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Building America's water workforce
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PARTICIPANTS:

FRED DEWS
Host

JOSEPH W. KANE
Senior Research Associate and Associate Fellow, Metropolitan Policy Program

JENNY SCHUETZ
David M. Rubenstein Fellow, Metropolitan Policy Program,

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DEWS: Welcome to the Brookings Cafeteria, the podcast about ideas and the experts who have them. I'm Fred Dews.

Think about the water you drink, the tap it comes out of, or the water you wash your hands with or water your lawn with. Think about where the rain water goes after it washes down your street and into the gutter.

The infrastructure of pipes and pumps brings this water to us and takes it away, but have you ever thought about the people who makes the water system work in your community and nationwide?

My guest today is a scholar who has thought deeply about and written on the water workforce and he's here to talk about the challenges and opportunities facing that workforce.

Joseph Kane is a Senior Research Associate and Associate Fellow in the Metropolitan Policy Program at Brookings and co-author with Adie Tomer of the new report, Renewing the Water Workforce, Improving Water Infrastructure and Creating a Pipeline to Opportunity.

Also on today's show in a new coffee break, meet Jenny Schuetz, also a scholar in our Metropolitan Policy Program who focuses on housing markets and how they affect people in different income brackets.

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Now on with the interview. Joe, welcome to the Brookings Cafeteria.

KANE: Thanks, Fred, for having me.

DEWS: So you and Adie Tomer, who has also been on our podcast and was most recently on our Intersections podcast talking about this topic, have this report on renewing the water workforce.

As I said in the introduction, we focus a lot on the water infrastructure, the pipes and the pumps, that bring us the water, take the water away, but not the people who work on it.

So what got you interested in this aspect of the issue?

KANE: Yeah, so a lot of my recent work has examined water infrastructure needs in terms of investment and economic concerns at a local level, so in other words what are some of the operational challenges faced by utilities in a face of an extreme climate, how are we adapting or not adapting these system to from reliably, and why aren't these concerns being viewed in terms of the industries and households served when we're thinking of efficiency affordability and so on.

But in addition to all this, I've also explored the infrastructure workforce as a whole measuring the types of workers involved in constructing and maintaining all our various transportation, energy, logistics, and other infrastructure facilities for decades to come.

So it's not just about looking at short-term shovel ready jobs, but emphasizing long-term career pathways, which are often involved in the skill trades; right.

So what types of jobs do these workers fill, how much do they earn, what are their educational and training requirements, these types of questions are central when we think about not only investing in our physical infrastructure but also investing in all the skilled talent we need to oversee these assets.

So really examining the water workforce is a perfect nexus of these topics. We understand or at least hear about water infrastructure concerns in places like Flint for instance, but there's a human dimension to all of this too, which should be attracting more attention and action.

And the moment is ripe for action given the opportunity at hand to both improve our infrastructure and provide durable career pathways for all types of workers across all regions.

DEWS: Yeah, I want to take a deep dive into some of your findings about the composition of the water workforce in a minute here, but first I'm always interested in how you go about doing this research, how do you identify what is a water-related job, did you do site visits, I mean, how does this come about?

KANE: Right. So this water workforce project was exciting for a number of reasons. Statistically it not only gave me a chance to dive deeper into this crucial topic,

pun intended, but it also allowed me to meet with a bunch of different folks across the country to reflect on the very real challenges and innovations already underway to improve our infrastructure and support a long-term economic opportunity.

So, for example, there have been several previous utility surveys and regional studies measuring some of these issues, which are terrific, but they do not always provide a truly national comprehensive view of all the different industries and occupations in the sector.

In order to more accurately estimate just how many workers are involved in water infrastructure, construction, maintenance, and other activities, I aim to create a more consistent definition of the type of tasks they carry out and ultimately take a broader view of the career in this space, so not just looking at a handful of jobs tied to a particular project in a particular place.

