Smart water for a healthy economy

"Indiana's opportunity to lead the nation with innovation and entrepreneurship in sustainable water infrastructure"

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Global Water Technologies, Inc.

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Introduction

Indiana is uniquely positioned to benefit from an emerging new technology sector: smart water distribution, which combines sensors and software with data analytics to reduce loss and improve efficiency in drinking water systems.

The following information has been prepared by Global Water Technologies to outline the opportunities available to our state and encourage immediate action and collaboration among its public and private sectors to realize these opportunities.

A combination of recent efforts within the state and Great Lakes region and a growing national awareness of water infrastructure needs make this the perfect time for Indiana to launch a living laboratory for new water technologies… and to prepare for federal funding opportunities that are likely to facilitate public-private investment for such pilot projects across the country.

Together we can lead this exciting new sector.

The U.S. water sector is on the verge of transformation

Certain countries and U.S. regions have succeeded in adopting and implementing advanced water and wastewater strategies... Such change has transpired where political and professional stakeholders have worked together to promote adoption of innovative market mechanisms, cutting-edge engineering practices and efficiency technologies, along with standards and regulations that enhance accountability.

Achieving this, however, will require engaging engineering, financial and political leadership to crystallize an actionable national water agenda, strengthen the mechanisms that mitigate sector fragmentation and deliver a supportive policy framework.

Ernst & Young
Global Cleantech Center 2013

Executive Summary

Indiana is uniquely positioned to benefit from an emerging new tech sector: smart water distribution, which combines sensors and software to reduce loss and improve efficiency in drinking water systems.

It's a huge opportunity for our state, since water prices are increasing rapidly and aging underground infrastructure is leaking at an alarming rate.

Some 20 percent of water that has been treated to high drinking quality standards is now lost before it reaches any home or business… and each day hundreds of water main breaks across the U.S. are slowing down the economy and impacting public health and safety.

Water risk is also a concern for business leaders, as outages and availability are factored into financial performance… especially in urban areas with growing demand, limited supply and increasing drought.

However, these problems are often hidden, since water pipes are buried underground and many growing leaks continue undetected. Although local water utilities do an admirable job working with systems that were designed in the first half of the 20th century, they now face thousands of miles of pipes that are reaching the end of their useful lives.

The **American Water Works Association** (AWWA) reviewed national water infrastructure and found that $1 trillion of investment will be needed to maintain our current levels of service in the coming decades. The **American Society of Civil Engineers** gave the nation's drinking water infrastructure a grade of D in 2013 and estimated that Indiana alone faces $5.9 billion in improvements over the next 20 years.

The **U.S. Chamber of Commerce** and **National Association of Water Companies** have outlined the impact of this issue on businesses and are launching a national awareness campaign at: www.waterisyourbusiness.org.

Since water is also a local matter, each community faces unique challenges related to the types and conditions of its water infrastructure, the impact of a growing (or declining) base of users and changing weather patterns. Events like last summer's severe drought and water restrictions show the impact of water scarcity on families and businesses.

As a result, we are entering a new period where water prices will increase on a regular basis and losing 20 percent of that valuable product before it reaches customers will no longer be sustainable.

Fortunately Indiana is developing ways to address this problem in our communities and provide solutions for other parts of the country. New technologies with better measurement in underground pipes can provide real-time data on water distribution. Upgrades to smart water meters and consumer dashboards encourage greater efficiency.

As water prices increase, customers will start demanding better information on their usage and ways to lower bills. Instead of being charged for hundreds of cubic feet used 60 days ago, they will want to know how many gallons they are using this week.

Such analytics will provide better customer service and can also be used to create new demand-based tools. For example, imagine a situation where water utilities facing a shortage could reward customers for voluntarily reducing usage, rather than having city leaders issue water restrictions and punish offenders.

Smart water systems could also use predictive software to create an early warning system for water main breaks, allowing repairs to be made before streets are shut down, fire hydrants lose pressure and businesses are disrupted.

Indiana must tap its dynamic technology community, strong research universities and advanced manufacturing base to create new jobs and opportunities in the emerging water technology sector.

Our state overlaps two of the leading water technology clusters in the nation. **Confluence: Water Technology Innovation Cluster** is an Indiana-Ohio-Kentucky initiative that was launched with support from the EPA and SBA to leverage federal resources such as the national water laboratories in Cincinnati. To the north, the **Tri-State Alliance** is an Indiana-Illinois-Wisconsin effort to promote water research and includes Milwaukee as a United Nations Global Compact City for freshwater expertise.

Indiana communities can benefit from this regional activity by deploying smart water technologies and testing new solutions. For example, **Global Water Technologies** has partnered with **Indiana University Purdue University at Indianapolis** (IUPUI) and **Grundfos**, a world leader in pumps with a major presence in Indianapolis, to promote a “living laboratory” where new water technologies can be deployed, tested and refined in real-world conditions (Appendix A).

Local water innovation and entrepreneurship can benefit the entire state and national efforts to promote such pilot projects are gaining support. Last month, the U.S. Senate passed legislation to provide innovative financing for water

infrastructure pilot projects. The Water Resources Development Act of 2013 (WRDA) passed with bipartisan support that included both Senator Coats and Senator Donnelly. It includes language to create a Water Infrastructure Financing and Innovation Act (WIFIA) that would provide low-interest loans for pilot projects ranging from $5 million to $20+ million. The legislation heads the U.S. House this summer.

At the same time, Indiana legislators are also planning to study water policy in the state. Recognizing the critical need to sufficient, stable supplies and the economic impact of water on every business in the state, sound water policy is a priority for all Indiana communities.

Water technologies provide an exciting opportunity for Indiana to lead in developing smart solutions for the world's most precious resource.

State leadership is needed to recognize the benefits across a fragmented landscape with hundreds of drinking water systems across Indiana and to unleash the benefits of new technology and sustainable water infrastructure to improve economic development and quality of life for Indiana communities.

National water infrastructure crisis impacts Indiana

The drinking water system in the United States is facing a major crisis.

Pipes installed in the early to mid-1900s have served so well that they have been forgotten and neglected in many areas of the country. As those buried pipes exceed their useful lives, they are beginning to leak and fail in record numbers, resulting in hundreds of disruptive water main breaks each day.

As a result, many cities and towns across the country and here in Indiana now routinely lose more than 20 percent of drinking water through an aging network of leaking underground pipes. This water infrastructure lacks “smart grid” technology to monitor those conditions and identify problem areas. Therefore, undetected leaks grow until pipes fail, resulting in dangerous and destructive water main breaks — wasting clean water, losing revenue, disrupting customers and increasing labor, energy and repair costs for utilities.

With growing water shortages and rising rates, water main breaks are estimated to cause $3 billion a year in lost water, expensive repairs, damage to surrounding areas and property, dangerous conditions, public health and safety concerns and lost economic activity from business closures.

Now community leaders are seeking ways to reduce damage to infrastructure and local economies and demanding that utilities find ways to address their “non-revenue water” costs.

