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CENTERS OF EXCELLENCE
FOR LABOR MARKET RESEARCH

California Workforce Needs in the Water/Wastewater Industry

Prepared by the Centers of Excellence for Labor Market Research
California Community Colleges' Economic and Workforce Development Program

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Why Water/Wastewater?

- Over 150,000 public drinking water systems and more than 16,000 publicly owned wastewater treatment systems throughout the country (supplying more than 80% of the U.S. population's drinking water)
- Water/wastewater systems are also vital to public health by treating water for contaminants such as natural chemicals and minerals, fertilizers and pesticides, and heavy metals
- Despite the importance of water/wastewater systems, the infrastructure for these systems is aging
- The water/wastewater industry continues to report workforce vulnerabilities related to a large number of impending retirements and hiring difficulties

Literature Review: *Why Water/Wastewater?*

Findings from previous reports conducted by the federal government, think tanks, industry associations, and the COE can be grouped into three categories:

1. **Aging Workforce and Looming Retirements:** Though estimates vary, employers report that a significant percentage of their workforce will become eligible for retirement in the near future.
2. **Workforce Diversity and Inclusion:** Because water/wastewater workers tend to be older and nearing retirement age, there is a lack of young workers. Additionally, there is a lack of gender and racial diversity.
3. **Industry Awareness:** The industry is not well known among students and often neither they nor job seekers are aware of opportunities in the water/wastewater industry.

Defining the Water/Wastewater (W/WW) Industry

- Water Supply and Irrigation Systems (221310)
  - Examples of Employers: Atascadero Mutual Water Company, Imperial Irrigation District, Redding Water Utility Department
- Sewage Treatment Facilities (221320)
  - Examples of Employers: Leucadia Wastewater District, San Rafael Sanitation District, Tuolumne Sewer District
- Water and Sewer Line and Related Structures Construction (237110)
  - Examples of Employers: Advanced Drainage Systems, Bakersfield Well & Pump Company, Eaton Drilling Company
- Other Heavy and Civil Engineering Construction (237990)
  - Examples of Employers: American Civil Constructors, Ghliotti Construction
- Site Preparation Contractors (238910)
  - Examples of Employers: Graniterock, Southern California Grading
- Local Government, excluding Education and Hospitals (902999)
  - Examples of Employers: Alameda County Waste Management Authority, Goleta Sanitation District, Sacramento County Environmental Management,
- State Government, excluding Education and Hospitals (903999)
  - Examples of Employers: California Department of Water Resources, California Pollution Control Financing Authority

Mission-Critical Occupations

Functional Group	SOC Code	Occupation Title	Related Job Titles
Electrical	17-3023	Electrical and Electronic Engineering Technologists and Technicians	Electrical Technician, Control Systems Technician,
	47-2111	Electricians	Electrician, Water Systems Electrician, Sewer Pump Station Electrician
Maintenance	17-3098	Calibration Technologists and Technicians	Calibration Technician, Engineering Technician, Instrumentation Technician
	49-9041	Industrial Machinery Mechanics	Plant Machinery Maintenance Mechanic, Water Systems Mechanic, Water Treatment Plant Repairer
	49-9071	Maintenance and Repair Workers, General	Maintenance Worker, Maintenance Services Worker, Building Maintenance Technician, Repair Technician
Operational	47-2073	Operating Engineers and Other Construction Equipment Operators	Back Hoe Operator, Heavy Equipment Operator, Water Equipment Operator
	51-4041	Machinists	Machinist, CNC Machinist
	51-8031	Water and Wastewater Treatment Plant and System Operators	Plant Operator, Wastewater Operator, Wastewater Technician, Wastewater Lead Operator

Research Questions

1. **What is the labor market for the water/wastewater industry?**
   a. What are the mission-critical occupations?
   b. What is the supply and demand for water and wastewater treatment plant and system operators and other mission-critical occupations?
   c. What are the essential skills for these mission-critical occupations across all industries and within the water/wastewater industry?

2. **What are the current and potential challenges facing the water/wastewater industry?**
   a. What methods do water and wastewater agencies typically use to recruit new hires (e.g., unions, online job postings, word of mouth)?
   b. Are existing connections between industry and supply from community colleges and other training providers in place to fill demand for these occupations?