At the same time, I talked with many different researchers, utilities, and other groups confronting these issues head-on. So by taking site visits to the Bay area in California, Louisville, Kentucky, and then Camden, New Jersey, it offered me a chance to see and absorb some of the major challenges and opportunities faced by a variety of different markets, economically and otherwise.

I have to say the utility and workforce leaders in these markets are pioneering some of the most promising programs and collaborations in this respect, aiming to identify and support their next generation workforce now. I wrote up a few blogs on these efforts, which I highly recommend listeners also check out.

So, yeah, I think the combination of quantitative and qualitative work was a driving motivation to do this research in the first place, to not only provide a bunch of helpful metrics for utilities and educational institutions and other groups in their planning efforts, but to actually equip them with timely insights and actual strategies to get something done as well.

DEWS: You've mentioned terms like promising programs, the next generation workforce. It seems like it's a real forward looking workforce economics focused report.

Can you just briefly describe what think the topline conclusion is of the study?

KANE: Yeah, by defining and measuring the water workforce, not just the water utility workforce, which I'll describe in a minute, the study reveals the enormous economic opportunity the water infrastructure as a whole offers the country.

At a time when many Americans are struggling to access economic opportunity and many of the country's infrastructure assets are at the end of their useful life, we know that infrastructure jobs offer considerable promise, which I covered in some of my previous work, but water jobs are particularly emblematic of this opportunity.

This is especially true when it comes to the and competitive and equitable wages that water workers earn and the specialized in-demand skillsets they develop over time, but it's largely up to employers, workforce leaders, policymakers, and other national organizations.

The federal agencies just further support workers in this sector and ultimately seize the opportunity at hand.

DEWS: Well, then breakdown if you would, Joe, who or what is the water workforce. I mean, what are the characteristics of this workforce.

KANE: In short, the water workforce refers to all the workers involved in constructing, operating, designing, and governing our water infrastructure nationally whether maintaining individual treatment plants or carrying out repairs in homes. There are many different types of water workers in urban and rural areas nationally. They are everywhere, think plumbers, pipe layers, electricians, and engineers, in addition to all the managers, analysts, and support workers that keep our systems safe, clean, and reliable every day.

So it's easy to overlook these workers, but they're just as vital, if not more so, than the physical infrastructure we all take for granted each time we drink a glass of water, take a shower, or even brush our teeth.

So adding up all these workers nationally amounts to a total employment of nearly 1.7 million in 2016 alone. Put it another way, water workers consistently

makeup about two percent of employment, which might seem small on the surface, but this is an enormous and widespread segment of our labor market that is essential in every region across the country from New York and Los Angeles to New Orleans and Kansas City.

There are tens of thousands of water workers scattered across each region who play a foundational role managing our water infrastructure. And collectively the water workforce fills 212 different occupations and carries out an enormous range of activities, again whether installing and repairing equipment or analyzing and overseeing operations.

And the most important mission critical occupations like water treatment operators for instance tend to be the largest. There are thousands of these financial, technical, and administrative occupations too.

So it's easy to just emphasize the biggest positions that are concentrated in the skill trades here, there are many other positions and career pathways found throughout the sector.

DEWS: I want to give a shout out to the plumber who comes to my house and fixes my flash hot water heater. Thank you very much, but it's fascinating to know that there are so many more occupations in the water workforce than just the plumber or the utility company and the water treatment plant people that we think of working on our water infrastructure.

So again this isn't about the physical infrastructure itself, it's about the workforce, but I think it's important just to remind listeners how you conceive of what is the water infrastructure.

Again, it's more than just my flash hot water heater, the pipes in my house, and my garden hose and the gutters that take the rain water away.

KANE: So this is a subtle but important point. So when I refer to water infrastructure, I'm including all the different facilities responsible for providing drinking water, treating waste water, and managing storm water.

What do I mean by that, these systems range from traditional gray

infrastructure, such as pipes, pumps, and centralized treatment plants to green infrastructure, such as rain gardens and other related natural assets that tend to be more decentralized.