Water main break closes 38th Street and entrance to Indianapolis Art Museum

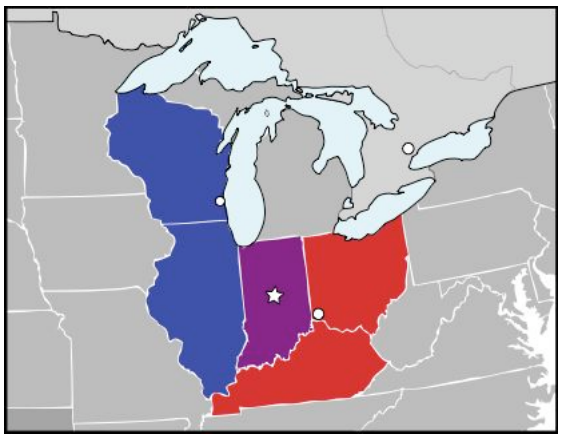
Large financial investments in U.S. water infrastructure will be needed over the coming decades. According to a new report by the **American Water Works Association (AWWA)**, funding for buried drinking water infrastructure over the next 25 years totals more than $1 trillion nationwide, assuming pipes are replaced at the end of their service lives and local systems are expanded to serve growing populations.

According to the **American Society of Civil Engineers**, pipes installed in the late 19th century have an average life span of about 120 years, but pipes installed after World War II have a shorter life span—about 75 years. Therefore, several generations of pipe will reach the end of their usable life over the coming years, leading to an ever-growing number of leaks and water main breaks.

Emerging Great Lakes region for water technologies

Home to nearly 20 percent of the world's surface fresh water, the Great Lakes are also the site of an emerging sector of innovative water technologies, including two multi-state clusters with national and international resources.

Indiana is uniquely positioned to leverage its position and show national leadership in this sector, as it overlaps these two water technology clusters.



Confluence Water Technology Innovation Cluster: In a unique partnership involving two federal agencies, the Environmental Protection Agency (EPA) and Small Business Administration (SBA) joined forces in 2011 to create a water technology cluster in the Indiana-Ohio-Kentucky region. Leveraging the EPA's national water and environmental research center in Cincinnati, the effort sought to encourage technology transfer and job creation in the region and address the nation's critical need for better water solutions.

In January 2013, the **Indiana Department of Environmental Management** signed a Memorandum of Understanding in a landmark cooperative agreement among the three states to develop shared protocols for approval of new water technologies — a first in the United States. In February, Global Water Technologies hosted a meeting of the EPA and SBA in Indianapolis with local business, government and university representatives.

Tri-State Alliance: To the north, Alliance for Regional Development and the Chicagoland Chamber of Commerce have identified water technology as an economic driver for the Tri-State Alliance of Indiana, Illinois and Wisconsin. With business leadership from all three states (Jim L. Stanley, CEO for Northern Indiana Public Service Company (NIPSCO), serves as Indiana Chair), the group is encouraging innovation, entrepreneurship and sustainable use of water resources as key to keep the region competitive in a global economy.

The Water Council in Milwaukee, which is recognized internationally as a United Nations Global Compact City for freshwater technologies, has taken an aggressive role in developing water-related jobs, with active support from local companies like Badger Meter and A.O. Smith.

This summer, Milwaukee will open a water technology hub, with $83.5 million in public and private money budgeted over the next year to support water-related businesses and research. The effort includes a seven-story brick building downtown that used to be a factory and has been renovated to serve as a water technology hub for research and start-up companies.

Indiana resources: In addition to its strategic geographic location overlapping these two clusters, Indiana is fortunate to have a business-friendly environment and dynamic entrepreneurship that allows it to leverage these new opportunities.

Leadership from organizations such as the **Indiana Chamber of Commerce** are calling attention to the importance of maintaining sustainable and sufficient water supplies to support new economic development, especially in areas like Southern Indiana where new development is anticipated.

Groups fostering innovation like **Techpoint**, Indiana's statewide technology initiative, are also working to build on the state's success in information technology with web and mobile marketing by expanding into other areas where emerging technology can make a difference.

Indiana has leading universities like **Purdue University**, which this month is welcoming hundreds of water experts for a conference of the International Association of Great Lakes Research, and **Indiana University Purdue University at Indianapolis (IUPUI**), which has developed one of the first on-line asset management training courses for water utility professionals.

Local water efforts in the state are also getting national attention. In 2012, Indianapolis hosted the **U.S. Conference of Mayors Water Council** and Mayor Greg Ballard outlined the environmental and economic benefits efforts to modernize water infrastructure. "Word is getting out that we have established Indianapolis as the clean-water leader by using a collaborative, innovative, sustainable, and cost-effective approach," Ballard reported in his annual State of the City address. The mayor also testified before the U.S House of Representatives Committee on Science, Space and Technology about the impact of the summer drought that forced restrictions water use.

Indiana impact and opportunity

Clean, cheap water has been considered a right by many in the United States, where drinking water is delivered for less than a penny per gallon and customers often pay no attention to water usage and little attention to water utility bills. However, after a decade of outpacing other utility rate increases, water prices are getting increasing scrutiny from both consumers and state regulators.

Since the price of delivering drinking water is largely driven by the capital costs of maintaining aging infrastructure, water bills have been rising dramatically and are expected to continue that trend. At the same time, utilities also face higher costs to treat and deliver water, with stricter regulations and increasing energy prices.

Significant increases in water rates are already causing concern in many parts of the country. As a result, regulatory agencies are expected to push utilities to improve efficiency and reduce the amount of "non-revenue water" lost through leaks and water main breaks with better asset management.

