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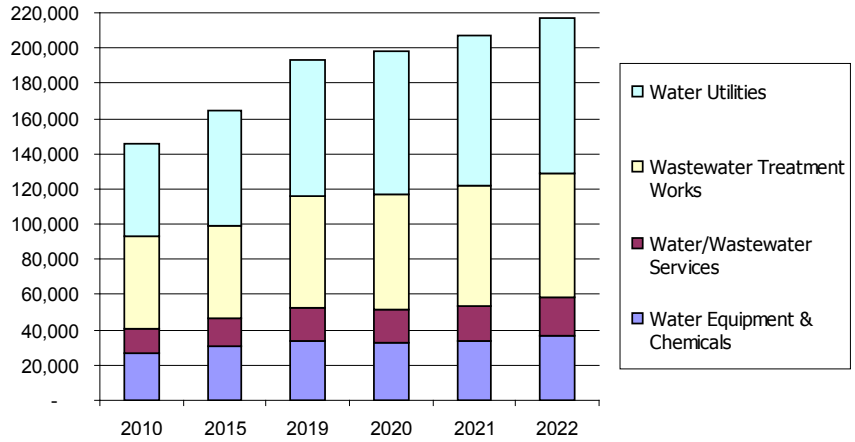
WATER THE MOST RESURGENT SEGMENT IN THE INDUSTRY—MORE OR LESS

The United States water industry accounted for $220 billion in revenues and grew 4.7% in 2022, according to compiled segment analysis by ***Environmental Business Journal.*** Growth across the segments was particularly encouraging, according to data compiled by EBJ and summarized on the chart on this page, on the water industry table on page 3 and throughout this review. The covid onset year of 2020 led to a modest decrease in revenues in water equipment and water services, but overall industry growth as water usage went up along with pre-approved rate increases for water and wastewater.

Many utilities halted rate increases into 2021, a year in which growth returned to both water equipment and services categories. **U.S. Bureau of Census** data on state & local revenues and spending on water and wastewater through 2020 shows revenue increase of 7.0% in public water utilities and 5.5% in public sewerage, each higher than the annual growth of the last three years summarized on the table on page 4. Spending by these authorities, totaled over $144 billion in 2020, according to Census data, and increased less than a percentage point lower than their revenues.

Investments in digital infrastructure likely paced the growth in instruments & information equipment and systems, contributing to equipment segments growing 7-8% in 2022, trailing only services. As more detailed analysis shows on page 8, revenues in water and wastewater for consultants and design engineering firms increased by double digits in 2022, and the industry leaders on the list of the top 20 almost uniformly benefited in increased billings. Environmental consulting & engineering (C&E) firms generated more

Revenue Growth in the U.S. Water Industry, 2010-2022 ($bil)



Source: Environmental Business International, Inc. Segment models based on revenue generation and research by EBI derived from surveys, interviews and compliations of reliable secondary and published data.

Inside EBJ: **TheWater & Wastewater Industry**

CEC'S WATER PRACTICE HELPS CLIENTS USE FEDERAL INFRASTRUCTURE FUNDING WISELY

Civil & Environmental Consultants, Inc. (CEC, Pittsburgh, Pa.) is an engineering and environmental consulting firm with more than 1,300 team members and 30-plus offices nationwide. CEC provides innovative design and permitting solutions and integrated expertise in air quality, civil engineering, ecological sciences, environmental engineering and sciences, manufacturing infrastructure services, survey/geospatial, waste management, and water resources. CEC serves a diverse client base that includes the manufacturing, mining, oil & gas, power, public sector, real estate, and solid waste markets. CEC is consistently ranked among the top firms on Engineering News-Record's annual lists of the Top Design Firms and Top Environmental Firms.

