

**Expanding the Infrastructure Talent Pipeline and  
Boosting Economic Opportunity**

**Testimony submitted to the  
Committee on Small Business  
Subcommittee on Innovation, Entrepreneurship, and Workforce Development  
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*\*The views expressed in these remarks are those of the author alone and do not necessarily represent those of the staff, officers, or trustees of The Brookings Institution*

Good morning, members of the committee, thank you for the opportunity to offer testimony as you consider different innovations and investments in workforce development. My name is Joseph Kane, and I am a Fellow in the Metro Program at the Brookings Institution. The purpose of my remarks today is to frame specific challenges and opportunities facing the country's infrastructure workforce, including the potential to expand career pathways in the coming months and years.

As you know, workers have faced an increasingly polarized labor market during the COVID-19 pandemic and over the last few decades. Middle-skill jobs—which typically require more than a high school diploma but less than a four-year college degree—have grown much slower than other low-skill and high-skill jobs. The Great Recession amplified this trend, with the greatest job losses among workers with a high school diploma or less; 95% of jobs created during the subsequent recovery went to those with at least some college education. Even before the pandemic, 53 million American workers—or 44% of all workers—earned only about \$10.22 per hour. Many of these lower-income workers—including a disproportionate number of women and people of color—have struggled to find long-term, better-paying jobs, and the pandemic has only heightened these difficulties.<sup>1</sup>

At the same time, the country's infrastructure—including transportation, water, energy, broadband, and other systems—has increasingly faced gaps in investment. That's not only true when it comes to needed physical upgrades and expansions, but also when it comes to hiring, training, and retaining a skilled workforce to construct, operate, and maintain all these various systems. Aging and inefficient designs; a more extreme climate; and rapidly-evolving technologies are pressuring transportation departments, water utilities, and many infrastructure owners and operators to have a workforce ready to take on

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<sup>1</sup> Source (entire paragraph): Adie Tomer, Joseph W. Kane, and Caroline George, "Rebuild with purpose: An affirmative vision for 21st century American infrastructure," Brookings, 2021.

different projects. A lack of fiscal and technical capacity at a state and local level, in particular, has long stymied efforts to improve infrastructure and prioritize infrastructure workforce development. However, the recently-passed Infrastructure Investment and Jobs Act (IIJA) offers an unprecedented opportunity to address these gaps—and accelerate momentum around careers that pay higher wages, require shorter-term credentials, and need a new generation of talent.

To maximize this opportunity, federal, state, and local leaders can't just create short-term jobs—namely construction jobs—for the same people. They need to be ready to harness the IIJA funding and other potential federal funding in ways that expand opportunities to the full diversity of our workforce—women and men, the unemployed and underemployed, and younger students and adult learners—across a broad range of positions in the skilled trades and other in-demand fields.<sup>2</sup> They need to focus on creating an infrastructure talent pipeline that can offer more sustained opportunity to workers and provide greater certainty to infrastructure operators and other employers, including contractors and small businesses in this space.

Federal leaders have an integral role to play defining what an infrastructure job means for different workers and employers across the country—while boosting greater access to these careers. Without a consistent understanding of who can fill these positions, where they are located, and what types of skills and training are needed, the country risks missing the generational opportunity at hand. Much of my past and ongoing research has focused on defining these needs, which I will describe first before discussing potential solutions.

### **Defining the Infrastructure Workforce Challenge**

The country's infrastructure workforce challenges primarily center around a lack of visibility and flexibility.

Addressing these challenges begins with acknowledging the variety and extent of infrastructure career pathways nationally, as past Brookings research has explored.<sup>3</sup> In 2019, before the pandemic hit, 17.2 million workers—or more than one of every 10 workers nationally—were employed in infrastructure, primarily concentrated in 91 different occupations. The largest positions include truck drivers, electricians, plumbers, and other skilled trades found in urban areas, rural areas, and every kind of place in between. But many workers are also involved in administrative, financial, and managerial roles at warehouses, utilities, and engineering firms. Operational jobs represent three-quarters of all infrastructure jobs.<sup>4</sup>

A basic challenge facing infrastructure employers—including utilities, transportation agencies, and engineering firms—is a lack of awareness among Americans that these careers even exist. Many infrastructure jobs (along with the relevant educational and training pathways to access them) lack visibility among students and prospective workers. This obscurity continues even as infrastructure jobs offer more competitive, equitable wages due to prevailing industry norms and greater labor protections, including higher levels of unionization. In particular, infrastructure jobs can pay 30% more to workers at