Circle of Blue's 2011 Water Pricing Survey

City	Service Area Population (000s)	Average Monthly Bill for Family of Four Using 50 gallons/person/day	% change from 2010 bill (50 gpd)	Average Monthly Bill for Family of Four Using 100 gallons/person/day	% change from 2010 bill (100 gpd)	Average Monthly Bill for Family of Four Using 150 gallons/person/day	% change from 2010 bill (150 gpd)
Uniform Seasonal							
Phoenix	1600	11.31	2.6%	36.59	6.7%	64.37	7.6%
Uniform							
Fresno [1]	122	14.89	0.0%	19.75	0.0%	24.61	0.0%
Chicago [2]	N/A	12.06	0.0%	24.12	0.0%	36.18	0.0%
Memphis [3]	583	11.01	5.1%	22.02	5.1%	33.02	5.0%
New York	8360	23.60	13.0%	47.20	13.0%	70.80	13.0%
Seasonal Increasing Block							
San Antonio	1000	12.40	1.6%	20.67	5.2%	33.57	1.9%
Salt Lake City	380	15.23	5.2%	24.42	6.7%	34.20	4.7%
Los Angeles	4000	29.65	9.1%	64.80	10.8%	111.29	12.3%
Seattle	630	43.57	3.4%	75.22	3.4%	121.22	3.3%
Santa Fe	78	46.81	8.2%	131.37	8.2%	242.67	8.2%
Increasing Block							
Jacksonville	614	21.68	11.0%	35.56	18.4%	49.46	22.0%
Las Vegas	2000	19.79	15.2%	36.13	9.7%	56.52	7.2%
Denver	1300	20.46	12.2%	37.33	13.1%	66.25	13.6%
Tucson	775	18.99	8.8%	36.32	9.9%	83.12	14.4%
Charlotte	774	14.76	4.2%	36.28	1.7%	78.84	0.8%
Dallas	1306	16.72	3.5%	37.98	0.4%	68.37	4.7%
Houston	2060	25.51	16.1%	49.09	24.3%	87.97	23.6%
San Jose	107	25.40	3.6%	42.42	3.6%	61.30	3.7%
Columbus	1115	25.74	7.5%	46.29	7.5%	66.84	7.5%
Fort Worth	625	22.28	0.4%	43.72	0.6%	67.68	0.7%
Austin	796	20.34	6.0%	50.13	6.3%	101.22	7.3%
San Francisco	2400	36.07	17.8%	69.03	18.1%	101.99	18.2%
Boston	609	32.68	2.6%	67.18	2.6%	102.34	2.6%
San Diego	1300	48.23	9.5%	77.73	9.6%	109.07	9.6%
Atlanta	1200	38.07	12.5%	82.07	12.5%	126.07	12.5%
Decreasing Block							
Milwaukee	661	20.20	25.4%	33.64	25.4%	47.08	25.4%
Detroit	900	17.64	8.8%	30.91	9.0%	44.19	9.0%
Baltimore [4]	1800	26.91	9.0%	43.06	9.0%	64.58	9.0%
Indianapolis	800	31.54	25.0%	53.34	29.3%	74.51	31.2%
Philadelphia	1672	29.82	9.1%	53.70	9.5%	75.29	9.4%

1) Fresno: 2010 figures have been recalculated using a single-family residential rate instead of a multi-family rate

2) Chicago: 2010 50 gpd figure is corrected

3) Memphis: 2010 figures corrected to remove an erroneous 5.64 fixed charge

4) Baltimore: 2010 figures for 150 gpd and 50 gpd have been corrected

Indianapolis water rates increased 25% in 2011

A good example is regulation passed in Indiana during the 2012 legislative session that requires water utilities to annually report to the **Indiana Utility Regulatory Commission** "actions taken to minimize the impact of higher consumer rates." Technology is a key way to reduce such costs and regulators are increasingly expecting utilities to use it for the benefit of ratepayers, as Global Water Technologies testified last month (Appendix B).

In addition to the increasing costs of aging infrastructure and higher water bills, efforts to control water main breaks will also be driven by the collateral damage each break produces. Unlike outages in the telecom and electric grids, water main breaks result in destructive flooding that damages surrounding property and

threatens public health and safety. From traffic disruptions and loss of pressure in fire hydrants to boil water orders and closed businesses, water main breaks have significant impacts on local communities. These are concerns for both water utilities and also for community, business and political leaders

Extensive drought conditions across large parts of the United States in 2012 also helped to underscore the need to improve water efficiency. For example, in Indianapolis water usage hit a record 233 million gallons per day as demand surged past available supply and city leaders were forced to implement emergency restrictions on water use for much of the summer.

Severe drought in Indiana restricts water use, kills plants

While such actions can be used to force a reduction in drinking water demand, utilities must also take actions to ensure an adequate supply and especially to reduce the amount of valuable treated water that is lost in their distribution systems. Greater public awareness of the impact of water restrictions will also lead to calls for improved efficiency.

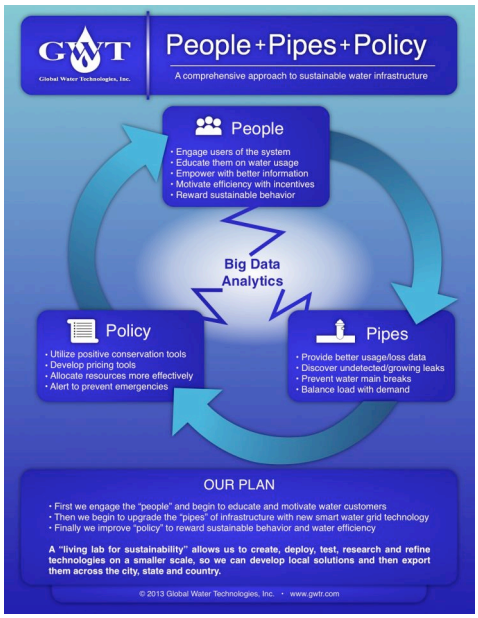
Innovative new demand solutions can also play a role. New customer software being developed in Indiana allows water customers to better understand and control their usage. Combined with real-time data, they can see how many gallons of water they used this week, rather than being billed for estimated amounts from sixty days ago. Such transparency encourages responsible use and can also be used to motivate and reward conservation, especially during times of shortage.

Better data also expands benefits across the drinking water system, using smart meter upgrades and sensors in the pipes to identify where leaks are occurring and allowing action to fix those problems before expensive and disruptive water main breaks occur.

Water prices and scarcity are impacting Indiana and present an opportunity for our state to lead with new solutions.

People + Pipes + Policy solution

Improving efficiency in our drinking water system requires a comprehensive effort that engages the consumers of water, the infrastructure that delivers it and the regulatory environment that shapes its operation.



Appendix C: Water 2.0 Infographic

First **people** need to be engaged as customers, rather than just ratepayers, and given better information on water usage and education on how that impacts their communities. Then they can be motivated and rewarded for efficient water use.

At the same time, new technology can improve the "**pipes**" of water infrastructure (including meters, valves, fire hydrants, etc.) through better measurement and metering that reduces water loss and minimizes damage from water main breaks.

Sound **policy** can utilize these new approaches to create positive conservation tools, innovation pricing mechanisms and other approaches that allocate resources more effectively and reduce water loss.

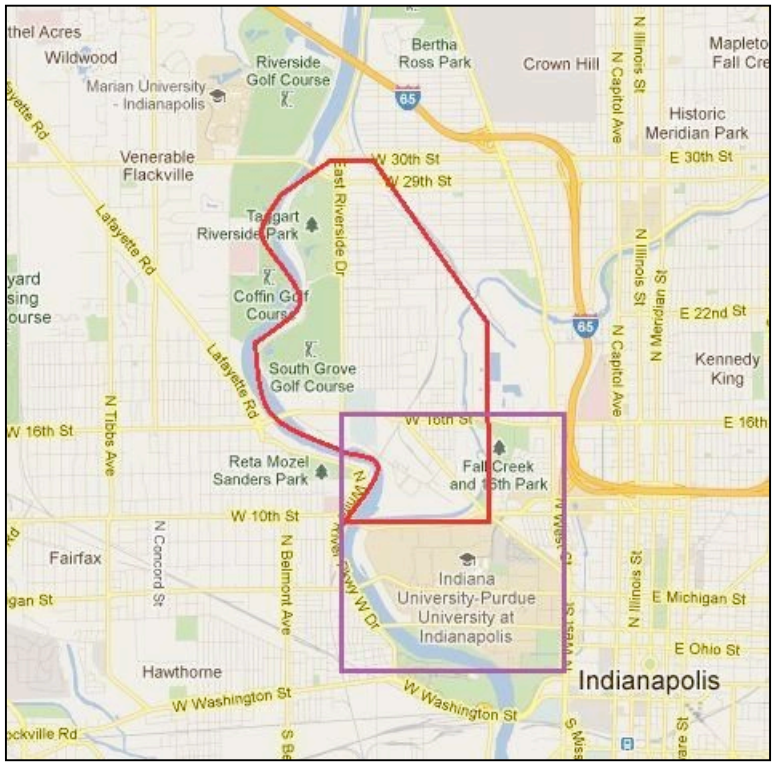
Investing in new technologies to enable this "people + pipes + policy" approach allows communities to move toward future possibilities, such as:

- using demand-based distribution to match water supply
- extending infrastructure life and prioritizing repairs with data
- creating early warning systems for water main breaks
- implementing flexible pricing and billing for water use

Indianapolis plans “living laboratory” for water research

A unique partnership among neighborhood, university and business leaders has created a “living laboratory” to demonstrate how such new technologies and a smarter water grid can be tested locally and then deployed across communities.

An area just north of the **Indiana University Purdue University at Indianapolis (IUPUI)** campus has been selected to develop a strategic plan on how to utilize an urban neighborhood for developing watershed and environmental solutions in sustainability. The **Riverside Watershed Environmental Living Lab for Sustainability (RWELLS)** is an area along the White River that includes 2,000 households, a mix of light industrial and commercial properties, and a city park and golf course. The diverse neighborhood lies along the northern edge of 16 Tech, a new technology corridor established by the **City of Indianapolis** to spur redevelopment in the area. **Citizens Energy Group** provides integrated water, wastewater and natural gas services to the area and has a nearby plant that provides most of the drinking water for the downtown area. The utility was established in 2011 through an acquisition of the water systems from the City of Indianapolis and serves more than 300,000 households in Marion County and the surrounding counties as charitable public trust.



In 2012, students from the Purdue School of Engineering and Technology began mapping water resources in the RWELLS area under a grant sponsored by IUPUI Solution Center and the **Buried Asset Management Institute-International (BAMI-I)**. The team identified opportunities to apply total asset management principles and introduce new technologies in the area as a way to improve water efficiency.

In addition to the university and utility resources, private sector support for the effort was provided by Global Water Technologies and Grundfos-owned

Peerless Pump, which has significant manufacturing operations just west of the area and is one of the largest providers of water pumps in North America.

This collaborative effort to address water issues in real-world conditions allows innovative technologies to be tested, analyzed and refined so they can be adopted on a wider scale. As such, RWELLS provides a model for other communities and cities in Indiana and across the country.

The living laboratory concept can be used in other Indiana communities as well. For example, by including a combination of urban, suburban and rural communities, the benefits of research can be combined to determine which sorts of activities, messaging and rewards are most effective in motivating customer behavior to encourage conservation. In addition to such behavioral economics, the impact on different type and ages of water systems will provide valuable information for similar Indiana communities.

By seeding this effort through living laboratories on a small scale and with a collaborative approach, Indiana communities can work together to improve their drinking water systems and share the information and lessons learned with other cities and towns. Tapping into the state's research universities is an ideal way to foster this collaboration and to provide valuable research that smaller communities may not be able to provide on their own.

By launching initial pilot projects now, Indiana is also wisely positioning itself to compete for federal funding and public-private partnerships for the $5 million to $20 million envisioned by the Water Infrastructure and Innovation Act that just passed the U.S. Senate.

The opportunity to attract larger amounts of federal funding and private investment to Indiana communities in the emerging water technology sector would be a major accomplishment that positions the state for additional growth and economic development.

In fact, the state's unique position of overlapping the nation's two leading water technology clusters give it a competitive advantage in exporting solutions developed in Indiana to other states and internationally.

Smart water technologies in Indiana

The past 10 years have seen an amazing transformation of traditional utilities through the implementation of new technologies. From the telecom industry where smart phones have changed daily life to smart grids that are balancing loads for electric utilities and their customers, technology has enabled huge gains in productivity.

Now the water sector is poised for similar benefits that can improve efficiency, reduce loss and better engage customers with a **"smart water grid"** that provides better measurement, monitoring, communications and control.

Global Water Technologies, a small company based in Indianapolis, has secured a combination of locally developed and international smart water tools to implement its "people + pipes + policy" approach to improve water distribution. Three of those new technologies are ready for immediate deployment in the living laboratory concept for sustainable water infrastructure.

Consumer dashboards with usage analytics
Effective technology empowers the end users of the system, and the first step in a smart water grid is engaging the people who are the consumers of water with better data and useful information.

An innovative new system of web-based analytics **being developed in Indianapolis** allows users to better understand their water consumption. By providing tools that explain and chart usage, the software educates consumers on not only their water use, but also how that compares to similar households or businesses and what actions can improve efficiency.

Better customer data can change behavior and reward efficiency

In addition to monitoring and measuring water consumptions, the platform enables consumers to develop a plan for action and provides reporting and

rewards for sustainable behavior. The innovative tool also encourages competition among larger groups of water users and could be a very valuable way to provide a demand-side solution during times of shortage.

The software has been tested in a small Indiana community and is currently being considered for pilot testing at locations in Indianapolis and Fort Wayne.

Two-way smart meter upgrades

As users become more engaged with the water usage, they will quickly expect better data on their consumption. With rising water rates impacting affordability, customers who get real-time data in most other areas of their lives are likely to expect more than a bill for estimated usage from last month. Instead they will demand accurate readings of how much water they are using this week and how much they should budget or adjust their consumption.

Existing meters with "smart" upgrades provide real-time data

While water meter replacement has lagged in many communities, new technology is being developed in Israel, which has long faced issues of water scarcity. This new technology provides two-way command and control functionality to existing water meters and valves. This new approach allows both utilities and consumers to collect, analyze and **react** to data in real time.

This new technology is available for the first time in the United States for deployment in the living laboratory concept developed in Indiana. Initial work to demonstrate the benefits of such innovation has begun in Indianapolis.

