we “unleash” new rules, reduce old regulations and otherwise update our traditional public response to water-related emergencies and threats, we will miss the opportunity to engage “reality” to do new things from these lessons learned. We need an open-competition for alternative ways of mitigating risk, deploying solutions, funding projects and investing in technologies.
- We must have the discussion among congressional and legislative leaders where abbreviated rules and exemptions can unleash resilient innovations and investments including public-private partnerships, and we should review the past decade’s worth of exemptions to inform us of what should become permanent rule-changes and standards.
- One challenging “standard” in existing rules is the definition of “respond” which is time-based and not results oriented such as the definition of “recover” that seeks to capture as much of what has been lost or sparks alternative strategies and technology applications. For example, we can put out a major fire in record time, but the product used to douse the flames leaves a residue on the ground and into water-ways that either permanently or for the near-term affects sources and qualities of drinking and potable water. If technology and equipment developers, investors, providers were “recovery” focused and driven, we could recapture and reuse more water, push changes into the infrastructure to minimize losses or emphasize recovered amounts, and increase real-benefits not minimum outcomes. Innovators, entrepreneurs, investors and the private sector can be incentivized to deliver “recovery and resiliency” if those standards were built into the rules, funding cycles, and resource allocations.

Risk Assessment of Water Resilient Innovation, Investment and Technology

- We have heard the need to prove out options, to assess adapt and adopt strategies, and to transition to a new risk model by asking how much risk we are willing to accept for not taking actions, conduct the associated cost-benefit analysis like an insurance company would, and therefore increase awareness of these options and alternatives to “pool” costs, risks, and investment
- How we share risk assessment, mitigation information and apply it to resilient innovations and technologies could minimize reluctance to invest. The “if we don’t do this, then the costs and impacts will be worse” is a good message but it hasn’t worked. We need to communicate “risk reduction” consistently and clearly that captures attention of citizens, rate and taxpayers, and of course investors.

Small and Rural Water System Resiliency

- While there is a natural inclination to focus on larger cities and the impacts upon millions of citizens, the harshest impacts from weather-related events is on suburban and rural communities that do not have the management, staff nor the emergency response capabilities. And because suburban, small and rural locations include large residential centers, oil and gas production, agriculture, and light manufacturing – we cannot assume they have the staff, technologies, equipment nor tools to plan, anticipate, respond much less become resilient.
- Suburban, small and rural communities – and their water suppliers – do not have dollars reserved for resiliency, nor do are they encouraged to seek investment models that generate resiliency without significant impacts on their financials. For instance, assessing shared-service center strategies and investing in technologies, equipment, infrastructure for resiliency is only discussed immediately after an incident and then reviewed just before the next incident.

Decision Processes, Adoption of Water Resilient Innovations, Technologies

- Is there a profile of each city, each sector, each region that ‘interfaces, connects’ urgent and emergency response assets with the design for resiliency? Do we know whom has the authority, the so-called ‘red-phone’ to not just make a decision on the spot, but to champion the pre-positioning of assets, units as well

as readiness teams of expertise to be implemented before an event or within an hour, twelve hours, twenty-four hours? Is this the purview only of public sector management, not a new public-private partnership model?

- Vendor-approved processes for new technologies, equipment, innovations are not just cumbersome during typical operating periods, but are especially difficult to do during and after an incident. We have not way of testing, proving, assessing and adopting a new generation of solutions in an organized, efficient, and economically effective means across multiple levels of government agencies, funders, and decision-makers. We need demonstration programs and sites, we need to know which vendors have been assessed and approved in different locations, states, programs, and situations. One way to improve the process may be to align AH2O demonstration hubs and technology showcases with the emergency and resiliency exercises that every level of the public sector does, include private sector resiliency planners in such an initiative.
- We are missing demonstration of products, technologies, equipment and solutions that imply resiliency but often many novel products are not commercially viable. All the same, we have so many competing products and solutions in the market, there is no way to determine which ones are most applicable to a specific threat, incident, or persistent challenge. Is this where national laboratories, incubators, and programs like AccelerateH2O could assist the assessment for resiliency among decision-makers, buyers, investors, and communities?
- FEMA is enhancing its “hazard mitigation” profile to include alternative sourcing for water supply (ASR), retention and detention, and other existing and emerging technology solutions. This may be an opening for connecting FEMA’s efforts with peer federal and state agencies into a package that can be quickly applied to localized scenarios as identified from the Roundtable.
- Can AccelerateH2O work with the major water research foundations, technology groups and associations, academic institutions and incubators, investors and similar experts to identify and package integrated technology solutions across multiple sources and providers, engineering firms?