They also include individual on-site treatment systems such as septic systems and then also other related physical assets specific to building, such as plumbing. So there's really a wide range of manmade structures here as well as natural structures in play.

DEWS: Let's pause for a moment for another coffee break.

SCHUETZ: My name is Jenny Schuetz. I'm a David M. Rubenstein Fellow in the Metropolitan Policy Program here at Brookings. I grew up in Blacksburg, Virginia, which is a small college town in the southwest part of the state and it's a little bit of an odd place to grow up if you become an urban economist, because there are only 15,000 people in my home town.

I was inspired to become a scholar probably by two things: One is finding ideas and topic areas that I'm very passionate about and I want to study and the other was having great mentors all the way through my career.

So if you want to be a researcher, a scholar for your career, you need to find something you really care about and are interested in. Research can be a little bit of a solitary exercise. You spend a lot of time by yourself with your data and your computer.

So I took a class in graduate school where I learned about a core theory of urban economics, called the monocentric city model that explains how land values vary within cities. To me this was like the light on the road to Damascus, that this just explained how cities formed and where people build and where we have tall buildings and short buildings.

I found this so exciting that I thought I want to spend the rest of my life studying spatial patterns of cities. It was also really helpful to have great mentors and teachers at every stage of my career. So for my undergraduate thesis advisor, through jobs, and graduate school, research is really a craft that you learn as an apprenticeship. So working with a senior scholar who teaches you how to do research, how to breakdown

the process, and how to work through a topic, so it's a one-on-one learning experience, and having the right person to guide you and encourage you and support you the whole way is real important.

The most important issue that we're facing is the increasing barriers to economic opportunity for lots of American families. So we know for instance that the ZIP Code that you're born in and grow up in is very predictive of things like how much schooling you get and your future career and income, even things like your health conditions and your life opportunities. That's really antithetical to the American dream, the idea that a kid born anywhere in the country can grow up and be anything they want to be.

So Americans have become less geographically mobile over time. People are less likely to move from ZIP Codes that are poor, that don't have a lot of jobs, or resources, but they're less likely to move to communities where they have better opportunities and can build better lives.

One of the reasons behind this is housing cost. So if you live in some place like Detroit, Michigan, or Odessa, Texas, it's very hard to pick up and move to a place like D.C. or the Bay area, because housing is so much more expensive.

So people in some senses are getting locked out of the high opportunity cities and locked into places where they are will have worse outcomes on the number of measures.

At the moment I'm working on trying to understand how to make housing markets work better for middle income families. So if we think about sort of tiers of people, low income families get some subsidies and support from the federal government, although generally not that much, high income families are doing pretty well, but middle income families really don't have a lot of policies that help them and there's a couple different ways in which housing markets aren't working that well for middle income families.

So places like D.C., the Bay area, New York housing has gotten so expensive that even somebody in the middle of the income distribution has a very hard time buying

a house, paying the rent, living in a neighborhood that has good schools, and access to jobs and transportation. So for some parts of the country, housing affordability is the main problem for middle income families.

In other places, the problem is that housing costs really haven't risen over time. So if you bought a house in some place like Flint or Detroit, over 30 years you may have paid off the mortgage but you haven't actually built any wealth. So when those families get to retirement, they really don't have savings accumulated. Our policies encourage people mostly to save through home ownership, which doesn't work everywhere in the country.

One of my favorite books that explains how cities work is called Crabgrass Frontier. It's by a Historian named Kenneth Jackson and it's a great way to understand how cities have changed over time and some of the ways in which they haven't changed.

So, for instance, people tend to think that suburbanization, people moving out to get bigger houses and more space is a post-World War II phenomenon. But if you read the history, this goes back actually several thousand years. As people have more money, they always want bigger houses and more space and more privacy, so the process of moving out and consuming more housing is a very old one.

DEWS: Now back to the interview.

So to put the idea of this large number of industries and occupations into context, just kind of what percentage of the overall water sector is composed of say utilities, the water utility that we all know?

KANE: As I briefly alluded to earlier, the water sector captures a vast array of industries and each rely on a different mix of occupations and workers.