Sensors + software for leak detection

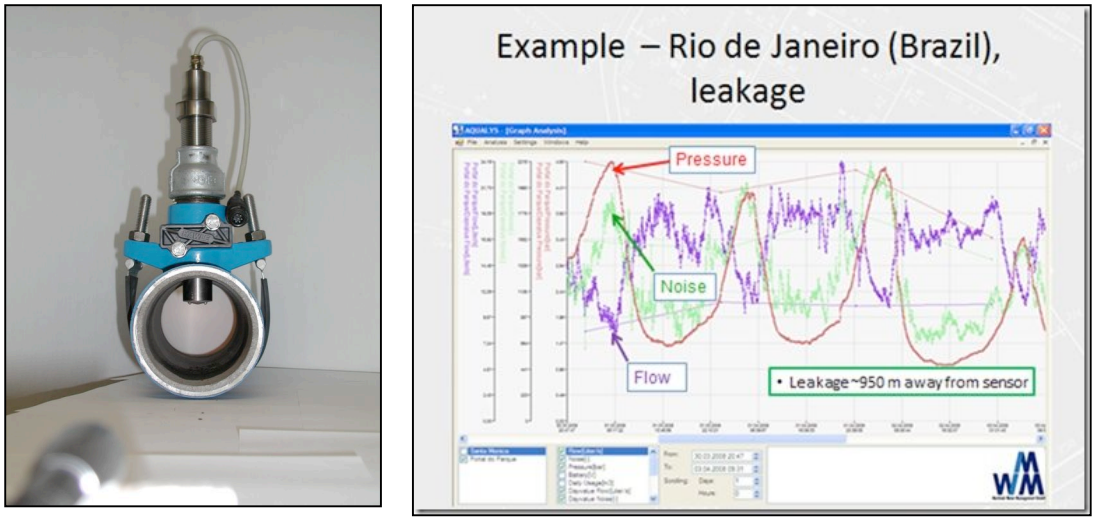
Along with better measurement for the consumers who are the end users of drinking water distribution, it is also important to take steps to reduce the real and apparent losses that occur before water gets to the meter. Encouraging water conservation (or mandating it during shortages) is not enough if the pipes

delivering that precious resource lose 20 percent of the treated drinking water before it gets to any customer.

European cities with older pipes than their U.S. counterparts understand this problem and have developed innovative ways to identify hidden leaks in their system. A patented system of sensors + software that measures pressure, flow and acoustic readings is being used across Europe and in several other countries to provide early notification of growing water leaks.

Such advanced data can be used to greatly reduce the amount of non-revenue water across the system and may also lead to the development of communications tools that provide actionable intelligence for operators, managers and city leaders.

Advanced systems may even use predictive modeling to create an **early warning system for water main breaks**. By identifying and repairing pipes before main breaks occur, communities not only save water, but also reduce property damage, avoid business disruptions and minimize risks to public health and safety.



New sensor + software technology is being used in other countries to reduce water loss

The European inventor of the technology visited Indianapolis during last summer's drought and met with utility, university and business leaders and has been working to plan the first U.S. deployment in the RWELLS living laboratory.

Future possibilities

These three complementary technologies are perfectly positioned for initial deployment in Indiana and will position the state to take a leadership role in developing pilot "smart water grids" in its living laboratories. Doing so is likely to

result in many other innovations coming to Indiana and attention grows for the emerging Great Lakes region for water technologies.

A number of new combinations of consumer and utility technologies are being developed in California's Silicon Valley and elsewhere to transform the water sector. Predictive analytics using real-time data and controls promise to create great opportunities for communities that have taken the early steps to position themselves for future efficiencies and new water technology tools.

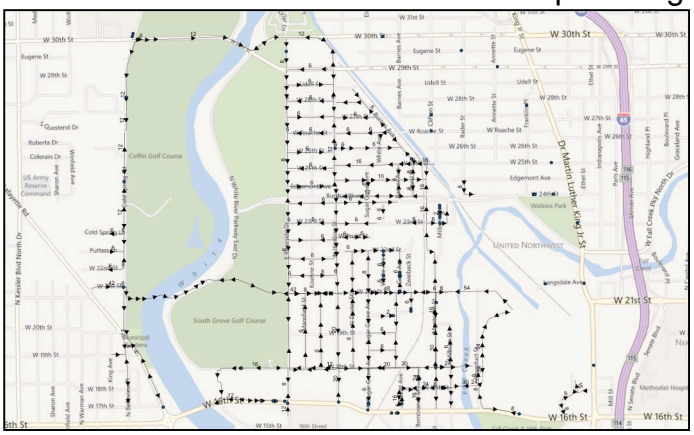
Communities that use such new technologies will have opportunities to save money and energy by **reducing loss**, to make **better projections** on infrastructure replacement, providing justification for proposed projects and also to help **extend the life of the assets** they have in place. They will also be positioned for advances like demand-side distribution and dynamic pricing.

As a "smart water grid" moves from concept to reality, the industry will be transformed and the states and communities that lead will reap significant benefits.

Moving forward to secure Indiana's leadership

In August 2012, Citizens Energy Group submitted a Water Wise Plan to the Indiana Utility Regulatory Commission that outlines ways to encourage conservation and reduce water loss. As the owner and operator of the state's largest drinking water system, Citizens recognized its leadership role in addressing both supply-side and demand-side methods to provide safe, adequate water resources for both current use and future generations.

Citizens identified three main factors to providing reliable drinking water; water supply, customer demand and infrastructure capabilities. The utility reviewed historic demands on the system and made projections for future requirements. It also outlined a number of recommended measures to address greater water efficiency, including leak detection, meter replacement, automatic meter reading and pressure management.



Water mains, flow diagram and breaks in RWELLS area

In addition to these measures, where new technologies can improve water supply, the plan also stressed the importance of effective communications and customer education. Such efforts can impact demand, not only among homeowners, but also to those using water in multi-family housing, commercial and industrial facilities and institutions.

Citizens announced its intention to perform a utility-focused water audit with component analysis, using AWWA guidelines to determine real and apparent water losses and make a plan to implement the identified measures in an economically responsible manner. Such cost-benefit analysis is increasingly important as utility regulators are increasing scrutiny of rate requests.

These are excellent moves that can help Indiana move forward in this emerging sector by combining individual utility operations with collaboration among the state's entrepreneurs and research universities — ideally through the living laboratory concept that brings all three together and allows rapid deployment of technologies on a smaller scale and in an affordable manner.

Those efforts are already generating positive attention for Indiana. Last summer, the RWELLS initiative was featured in *UIM, the Journal of Finance and*

Management for Water and Wastewater Professionals and in *Subsurface Asset Management*, an industry publication in Asia.

Global Water Technologies also has promoted the Indianapolis effort at the national level, through presentations at Water Summit 2012 in Milwaukee and this year at the **Water Innovations Alliance** Water 2.0 events with business and policy leaders in New York City and Washington D.C.

The **Compression Institute**, an organization founded by Robert "Doc" Hall, a pioneer on lean manufacturing and thinking who retired after 32 years at the Indiana University Kelley School of Business has also taken note. The living laboratory research platform is one of two national case studies for the institute's focus on water and a local working group was formed, including:

- *Dr. Tom Iseley* – Director of Construction Engineering Management Technology at IUPUI
- *Andrew Warrington* – President of Peerless Pump
- *Erik Hromadka* – CEO of Global Water Technologies
- *Stephen Nielsen* – Director of Wet Distribution Engineering at Citizens Energy Group
- *Matthew Klein* – former executive director of Indianapolis Department of Waterworks

Now state, local and business leaders have an opportunity to support such efforts and benefit from growing national attention. In addition to the federal legislation supporting pilot projects for water infrastructure, the **Water Environment Federation** (WEF) is bringing its annual technology expo to the region in October and presents an excellent opportunity for Indiana to showcase its effort as tens of thousands of water professionals from around the world head to Chicago.