3. **How are these industry challenges mitigated?**
   a. How have water/wastewater agencies addressed challenges associated with a retiring workforce?
   b. How can the California Community Colleges support these efforts?

Findings & Recommendations

Awareness	Diversity	Partnership	Skills
This theme describes the need for increased water/wastewater industry awareness to attract more students and job candidates.	This theme relates to increasing diversity in the water/ wastewater industry and how the industry and community colleges can build on existing efforts.	This theme describes how community colleges and the water/wastewater industry can improve their partnerships to make them more effective.	This theme relates to the identification of skills required for water/wastewater occupations and how community colleges can help students prepare for these occupations.

Findings & Recommendations: *RQ1a*

Research Question (RQ)	RQ Findings	Recommendations
RQ1: What is the labor market for the water/wastewater industry?		
RQ1a: What are the mission-critical occupations?	**RQ1a Findings:** This report identified eight-mission critical occupations, which are essential to water and wastewater operations, difficult to fill, and typically require at least a high school diploma: 1. Calibration Technologists and Technicians 2. Electrical and Electronic Engineering Technologists and Technicians 3. Electricians 4. Industrial Machinery Mechanics 5. Machinists 6. Maintenance and Repair Workers, General 7. Operating Engineers and Other Construction Equipment Operators 8. Water and Wastewater Treatment Plant and System Operators All eight mission-critical occupations have high entry-level wages and low typical entry-level education requirements and are relatively homogenous when considering workforce demographics. Throughout the state, the water/wastewater industry accounts for 13% of employment in these mission-critical occupations and these occupations account for 4% of water/wastewater employment.	The water/wastewater industry may want to conduct further research on emerging occupations developing due to technological advancements, legislation and/or regulatory requirements, or other factors to predict future mission-critical occupations in preparation for future industry needs. Though the intent of the industry survey was to identify potential emerging areas, most respondents either did not respond or said they did not know which areas were developing in the industry. It is unclear whether that is due to respondents' lack of interest in emerging occupations or lack of knowledge.