Traditionally water utilities are seen as the primary or only employer involved in overseeing the country's water infrastructure assets. However, a broader look at the water workforce nationally reveals that utilities employee about 298,000 workers, or about 17 percent of the total water workforce.

Other water-related employers led by plumbing contractors, engineering firms, and construction companies employ nearly 1.4 million workers.

In other words when we think about the water sector as a whole, similar to the entire infrastructure sector, there are all types of employers and establishments that depend on skilled talent.

And while water utilities are one of the most foundational employers in this respect, especially given their maintenance and oversight of our most important public assets, they are really part of a bigger ecosystem.

In this way when thinking about all the workers in this sector, it's important to acknowledge the complimentary and at times competing dynamic at play when employers are on the lookout for workers.

DEWS: I'll point out for listeners that the report itself is full of tables and pie charts and maps that break down by percent and numbers all these different classifications, the largest occupations in the water sector, the percent that are in utilities and so on.

Another area focus of this report is the demographics of the water workforce itself, again a lot of great charts and tables in here, can you talk about what some of the unique characteristics are of the water workforce?

KANE: Yeah. So in addition to measuring size of the water workforce, the study also examined a number of different characteristics of workers filling these jobs, which are important to consider when thinking about the types of workforce development strategies that are ultimately needed to support these workers.

So first water occupations not only tend to pay more on average compared to all occupations nationally, but also up to 50 percent more to workers at lower ends of the income scale.

In other words, many water workers earn competitive wages overall, particularly those in higher paying jobs such as lawyers, hydrologists, and so on, but water workers earn more equitable wages too particularly those just starting out their careers.

For instance, water workers earn hourly wage of about $14 and $17 at the 10th and 25th percentiles respectively, compared to the hourly wages of $9 and $11 earned by all workers at these percentiles across the country. So in total workers across

180 of those 212 water occupations earn higher wages at both of these percentiles.

Second, the fact that these equitable wages often appear in occupations where workers have lower levels of educational attainment further underscores the opportunity evident here. So in fact 53 percent have a high school diploma or less, these include carpenters, welders, and septic tank servicers among numerous other positions, instead they require more extensive on-the-job training and familiarity with a variety of tools and technologies. For example some of the biggest occupations like water treatment operators, usually need two to four years of related work experience.

Finally there is clear room to further diversify the water workforce. Like many in the skilled trades, water workers tend to be older and lack gender and racial diversity in certain occupations. In 2016 nearly 85 percent of them were male, which I think was striking. When you think 100 people in a room 85 were male, two-thirds were white, and multiple workers are nearing or eligible for retirement. In particular there's a lack of younger talent in these jobs, so just 10.2 percent of water workers are under the age of 24, which is lower than what we're seeing across all other occupations nationally.

So people of color also I'll say tend to be underrepresented in higher paying occupations involved in engineering management, which is also a big consideration here too.

DEWS: In terms of the gender distribution, it struck me that it's unevenly distributed where like the vast majority of plumbers, pipe fitters, construction workers are male; the majority of say office workers, clerical workers are women.

So given all these factors about the scope of the industry, the diversity of the industry, the demographics of the water workers, what are some of the challenges but also opportunities that y'all identified given those factors?

KANE: Absolutely. So I think the wages speak for themselves honestly. While many water workers are continuing to search for careers that offer higher pay or at the very least a more livable wage rate, we're seeing that this sector is supporting more enduring shared prosperity. And several other factors, such as cost of living, need to be taken into account when comparing these differences across different regions, but water

workers are clearly gaining access to a variety of well-paying employment opportunities across the country.

In terms of education and training, it's encouraging to see positions that emphasize a broad range of skills and experiences that do not simply start or end with a four-year degree. Career in technical education along with apprenticeships and internships hold promise for water workers and many other workers beyond this sector who increasingly need to adapt their skills and become familiar with new tools and technologies.