Timothy D. Murphy, CESSWI, is a Principal and serves as CEC's Corporate Public Sector Market Group Lead. *He is responsible for identifying trends and opportunities in public sector submarkets, as well as developing, implementing, and monitoring strategies and initiatives for growing market share and revenues. He works out of CEC's Toledo office.*

Matt Gramza is a Water Resources Engineer, CEC's Corporate Water Resources Practice Lead, and a Vice President *in CEC's Cincinnati office. He is a Certified Floodplain Manager and a Certified Professional in Erosion and Sediment Control with a focus on hydrologic and hydraulic analysis. He has significant assessment, design, and construction administration experience in dam safety and ecosystem restoration projects and has completed flood studies all over the country including many FEMA Map Revisions.*

EBJ: How has business been for CEC over the past couple of years, and what are some recent highlights of CEC's water practice?

Matt Gramza: CEC has continued to see geographic and business growth in its water practice amidst inflation, increased costs, operational costs, and labor pressures through dedicated, client-first service. It has also been an unprecedented time for federal funding, via the Infrastructure Act, which has long been needed.

Timothy Murphy: When you're talking about water management — whether its wastewater, stormwater, or drinking water — it's recession-proof and pandemic-proof. It is an essential service. The industry continued to operate and grow throughout the pandemic, as did our business.

Gramza: I took over the Corporate Water Resources Practice mid-year in 2022 and have welcomed the chance to lead a diverse group of professional, intellectual problem-solvers. The group recently added two key hires, one in Toledo, Ohio, and one in Corpus Christie, Texas, to further service our water resources clients.

EBJ: What trends do you see in watershed management, wastewater/process water, and municipal storm sewer systems?

Watershed management:

Gramza: In watershed management, the trend is blending hydrologic and hydraulic into a natural ecosystem design. We have seen a significant increase in our ecosystem restoration practice.

Murphy: We are taking a holistic approach to watershed management. We are looking at both water quality and water quantity and the long-term impact on the surrounding environment. We are studying to see if there will be increased water volumes due to some climate change impacts.

Gramza: Another trend is implementing nonstructural measures versus structural measures to prevent flooding and increase resiliency. In the industry, it's pretty common to see the old-school Army Corps concrete rivers and levees. Blending those with natural techniques can improve both watershed conditions and flood mitigation.

Wastewater/process water:

Murphy: One of the biggest challenges in the wastewater/process industry now is aging infrastructure. Communities are struggling to address that aging infrastructure in a cost-effective manner. As new funding from the Infrastructure Act comes through, CEC is helping communities use the funding wisely through design—proper design of wastewater improvements and water treatment improvements.

We have seen a significant increase in our ecosystem restoration practice.

Gramza: Another key component is improvements to wastewater systems in parks and recreational areas.

Murphy: One of the things that occurred through the pandemic is that people went to parks and recreation areas much more because they couldn't go inside anywhere. People got to these areas and realized "no one's maintained this for the past so many years" or "it's not in as good a shape as it could be." The increased usage put a lot of stress on the existing systems. Now there's funding available to improve these recreation areas.

Municipal Separate Storm Sewer System (MS 4):

Gramza: Green infrastructure versus gray infrastructure continues to trend these days.

Murphy: Instead of using bigger pipes or building bigger pump stations to move the stormwater around, we are looking at ways for the water to infiltrate back into the ground. Options like rain gardens and rain barrels that are taking water out of the storm sewer system and putting it back naturally.

Gramza: It's unlikely we're going to eliminate gray infrastructure, but we're infusing green infrastructure, especially during improvement projects where we can.

EBJ: Describe some of the new technologies that has CEC has incorporated into its water services.

Gramza: We were one of the first firms to get onboard with CivilGEO's advanced hydrologic and hydraulic modeling packages. The software allows us to expand our flood studies, leverage exiting GIS-based data sets, and model larger watershed systems more efficiently, more rapidly. (It was used in the dam project detailed in the sidebar.) Another technology being used regularly by CEC is Subsurface Utility Engineering that's typically applied to water systems.