At the same time national outreach efforts to the business community are being planned this summer. The **U.S. Chamber** and **National Association of Water Companies** are highlighting the importance of water infrastructure awareness in a new campaign at: www.waterisyourbusiness.org and many large U.S. corporations are looking for places where such innovation is taking place.

Summer 2013 timeline and budget

Efforts over the past two years have created an immediate opportunity for Indiana to leverage the current and growing national interest and to launch pilot smart water projects in the living laboratory context.

Partnerships and collaboration among business, community, government and university leaders have been developed and can be utilized to implement new technologies in a very cost-effective and efficient manner.

Global Water Technologies and Indiana University Purdue University at Indianapolis (IUPUI) have been working to prepare and deploy the following three technologies this summer:

Customer dashboard with usage analytics
Provide web-based consumer dashboard for water usage that allows users to track their consumption, compare to other similar households or businesses, make and test a conservation plan, learn about water issues and receive reward points and prizes for engagement.

> **Objectives:** Educate users, improve customer service, create demand-based tool for conservation during shortages
>
> **Initial user base:** 10,000 water customers in targeted ZIP codes
>
> **Project duration:** One year
>
> **Start date:** June 2013

Smart meter upgrades
Provide real-time usage data with command-and-control function with wireless hardware upgrade to existing water meters.

> **Objectives:** Provide better usage data and customer service, reduce costs for frequent shut-offs, develop remote emergency capabilities
>
> **Initial user base:** 5-10 water customers, expanding to 200 users
>
> **Project duration:** Six months
>
> **Start date:** July 2013

Early leak detection sensors
Monitor pressure, flow, noise and temperature in water distribution system and provide early detection of growing leaks.

Objectives: Reduce water loss and non-revenue water, create early warning system for potential water main breaks, establish initial base for demand-driven distribution

Initial user base: virtual zone around 2,000 water customers

Project duration: One year

Start date: July 2013

The first technology deployed will be the smart water consumer dashboard, beginning with a data feed of existing usage information and providing basic education on water use, infrastructure issues and conservation methods. This web-based tool provides easy adoption without impacting existing utility operations and is an important first step in providing better customer interaction.

Discussions have begun with potential education partners, including leadership with fire and parks departments on how citizens interact with water infrastructure such as fire hydrants and can be more efficient in outdoor use of water for recreation and irrigation. Initial discussions have also begun with leading providers of water-related education that can be provided to students and families through the web-based consumer portal.

As water customers are engaged through the interactive content and usage information, the most interested “early adopters” in each living laboratory will be identified and selected for smart water meter upgrades. This serves several purposes, as it provides an incentive for customer engagement and allows effective testing of new metering technology in real-world conditions. Smart meter upgrades would be expanded from a small initial base of a few users to a larger test group of 200 water customers, providing a range of data on types of usage and effective ways to improve outreach on water conservation.

At the same time, new sensor + software technology will be deployed to identify undetected leaks in the pipes of the water distribution system, since greater efficiency by the customer should not be offset by increased leakage in water pipes. Creation of a virtual zone serving approximately 2,000 customers in the living laboratory is envisioned as the first deployment of this technology.

IUPUI has agreed to serve as a program sponsor through the Purdue School of Engineering and Technology. This provides the expertise of Dr. Tom Iseley, who has more than 35 years of experience in planning, designing and construction of underground water infrastructure systems and is recognized as an industry leader in trenchless technology. Dr. Dan Koo is also a co-principal investigator and brings experience in numerous water, wastewater and storm water projects, from design and feasibility studies to specialized expertise in horizontal directional drilling, pipe relining, case boring and tunneling. IUPUI also has graduate and undergraduate students to support ongoing research efforts.

Hydrant pressure tested at working fire in RWELLS area

IUPUI is also developing **total asset management** approaches for use in water infrastructure and distribution systems, which could benefit from the research as such new requirements are emerging from state regulators across the United States.

In fact, a new online asset management training program for water utility professionals has just been completed and is now being prepared for certification.

Feedback from the project will be shared with both utility and government leaders and can be used by other Indiana communities to improve their water distribution and related services, such as fire protection and conservation education.

Working with neighborhood outreach and city leaders will also be helpful in developing **public education** and **communications tools** that can be used to address demand-based solutions during times of water shortages. This will also help to refine such efforts before they are deployed on a wider scale.

Local water utilities are the primary beneficiaries and logical supporters of smart water research efforts and resulting information and technology advances. However, the community benefits from these efforts and wider economic development potential also merit funding in the following forms:

- specific state and local project funding to coordinate with local utilities
- grants from local, state and federal sources (SBIR, STTR, etc.)
- sponsorships from businesses and organizations promoting sustainability
- equity investors in new water technologies

The proposed budget to launch this effort and deploy technologies in Summer 2013 is included as a separate attachment to this document.

Return on investment

Moving now to launch a pilot “smart water” grid within the living laboratory context is a wise investment that will generate returns in a number of different ways.

Improving interaction with water customers through the consumer dashboard for water usage will generate demand-based solutions to reduce consumption during times of shortage in a more cost-effective and customer-friendly manner. Better education on water issues and improved communications year-round should also reduce customer service calls and improve collections, as users are better able to budget for their expected water usage.

Smart meter upgrades to provide real-time usages will increase the functionality of the consumer dashboard and greatly improve the ability to create demand-based solutions during water shortages. Better metering may also reduce apparent losses from faulty meter readings and allow remote shut-offs that reduce service calls and can be used during emergency situations.

Early leak detection reduces of water loss through better condition assessment and the creation of a process that can be deployed across the system to identify undetected leaks and warn of impending water main breaks. Such returns to local communities include:

- A reduction in loss of treated drinking water (non-revenue water)
- Lower infrastructure repair costs (pipes, roadways, etc.)
- Reduced collateral damage to surrounding property (buildings, cars, etc.)
- Improved public safety (fewer closed roads, disruptive main breaks, etc.)
- Improved public health (less water contamination, fewer boil orders, etc.)
- Less economic disruption (reduced impact on area businesses)

The return on investment for utilities and municipal water systems would be calculated by measuring savings in water efficiency (reducing water loss and extending lifespan of infrastructure assets) and lower operational costs (reduced labor and energy consumption) plus benefits from improved relations with customers and significant savings from a reduction in water main breaks.

This effort also addresses the intent of new state legislation by finding ways to minimize future water rate increases. This will be especially helpful to water utilities in smaller communities that lack the funding to initiate such projects on their own and can learn from this research, especially if federal funding follows.

There are also numerous benefits from raising Indiana’s profile by taking a leadership role in the emerging smart water sector and creating positive attention for the state among business, investment and sustainability leaders.