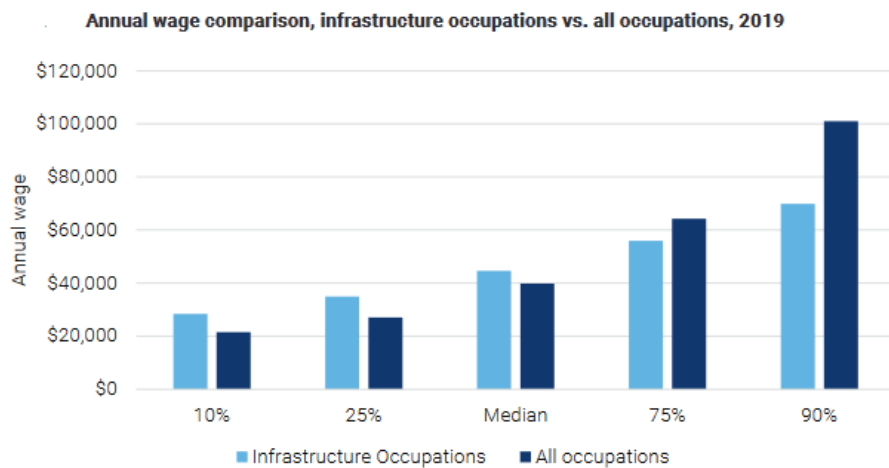
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<sup>2</sup> Joseph W. Kane and Jack Mills, "Harnessing the Infrastructure Investment and Jobs Act to train the next generation of workers," Brookings, 2022.

<sup>3</sup> Joseph W. Kane and Robert Puentes, "Beyond Shovel-Ready: The Extent and Impact of U.S. Infrastructure Jobs," Brookings, 2014.

<sup>4</sup> Joseph W. Kane, "Biden needs to create an infrastructure talent pipeline, not just more jobs," Brookings, 2021.

lower ends of the wage spectrum, or at the 10th and 25th percentile—in other words, workers with the least amount of experience who are just starting their careers.<sup>5</sup>



Source: Brookings analysis of Bureau of Labor Statistics Occupational Employment Statistics

Prospective workers may also lack awareness around the exact types of skills and training needed for these careers, which tend to emphasize work-based learning opportunities, such as apprenticeships and internships. For example, around a half (53.4%) of infrastructure workers have a high school diploma or less, compared to around a third (31.7%) of all workers nationally.<sup>6</sup> Likewise, nearly all infrastructure workers have at least some level of on-the-job training.<sup>7</sup> Whether employed as technicians, operators, or engineers, these workers frequently demand higher levels of STEM knowledge and digital skills gained by on-the-job training. Yet, even if they have awareness of needed training or credentials, students and prospective workers may still struggle to gain knowledge and experience for a host of reasons: a lack of employer engagement, rigid licensing requirements, underfunded career and technical education (CTE) programs, and limited supportive and wrap-around services, such as childcare.

A lack of visibility combined with a growing need for related experience and skills has resulted in massive hiring, training, and retention gaps. While some infrastructure jobs are projected to grow in coming years, the replacement needs—filling positions left vacant by retired workers or those leaving the sector permanently—are even more dire. Nearly a quarter of all infrastructure workers will need to be replaced over the decade, but some occupations are expected to see 10% or more of their workers leave each year on average.<sup>8</sup> That’s especially the case for infrastructure jobs with older workers nearing or eligible for retirement; 73% of bus drivers, for instance, are over the age of 45, and many are in their 50s. This “silver tsunami” across several occupations poses a short- and long-term threat to employee retention, knowledge transfers, and other operational needs in public and private employers alike.

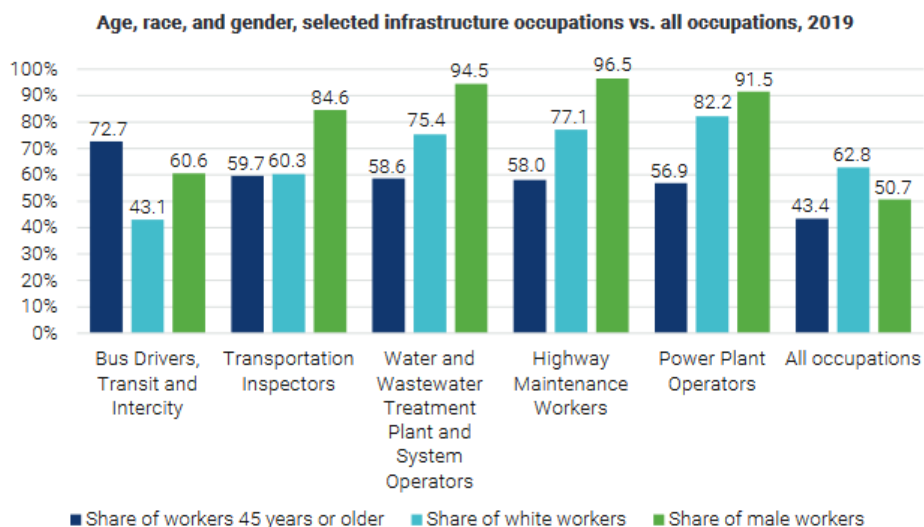
<sup>5</sup> Joseph W. Kane and Robert Puentes, “Expanding opportunity through infrastructure Jobs,” Brookings, 2015.