The importance of on-the-job is key too and while water workers develop many valuable skillsets as a result, setting themselves up for continued career growth, it's important to note that this need for training can also create a barrier to entry.

Nontraditional workers including disconnected youth, veterans, and other job seekers need to have flexible pathways by which they can learn about water careers and gain needed experience.

When it comes to demographics, it's clear that the water sector lacks younger more diverse talent in many positions. This is obviously a challenge for utilities and other employers in need of a long-term pipeline of workers to reliably carry out operations, but it also marks a huge opportunity.

I won't get into the weeds here, but in the study I point to the unique role played by water utilities as anchor institutions in many disadvantaged communities. Many of the biggest water employers are located in close proximity to neighborhoods with high unemployment, widespread joblessness, and low levels of educational attainment offering a clear outlet in my view to job seekers who could fill many positions in need of a new generation of workers.

DEWS: It struck me that the future water workforce will need to be larger than it is today, because of whatever -- many factors involved here, especially in the aging of the infrastructure itself. So again it's another way that it's a great opportunity in the water workforce.

We often think about water as being managed by these water utilities at

the local county or regional level, but what are, if any, the state and federal actors in the water workforce, what role do they play?

KANE: Correct. So in addition to utilities, there are a variety of other water actors who each have roles to play in this space. I already described some of the other water employers earlier, and there are a vast assortment of community partners that educate, train, and assist workers interested in water careers, and these include educational institutions, workforce development boards, unions, and then other groups that offer job readiness programs, transition services, and other support to workers.

In many ways national and state level actors are positioned to provide greater capacity and momentum for these regional efforts. Federally the U.S. Environmental Protection Agency is perhaps the most important agency when it comes to regulating utility activities and guiding workforce needs and the U.S Departments of Labor, Education, Veterans Affairs, and Agriculture offer programmatic support as well. A host of other national and state level organizations including industry associations, workforce groups, environmental coalitions, and state boards of education are also assessing existing training efforts and setting new strategic priorities.

DEWS: So, Joe, looking ahead as this report is considered and digested, and I hope shared around by the appropriate actors, what are the challenges and opportunities again, not just the demographics that we talked about a minute ago, but just for the water workforce in general looking ahead to the future?

KANE: There are many challenges I discuss in the study, but I'll highlight just a few of the major points here. The water sector is struggling to attract and hold onto skilled talent. Equipping workers with the needed skills and credentials is not always easy. Even those workers who are eligible and interested in water work cannot always navigate an inflexible time consuming hiring process or progress their careers.

For instance a lack of public visibility combined with declines in career and technical education has reduced interest and experience among perspective workers who could fill water-related positions. At the same time a silver tide of retirements is drastically cutting into the pool of skilled qualified workers in many utilities and resulting

in staffing vacancies up to 50 percent in some cases.

Likewise a combination of hard skills and soft skills are essential for water workers to carry out their jobs; however, not all workers are obviously gaining the needed education, experience, or competency in these skills. Even when students and other prospective workers are demonstrating an interest in water careers, pursuing the needed education, and gaining the relevant experience, there can still be challenges hiring them and providing long-term growth opportunities.

For example, depending on the particular region, many prospective workers, young and old, may lack job readiness, may remain out of work due to a criminal past, or may present a nontraditional background, which employers may not have the time, resources, or really the programmatic flexibility to even handle.

So, again, this is just a sample, but I'll say this, given the highly localized nature of water operations, capital planning needs, and labor demands, there are no one size fits all strategies to address these recruitment challenges, which often spillover into the hiring process and the long-term retention of workers.

The site visits, though, were enormously helpful to further clarify these barriers across different regions throughout the country.

DEWS: Opportunities for the water workforce in the future, how would you talk about that?

KANE: In many ways I think addressing the country's water workforce needs represents an aspirational moment where continued planning helps, but faster implementation is essential to drive new solutions. For that reason in the study, I lay out what I call a new water workforce playbook to accelerate thinking and action.

So rather than continually reflecting what needs to be done, having a consistent and discrete list of action items can help utilities, other water employers, community partners, and again those national and state leaders to begin to better prioritize and launch solutions.