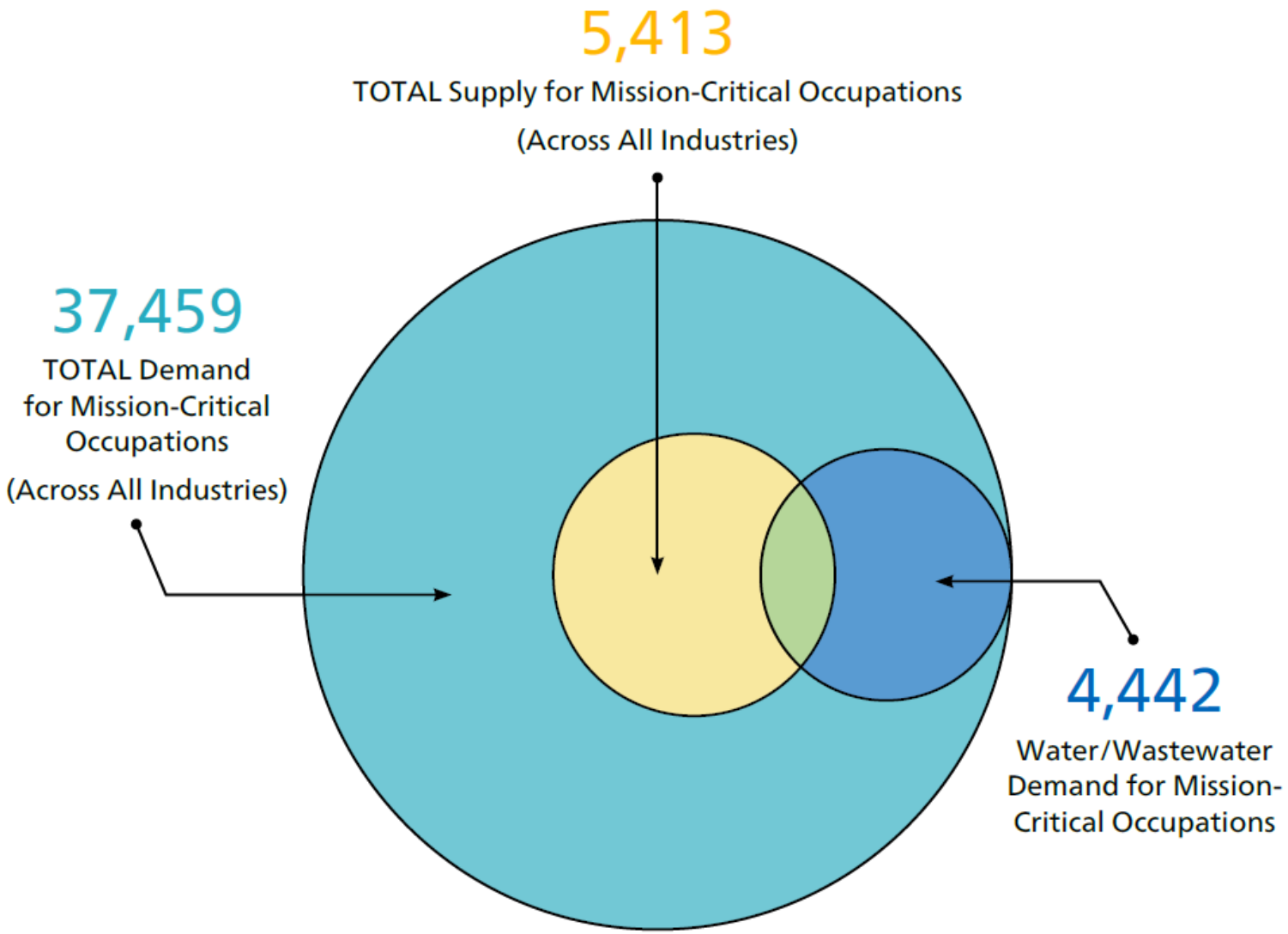
Findings & Recommendations : *RQ1b*

Research Question (RQ)	RQ Findings	Recommendations	Recommendations
RQ1b: What is the supply and demand for water and wastewater treatment plant and system operators and other mission-critical occupations?	**RQ1b Findings:** There is significant demand but low supply for these mission-critical occupations in California, indicating a labor supply gap of 32,049 awards. There is a projected labor market demand of 37,459 annual job openings statewide through 2026. Of those, 12% (4,442) are projected to be in the water/wastewater industry. An average of 5,410 awards (supply) have been conferred by educational institutions over the past three years. Community colleges account for 71% of the supply from educational institutions in California and provide training programs for all but one mission-critical occupation.	Continue to build and improve upon awareness of the water/wastewater industry and evaluate effectiveness of existing marketing campaigns and other efforts to attract potential employees.	Increase effectiveness of water/wastewater industry and community college partnerships, which will strengthen advisory boards, create more cooperative work experiences and other work-based learning opportunities for students, as well as build new and strengthen existing pipelines of qualified job candidates. Address current equity gaps in the water/wastewater workforce through targeted marketing efforts and partnership with community colleges, where the student population is more diverse than the current water/wastewater workforce – particularly in age and gender.

Findings & Recommendations: *RQ1c*

Research Question (RQ)	RQ Findings	Recommendations
RQ1c: What are the essential skills for these mission-critical occupations across all industries and within the water/wastewater industry?	**RQ1c Findings:** The essential skills for water/wastewater mission critical occupations are similar across all industries yet skills identified by survey respondents and listed in job postings vary greatly. This report identified the top 10 skills listed in online job postings for each mission-critical occupation. Essential skills are highly transferable across all industries. Most skills identified by survey respondents do not align with those requested in online job postings for any of the mission-critical occupations. This potential misalignment could contribute to industry's challenge of hiring qualified employees and deserves to be studied further.	The water/wastewater industry should conduct further research to determine if there is a misalignment between the skills in online job postings and those considered essential by hiring managers and, if so, the degree of misalignment. Once essential skills for each mission-critical occupation have been identified, industry and community colleges, via advisory boards, should collaborate to refine curriculum and address these skills.
		Leverage industry and community college partnerships to develop cooperative work experiences and other work-based learning opportunities that will help students earn as they learn skills for employment in the water/wastewater industry.