Data, Intelligence, Modeling of Strategic Resilience

- There are many sources of data, we are drowning in data but starving for intelligence. We collect most data to address a financial, legislative, rule, and/or a time-response measure. However, we do not collect data that informs us – public and private sectors – of performance. We have few if any resiliency standards for equipment, technology deployment and use, alternative applications and practices. If you have no standards, then introduction of innovations and the potential investment models discussed today will not reach the level of discussion, acceptance and deployment necessary. And with the advances of artificial intelligence and fast-paced analytics, why are we not connecting performance outcomes to millions of collected data points that once structured could produce additional insights for boots-on-the ground?
- There are so many government and academic land-use models and applications on the market and more being developed as a result of new investments out of the recent hurricanes and storms. Only now are we seeing ‘resiliency’ built into the analyses and alternative scenarios.
- Data and instrument integration – the so-called internet of things for water – can produce quick knowledge and recommended actions – and therefore generate fast-paced resiliency for the boots on the ground first responders, water managers, and emergency response officials. With all the smart-city focus and now smart-resiliency, has water become a critical area of interest and if not, why not?
- The other issues for resiliency – including cyber security, the advances from applying the internet-of-things, and the expansion of data capture for multiple benefits – requires us to explore what the national and industry cyber security experts have that can be easily adopted into water systems.

The Importance of Workforce, Skills Development in Resiliency

- A lot of the discussion about resiliency focuses on technologies, equipment, new solutions, and cross-functional strategies, but when we include workforce and skills development into water-related resilience is when we will have tackled several challenges. For instance, we know that great operators do incredibly well in typical situations; yet are not trained to handle and manage emergency situations nor create resilient management protocols, real-world responses. Simply what I have learned about what the City of Houston did to restore its operations seems remarkable but is anyone capturing their lessons learned, what decisions were made and when? Do we know where resiliency – not emergency response – is a part of certification programs, licensing, equipment manufacturer and vendor training, and whole set of other means of workforce development? And as more solutions become technologically sophisticated, we need to create curriculum for resiliency, technology, best practices and application into a package that does not exist today.

Concluding Review and Next Steps

Participants reviewed a matrix of public and private sector ‘pain points’ that should be used to identify, assess, demonstrate, and deploy appropriate technologies, equipment, integrated solutions, expertise, and capital to address persistent water-related challenges and emerging issues. In applying the ***Strategic Opportunity Matrix***, the upcoming InvestH2O 2018 Forum should organize 50-75 technologies, unique projects, and innovative investment models for presentation to investors, procurement decision-makers, and other interests. All the same, the Forum should not become another emergency response initiative, but focus on water-related challenges that can be resolved through innovative approaches for technology and investment. The Strategic Opportunity Matrix should be used to capture government, academic, industry and foundation suggested technologies and gaps to be filled, necessary or missing integrated solutions, deployment and adoption strategies including rules and standards, and enhanced communications and awareness for sharing knowledge, information, and expertise as relevant intelligence.

Resiliency Pain Points	“Drivers”	Technologies	Capital, Investment	Deployment/ Adoptions	Communications/ Awareness
Drought					
Storm Surge, Flooding					
Man-Made					
Cyber Threat					
Critical Infrastructure					
Real-Time Intelligence					

In planning for the September 26-27th InvestH2O Forum, participants suggested surveying of Roundtable invitees and a broader set of interests to complete the matrix, and therefore generate the attendance of technology firms, equipment providers, and investment entities.

AccelerateH2O shared the idea of launching a collaborative prize-competition with federal agencies to spark proposals to address issues identified in the Roundtable discussion and to strengthen specific investment scenarios around 3-5 highest common areas of impact and performance.

About AccelerateH2O:

We are singularly focused on overcoming barriers and limitations to innovating water and the deployment of technology to address critical challenges for citizens, consumers, businesses, and communities.

AccelerateH2O was established as a 501c3 statewide initiative to organize the innovation capacity of academic, industry, entrepreneurial, public sector, and investment expertise to spark immediate solutions to the ongoing drought and growth prospects demanding additional sources of water, and to generate efficient and economic solutions in the \$9+ billion Texas and the Southwest US unique marketplace. More about AccelerateH2O can be found at www.accelerateH2O.org including additional information on our Roundtables, Demonstration Hubs and Technology Showcases, Reports, and Partnerships.

About InvestH2O:

InvestH2O is our ongoing forum of connecting the best technologies, products, services, and integrated solutions with investors, procurement decision-makers, water managers, and collaborative partners in the private and public sectors. In 2015, 2016 and 2017, InvestH2O convened 125 and 250+ water and water technology attendees respectively, and attracted 20 and 45 emerging, growth technology firms to pitch their capabilities, applications, and investment needs. Through our ongoing platform, AccelerateH2O and InvestH2O connect interested parties, incubators/accelerators, and end-users with a broad spectrum of investment scenarios including pre-commercialization, equity, project, and infrastructure opportunities in Texas and increasingly the Southwest U.S. **More information on InvestH2O – previous forums and the 2018 Forum - can be found at www.investH2O.com**