For example, locally driven actions are crucial to help workers achieve the needed skills and identify the available pathways to securing greater economic

opportunity through the water sector, and these actions naturally start at the source, utilities and the employers actually looking to hire, train, and retain a skilled diverse workforce.

Water utilities in particular not only need to focus on recruiting and retaining workers for themselves, but they should be a standard bearer for the entire water sector.

And we can see this I think through a variety of internal programmatic changes where they can heighten the awareness of the water workforce opportunity and further prioritize action around faster hiring, more flexible training, and more predictable retention.

We're seeing this already happening in places like the Bay area where utility led efforts like Baywork, which I definitely recommend listeners check out, are better defining and upskilling workers interested in water careers.

In addition, there needs to be continued dialogue and shared learning via stronger community partnerships. So in other words to reach more prospective workers, all types of community partners and employers, not just utilities, need to sit at the table.

Educational institutions, workforce development boards, unions, and a range of other organizations all have a role to play here, as I mentioned before. It is critical for communities to keep stretching the tent to capture more partners and act more collaboratively.

Having a specific point of contact or even just one regional organization to coordinate these actions help, but so does having a clear space and opportunity to gather together in a public facing way, which places like Louisville and Camden are testing out.

Lastly, national and state leaders I think need to provide clear technical guidance and more robust programmatic support and investments in water workforce development.

So national leaders in my view are strategically positioned to bring greater consistency and direction to many of these issue, including certain dialogues, considering reform certification programs, and even forming templates for future action.

EPA and several other federal agencies are already examining different options in this way supported by a number of industry associations and workforce groups nationally. So I'm excited to see where this goes.

DEWS: Sure. One of your conclusions, Joe, that really appealed to me is the idea that the water workforce needs more public visibility and more branding, you've alluded to this many times, struggling to attract talent, students are a possible opportunity area for water workers.

What does more public visibility, more branding of the water workforce even look like?

KANE: Yeah, that's right. Expanding recruitment efforts hinges on the development of a more proactive and intuitive message I think on water careers. So to help connect with younger students in a broader range of prospective workers, utilities and other employers need to more effectively market their organizations and the variety of work opportunities in the space.

For example the Baltimore Public Works Department recently rebranded some of their training efforts under a new title and logo called YH20 to appeal more directly and intuitively with prospective workers and even demonstration projects, including the installation of rain gardens in neighborhoods can help.

So above all in connecting earlier and often with students and job seekers can help create a stronger pipeline for years to come. By doing so, we're not only setting ourselves up to improve our infrastructure but also promote greater economic opportunity.

DEWS: It seems to me that through this report we knew in the water workforce you and Adie have sort of defined the water workforce in a way that could be helpful for those who are trying to do this branding effort and expand the economic opportunity.

Where do you take this kind of research from here?

KANE: The issue isn't going to go away, right, it's going to keep being talked about in Washington, it's going to be a major issue I think in certainly the regions

that we visited and then regions beyond them.

I think this is an issue that economically speaking has tremendous importance to urban and rural areas alike. It's a bipartisan priority. So when we think of not just filling jobs for filling jobs sake, but providing career pathways for all types of workers that are ultimately helping to improve our infrastructure is I think compelling and it's certainly something that I think will continue to gravitate a lot of energy and action from the bottom up.

DEWS: Joe, I want to thank you for stepping by the studio today to share your time and expertise.

KANE: Thanks, Fred.

DEWS: You can find Joseph Kane's report with Adie Tomer on the water workforce on our website at brookings.edu/metro.

My thanks to audio engineer and producer Gaston Reboredo, with assistance from Mark Hoelscher. The producers are Brennan Hoban and Chris McKenna. Bill Finan does the book interviews, and to Jessica Pavone, Eric Abalahin, and Rebecca Visor for design and web support. Thanks also to our intern Steven Lee and finally thanks to Camilla Ramirez and David Nassar for their guidance and support.

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