<sup>6</sup> Joseph W. Kane, “Biden needs to create an infrastructure talent pipeline, not just more jobs,” Brookings, 2021.

<sup>7</sup> Joseph W. Kane and Adie Tomer, “Infrastructure skills: Knowledge, tools, and training to expand opportunity,” Brookings, 2016.

<sup>8</sup> Joseph W. Kane, “The future American workforce will have a lot of jobs to fill, particularly in infrastructure” Brookings, 2017.

In addition to a graying workforce, many infrastructure workers are predominantly white and male, signaling our inability to attract and hire a younger, more diverse generation of workers. In occupations such as power plant operators and highway maintenance workers, up to 82% of workers are white. Meanwhile, 82% of all infrastructure workers are male.<sup>9</sup> In individual infrastructure sectors such as water, these racial and gender gaps can be even more extreme: 99% of pipelayers are male, and Black and Asian American workers tend to be underrepresented overall, filling 12% of water jobs compared to 18% of all jobs nationally.<sup>10</sup>



Source: Brookings analysis of BLS Occupational Employment Statistics and EMSI data

Such imbalanced racial and gender statistics reveal underlying inequities in our workforce development practices. Demonstration projects, mentorships, and other early, repeated opportunities for career exploration can be lacking for students and prospective workers. Work-based learning and other bridge programs and internships may also be out of reach, despite being important tools to help disconnected youth gain skills and experience as they navigate the transition from school to work and foster positive relationships with adults along the way.<sup>11</sup> And beyond the young adults struggling to enter the workforce for the first time, older displaced workers in other economic sectors—including veterans and the formerly incarcerated—may also experience challenges. Adult and dislocated worker training programs are often underfunded, and the available transition pathways amid new technologies and the changing nature of work in energy and elsewhere lack flexibility.<sup>12</sup>

### Seizing the Infrastructure Workforce Opportunity

Infrastructure jobs are varied and widespread, offer more competitive and equitable wages, do not demand as much formal education, and have immediate and long-term hiring needs. Seizing this economic opportunity hinges on proactive federal leadership to ensure greater visibility and flexibility to

<sup>9</sup> Brookings analysis of BLS Occupational Employment Statistics.

<sup>10</sup> Joseph W. Kane and Adie Tomer, “Renewing the water workforce: Improving water infrastructure and creating a pipeline to opportunity,” Brookings, 2018.

<sup>11</sup> Martha Ross, Richard Kazis, Nicole Bateman, and Laura Stateler, “Work-based learning can advance equity and opportunity for America’s young people,” Brookings, 2020.

<sup>12</sup> Annelies Goger, “Turning COVID-19’s mass layoffs into opportunities for quality jobs,” Brookings, 2020.

fill careers. That doesn't mean filling one type of job in one place, but rather, having multiple entry points and pathways available for more people in more places. This flexibility matters because a diverse range of unemployed and low-wage workers in hospitality, retail, and other industries nationally following the pandemic need to transition to better jobs, which will require many branching pathways. That will also require an emphasis on supporting a robust talent pipeline—not just in the next five years of IJA implementation, but for decades to come.

Expanded financial and technical capacity around regional planning and employer engagement is a must, as is an expanded focus on future-looking skills development and flexible training opportunities.

*Visibility: Proactive regional planning and employer engagement*

Work-based learning helps students and prospective workers develop and apply new skills, and provides them with the experience needed to qualify for entry-level opportunities across the infrastructure sector. Such programs can introduce younger students to these careers earlier and more often, while especially empowering disadvantaged or disconnected workers of all ages. However, supporting these programs depends on proactive regional planning and employer engagement, which often lack sustainable funding. Federal leaders could provide greater certainty for these efforts through expanded eligibilities in IJA competitive grants, while providing greater technical assistance to individual regions that are testing new approaches.