Action Needed

While the benefits of improving our drinking water infrastructure are well-defined and there is no question that immediate investment is needed to protect safe, secure supplies of water for all communities, we face a significant obstacle in moving forward — inertia.

Innovation in the water sector has traditionally been very slow as utilities generally are focused on day-to-day operations and compliance with increasing mandates for water quality. Consumers assume drinking water will continue to be available at very low prices and pay no attention to the buried infrastructure that continues to deteriorate and lose growing amounts of water. Policymakers and technology companies have focused on other areas.

Now our water infrastructure is approaching a state of crisis and can no longer be ignored.

Change is coming to the water sector and Indiana must act now to lead a smart water transformation… using its strategic location and resources to encourage entrepreneurship and innovation in sustainable water infrastructure.

It's an opportunity worth pursuing with support from state and local leaders… to demonstrate how business, university and utility partners can start on a smaller scale by creating solutions for our own communities and then expand them across the emerging water technology sector in the Great Lakes. And then to compete for new federal funding to have those efforts used as a national pilot project that can be a model for the rest of the United States.

Let's take the first step by launching a living laboratory for smart water technologies this summer.

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Forward-looking statement

Statements in this document relating to plans, strategies, economic performance and trends, projections of results of specific activities or investments, and other statements that are not descriptions of historical facts may be forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking information is inherently subject to risks and uncertainties, and actual results could differ materially from those currently anticipated due to a number of factors, which include, but are not limited to, risk factors inherent in doing business. Forward-looking statements may be identified by terms such as "may," "will," "should," "could," "expects," "plans," "intends," "anticipates," "believes," "estimates," "predicts," "forecasts," "potential," or "continue," or similar terms or the negative of these terms. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. Global Water Technologies has no obligation to update these forward-looking statements.

Appendix A

January 10, 2013

News Release

Organizations Calling For a “Smart” Water Grid

INDIANAPOLIS, Ind. - Global Water Technologies (OTC Pink: GWTR) joins Peerless Pump, a Grundfos company, and the Construction Engineering Management Technology program at Indiana University Purdue University at Indianapolis (IUPUI) in promoting a "living laboratory" for sustainable water solutions.

The three organizations today issued the following open letter:

Dear colleagues and community leaders,

We have an excellent opportunity in 2013 to create new solutions using innovative water technology to make our communities more sustainable, create new jobs and provide leadership on an important issue for Indiana and the United States.

Across the country, aging water systems of underground pipes routinely lose more than 20 percent of our drinking water through undetected leaks and broken water mains. This is a big problem and the American Water Works Association estimates that more than $1 trillion is needed nationally over the next 25 years for underground infrastructure.

At the same time, growing water shortages and increased drought conditions (which we all experienced last summer) are raising awareness of how much we depend on fresh, clean water. We can no longer ignore this problem - instead we must use new technology to reduce water loss and better manage this valuable resource and our critical water infrastructure.

Water clusters are developing in cities like Philadelphia, Cincinnati, Milwaukee, Denver and San Francisco. Now we have a unique opportunity to demonstrate how Indianapolis can use its emerging technology community, strong research universities, advanced manufacturing base, skilled and energetic people and local entrepreneurship to create solutions that improve our system and can be a model for others.

The concept of a "living laboratory" for water technologies has been developed in partnership with several local companies and Indiana University Purdue University at Indianapolis (IUPUI). This would allow new solutions for "people + pipes + policy" to be tested in real-world conditions so that a "smart water grid" can be created with better measurement, more efficient delivery and greater customer education on water use and conservation.

We believe this new water effort will have a number of benefits for Indianapolis and the Central Indiana region, including the following:

- improve the local water & sewer infrastructure and operations,
- provide opportunities for new businesses and entrepreneurs to develop innovative ideas and create new jobs,
- encourage the development of education and training aimed at building and supporting a skilled workforce for new businesses,
- encourage sales and exports from existing area businesses, and
- improve water and sewer services and reduce total community costs.

In addition, providing the means to improve our supply of water and sewer services will encourage sustainable practices that reduce water loss and save energy. Sustainability and compression thinking is important in helping us maintain and improve our standard of living in a time of limited financial and natural resources.

We are currently organizing an initiative to fully implement these ideas and tap into the creativity and business leadership across Central Indiana so that we can realize the benefits of sustainability, economic development and job creation for our region.

Please join us in this effort as we move forward in the coming year. For more detailed information on this initiative and how you can participate, please contact Tom Iseley at IUPUI, Andrew Warrington at Peerless Pump or Erik Hromadka at Global Water Technologies. (Click here for contact form)

Sincerely,

Tom Iseley, Ph.D., Director, Construction Engineering Management Technology Program, Indiana University Purdue University at Indianapolis

Andrew Warrington, President, Peerless Pump

Erik Hromadka, CEO, Global Water Technologies

The Construction Engineering Management Technology program at IUPUI provides teaching, research and service opportunities for undergraduate and graduate students. More information is available at: http://engr.iupui.edu/cemt

Peerless Pump, a Grundfos company, is one of the largest manufacturers of vertical pumps in the world, with more than 70 years of progressive design, engineering and manufacturing. More information is available at: http://www.peerlesspump.com

Global Water Technologies is developing solutions to better manage the distribution of drinking water with a comprehensive “people + pipes + policy” approach as a model for sustainable water infrastructure. More information is available at: http://www.gwtr.com

Appendix B

May 16, 2013

Remarks for Public Hearing on IURC Cause Number 44306

Thank you for the opportunity to address the current rate case regarding drinking water for customers of Citizens Energy Group, IURC Cause Number 44306.

My name is Erik Hromadka and I have been a residential customer of water utilities in Indianapolis since 1990. I am also the CEO of Global Water Technologies, a small company based in Indianapolis that is working on smart water infrastructure solutions.

The issues regarding drinking water rates and delivery are certainly timely here in Indiana and across the United States. Yesterday, I spoke at a Water 2.0 conference in Washington DC about the challenges and opportunities that we face in improving the delivery of drinking water in a more efficient manner, reducing water loss and damage from water main breaks and ways to improve customer service levels.

Yesterday, the US Senate also passed the Water Resources Development Act of 2013, including innovative financing approaches for pilot projects to improve water infrastructure. Today, the American Water Works Association called that a "huge step forward" for water consumers. The legislation passed with bipartisan support, including both Senator Coats and Senator Donnelly, who recognized the importance of water infrastructure for our state.

Earlier this year, we released an open letter on smart water opportunities with two local partners, Peerless Pump and the Construction Engineering Management Technology program at Indiana University Purdue University at Indianapolis (IUPUI). The letter encouraged a living laboratory for sustainable water solutions in Indianapolis and a copy is attached for your review.

There are three points that we believe should be considered by the Indiana Utility Regulatory Commission and the Office of the Utility Consumer Counselor.