Murphy: We are doing a bit more with LiDAR scans to assist in some asset management issues out there in these systems. This identifies what folks actually have, where it is, and how old it is. A lot of institutional knowledge is retiring in this industry. Communities are struggling to keep track of what they actually have and what needs to be replaced.

Gramza: This kind of risk analysis on the infrastructure allows communities to prioritize where to spend the federal money that is coming in for those types of system improvements. These reports are GIS based, so databases can be built and continue into the future with overlays of the new projects. We've also applied hydrographic survey technologies to detail the underwater conditions of an historic timber dam.

EBJ: How can a more sustainable water infrastructure system be created throughout the country?

Murphy: That's a big question. You have some areas of the country with more than enough water and other parts of the country with not enough water. So, it basically comes down to responsible use of water as a natural resource. It's natural resource management.

EBJ: Describe the water infrastructure initiatives being implemented to satisfy the oil and gas and power and manufacturing industries.

CEC PERFORMS MAJOR DAMS ASSESSMENT IN OHIO; HURRICANE DAMAGE KEEPS DESIGN-BUILD TEAM BUSY

One of CEC's most significant projects is the **Grand Rapids & Providence Dams Assessment** in Lucas and Wood counties, Ohio. The Ohio Department of Natural Resources (ODNR) needed an engineering assessment and master planning at Grand Rapids and Providence dams. The structures are on the Maumee River, separated by Howard Island, within Mary Jane Thurston State Park. The nearly 2,000-linear-foot dam system is significant considering it was originally built in the 1830s as a Timber Crib Dam to convey river flows to the historic Miami and Erie Canal system, as well as the Mount Gilead Side Cut Canal. The original Timber Crib Dam was visible behind the Concrete Roller Dam. CEC's senior leadership and integrated technical services team provided high-quality project delivery and performed as an advocate and extension of ODNR's staff.

CEC continues to perform all the design, construction, and quality control/quality assurance services for the repairs for the storm damage caused by Hurricanes Irma and Maria in 2017. The project stretches out over 16 sites and 13 different roads on St. Croix in the U.S. Virgin Islands. The design-build team is performing all of the necessary data collection, reporting and permitting, traffic maintenance, site maintenance, community relations, construction of roadways, culverts, walls, and structures, temporary and permanent signage, pavement markings, utility coordination, pavement engineering, hydraulics engineering, and geotechnical engineering as required by the contract. The bridge, roadway, geotechnical, pavement, and hydraulic design included the replacement of three structures/culverts.

Oil & Gas:

Gramza: It's been our approach to improve the groundwater at orphan well sites by reducing groundwater contaminants, as well as reducing methane.

Power and Manufacturing:

Murphy: Power and manufacturing are water-intensive industries. Many plants have closed-loop systems of water — essentially recycling the water inside their systems. They are not continuing to draw new water, nor discharge wastewater.

EBJ: What transformations are needed to meet the challenges of water security and climate change?

Gramza: As we rebuild the nation's water resource infrastructure, we have to stay diligent in creating an enhanced resiliency of that infrastructure to accommodate changing climate conditions. We are also assisting clients with beneficial reuse of water to reduce impacts on our natural resources.

EBJ: Please share your perspective on water infrastructure funding.

Murphy: The money all comes from the federal government, and the majority is being spent at the state and local level. That's where the systems all are, whether it's the treatment plant or the distribution system tied to it. Gramza: The biggest needs are at the local level, and we can assist in prioritizing and administering these funds to make the most effective infrastructure improvements.

Murphy: We are seeing more private investment in water treatment facilities. There are companies that are owning and operating treatment systems for communities. Having these private investments can limit the burden on the customers. Communities can only raise water rates and sewage rates so high before people can't afford it. It's not like you can just eliminate it like your cable bill. You need to have drinking water. Gramza: This money can allow communities to undertake new projects and not just make repairs to the existing, aged systems. □