For example, employers can partner directly with community colleges, technical schools, and similar educational institutions—along with other community-based organizations—to help students gain the necessary skills, knowledge, and qualifications to be hired. Federal leaders could support such collaborations and “sector partnerships” through expanded funding and technical assistance, as has already been elevated by the Department of Labor, Environmental Protection Agency, and other bodies.<sup>13</sup> Water utilities and other workforce groups in the San Francisco Bay Area, for instance, have banded together as part of a regional “BAYWORK” effort to hold workshops, meetings, and other events around the water workforce challenge; to clarify strategic priorities and measure hiring needs around mission-critical occupations; and to provide on-the-job training opportunities.<sup>14</sup> Similarly, in Washington, D.C., Mayor Muriel Bowser started a new “Infrastructure Academy” to serve as single, postsecondary educational institution and regional destination to help with workforce screening, training, and recruitment.<sup>15</sup>

Apprenticeships and pre-apprenticeship programs offer another earn-and-learn opportunity for workers entering the infrastructure workforce. These programs typically last several years and span the worksite and the classroom, and play a strong role in the construction and utility trades. Expanding apprenticeship opportunities to connect with more workers would provide yet another viable on-ramp to the infrastructure career pipeline. For example, the ICATT Apprenticeship Program, which is modelled after and benchmarked against the German dual education system, allows manufacturing employers to invest in a local talent pipeline and build a loyal workforce through extended earn-and-learn

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<sup>13</sup> For instance, sector strategies and initiatives are gaining greater visibility. See: United States Environmental Protection Agency, “EPA Announces Initiative to Recruit and Retain the 21st Century Water Workforce,” 2020.

<sup>14</sup> Joseph W. Kane, “Investing in water infrastructure and workers: Examining the Bay Area’s regional approach,” Brookings, 2018.

<sup>15</sup> Joseph W. Kane and Lara Fishbane, “Can ‘infrastructure academies’ solve our most pressing workforce challenges?” Brookings, 2018.

opportunities; federal leaders could expand the reach and application of such global models in different industry sectors, such as infrastructure. Beyond additional federal funding for apprenticeships, expanding the work opportunity tax credit (WOTC) could further incentivize employers to test these types of approaches, reach more workers, and facilitate access to on-the-job-training.

#### *Flexibility: Skills development and more accessible training opportunities*

Above all, the ultimate reach and impact of the IJA funding and other potential federal funding must ensure there are flexible training opportunities in place to help more and different types of workers grow their knowledge and experience over time. This will be crucial as new technologies and the nature of work keeps changing across the infrastructure sector, which will demand ever-evolving skillsets and credentials to navigate the labor market.

Programs focused on younger workers—particularly those out of school, out of work, and facing other social and economic disadvantages—can grow and diversify the infrastructure workforce. Service-based learning opportunities and expanded Pell grant eligibility for short-term job training and CTE programs are two ways that federal leaders could address these youth workforce needs.<sup>16</sup> Even reaching younger students in middle school and high school should not be overlooked, as many infrastructure employers look for ways to be present in the classroom and communities through demonstration projects.<sup>17</sup> Funding eligibility and prioritization for such efforts in the IJA competitive grant programs, including expanded local hiring of younger, disadvantaged workers, could offer light-touch ways to expose more people to infrastructure careers.

However, younger individuals are just one segment of the prospective infrastructure workforce. Many other nontraditional and underrepresented workers—including women, people of color, and middle-aged workers—can realize greater opportunity in this sector as well, especially following the COVID-19 pandemic. Enhancing existing federal efforts, such as the Women in Apprenticeship and Nontraditional Occupations (WANTO) Grants program, could help support community-based organizations provide more accessible on-ramps.<sup>18</sup> Helping unemployed and underemployed workers transition to careers in the infrastructure sector will be especially important in the coming months and years. Expanding supportive services and transition assistance will be essential, similar to how the Economic Development Administration, Appalachian Regional Commission, and other federal agencies have transitioned displaced fossil fuel workers into clean energy careers through the POWER Initiative and the Assistance to Coal Communities (ACC) program.

#### **Conclusion**

Members of the committee, I believe there are enormous challenges facing our infrastructure workforce, but also enormous opportunities. Admittedly, the issues I have described today only scratch the surface of what federal, state, and local leaders need to do around infrastructure workforce development, particularly amid an influx of new IJA funding. The infrastructure talent pipeline is increasingly empty, and the lack of skilled workers may pose difficulties to getting projects done and

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<sup>16</sup> Adie Tomer, Joseph W. Kane, and Lara Fishbane, “An infrastructure stimulus plan for the COVID-19 recession,” Brookings, 2020.

<sup>17</sup> Joseph W. Kane, “Recognizing infrastructure’s role as a local economic anchor,” Brookings, 2018.

<sup>18</sup> Caroline George and Joseph W. Kane, “Reversing America’s poor track record on inclusivity in infrastructure jobs,” Brookings, 2021.

helping communities. But as conversations evolve in the coming months, I want to emphasize the opportunity you and other leaders have to further refine and test potential applications of any new funding—to not simply reinforce existing and inequitable workforce gaps, but to create stronger pathways for all prospective workers, including those underrepresented in infrastructure and infrastructure-adjacent occupations. Doing so has the potential to expand economic opportunity well beyond the IJJA’s initial launch and into years to come.