• The delivery of drinking water in Central Indiana and across the country continues to become more important with increasing demand, especially in urban areas, and constrained supply, especially during periods of drought. These problems are compounded by aging infrastructure, with hidden underground leaks and a growing number of water main breaks.

While traditional water pricing discussions have often focused on keeping rates low and suggestions that drinking water is almost "free" with the price of a gallon at less than a penny, it is also appropriate to consider the cost of not having water. This emerging area of measuring "water risk" from outages or scarcity is a concern for both businesses and

families. Investing in water infrastructure to ensure uninterrupted delivery of water in the future and reduce loss in the system today is an urgent priority.

• Innovative new technologies, including some developed here in Indiana, can be used to improve our drinking water infrastructure. From dynamic, consumer-based analytics on daily usage to smart meter upgrades and sensors to identify hidden water loss patterns, recent advances in technology can make our water infrastructure "smarter" and reduce the amount of water that is treated to high drinking quality standards, only to be lost before it reaches the customer. Just as technology revolutionized the telecom sector in the past 10 years, advances in water technology are poised to greatly improve the water utility sector. In fact, a new report just released by Ernst & Young suggests the water sector is on the verge of such transformation.

Central Indiana has a unique opportunity to participate in this transformation, as it overlaps two of the nation's leading water technology clusters. By embracing innovation and developing local solutions to improve water delivery, our region can not only make better use of our precious water resources, but also create new jobs and solutions that can be used elsewhere in the state and across the country.

• Advances in technology can also lead to better policy on water usage and a shift from treating users as "ratepayers" to serving them as customers, with higher levels of service and satisfaction. For example, advances in reporting usage can let customers know how many gallons of water they used last week, rather than the confusing metrics of how many hundreds of cubic feet they used 60 days ago. Instead of issuing restrictions on water usage during times of shortage, demand-based solutions could be used to reward customers who reduce consumption when needed. Better measurement and monitoring tools can also allow more efficient allocation of resources to extend the life of water infrastructure and to reduce the cost of future repairs and the harm to families and businesses from water outages.

So in this consideration of water pricing for Central Indiana, it would be helpful to see a comprehensive approach that addresses "people + pipes + policy" in a way that recognizes the value of investing in our water infrastructure for the future and encourages innovative ways to better serve customers and make sound policy for our communities.

Thank you for your time and consideration.

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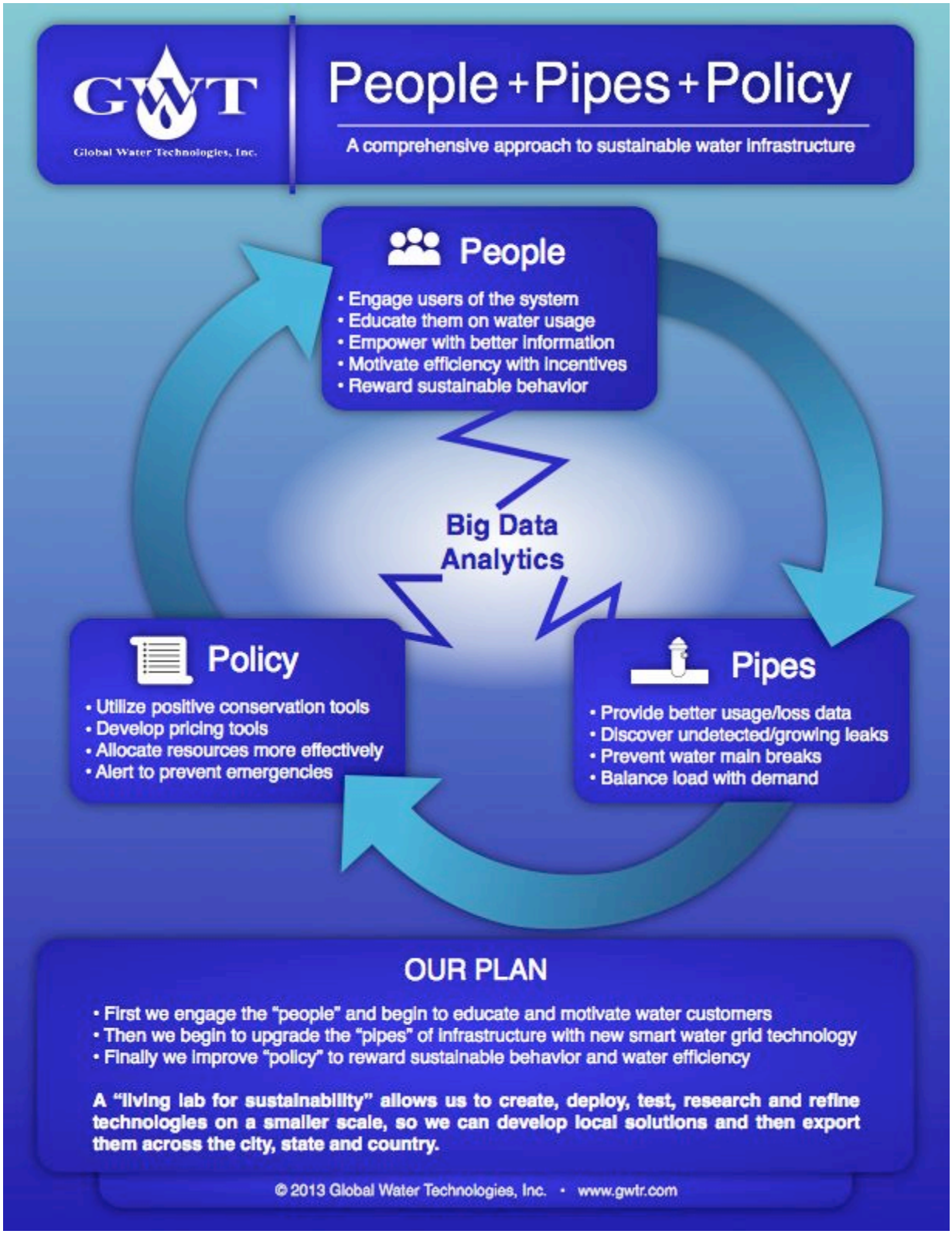
Appendix C


GWT
Global Water Technologies, Inc.
People + Pipes + Policy
A comprehensive approach to sustainable water infrastructure
People
• Engage users of the system
• Educate them on water usage
• Empower with better information
• Motivate efficiency with incentives
• Reward sustainable behavior
Big Data Analytics
Pipes
• Provide better usage/loss data
• Discover undetected/growing leaks
• Prevent water main breaks
• Balance load with demand
Policy
• Utilize positive conservation tools
• Develop pricing tools
• Allocate resources more effectively
• Alert to prevent emergencies
OUR PLAN
• First we engage the "people" and begin to educate and motivate water customers
• Then we begin to upgrade the "pipes" of infrastructure with new smart water grid technology
• Finally we improve "policy" to reward sustainable behavior and water efficiency
A "living lab for sustainability" allows us to create, deploy, test, research and refine technologies on a smaller scale, so we can develop local solutions and then export them across the city, state and country.
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