Labor Market Analysis

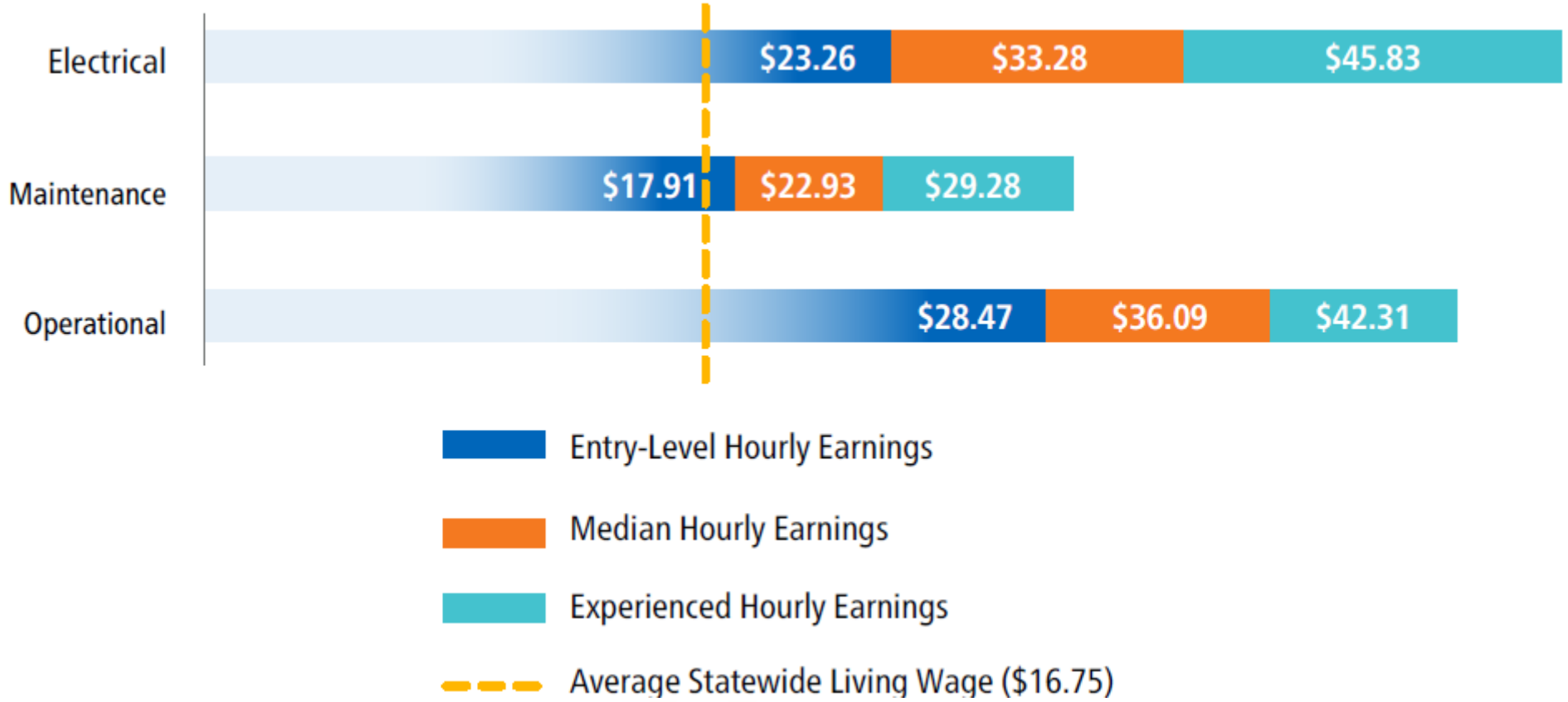


Mission-Critical Occupations: *Demand*

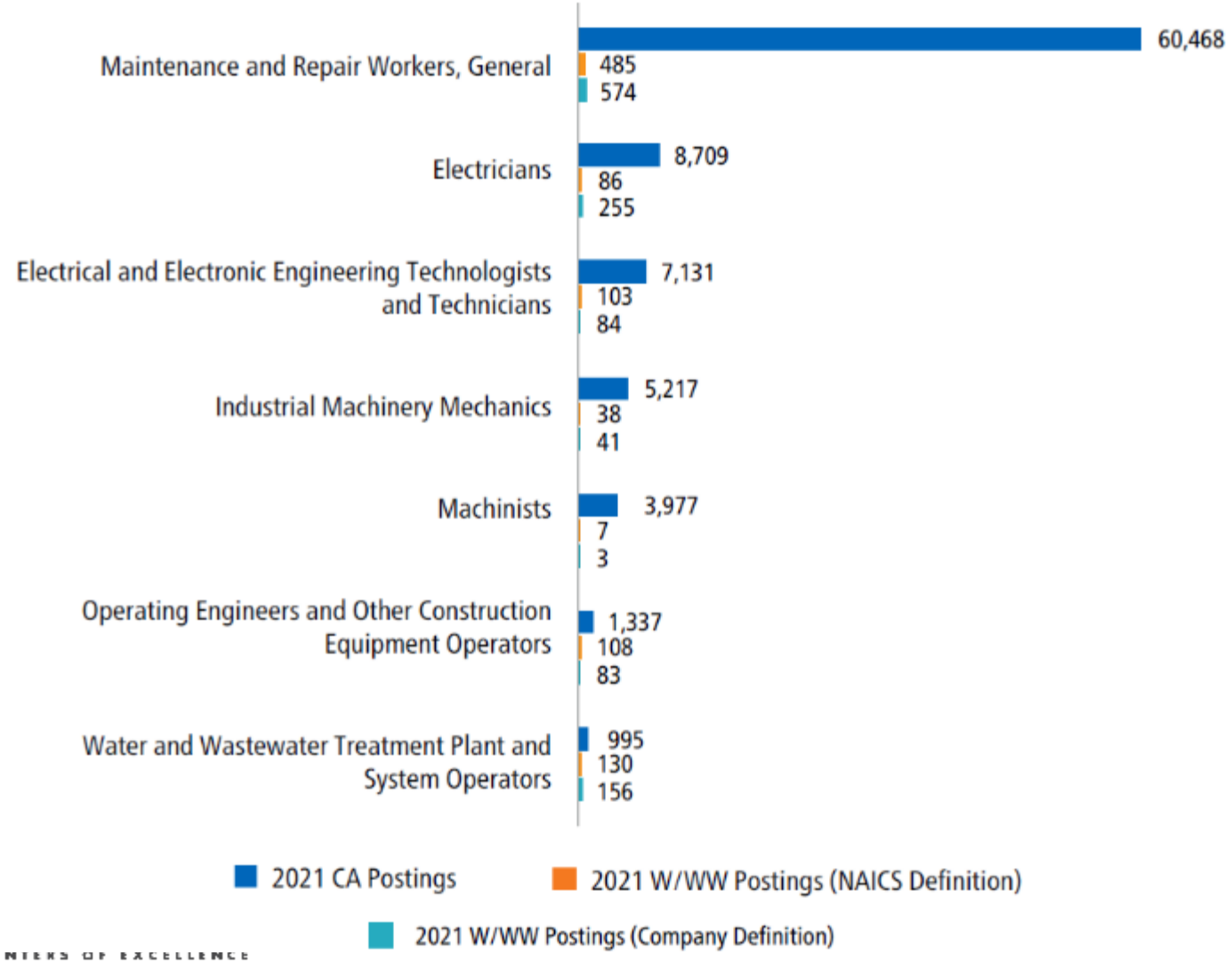
Industry	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Demand (Annual Openings)
Water/Wastewater Industry	44,072	44,957	884	2%	4,442
All Industries	343,641	359,554	15,913	5%	37,459
Water/Wastewater as % of Total	**13%**	**13%**	**6%**	**N/A**	**12%**

Region	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Demand (Annual Openings)
Central	7,907	8,103	196	2%	802
Northern	15,461	15,756	295	2%	1,567
Southern	20,704	21,098	393	2%	2,074
Total	**44,169**	**45,139**	**970**	**2%**	**4,442**

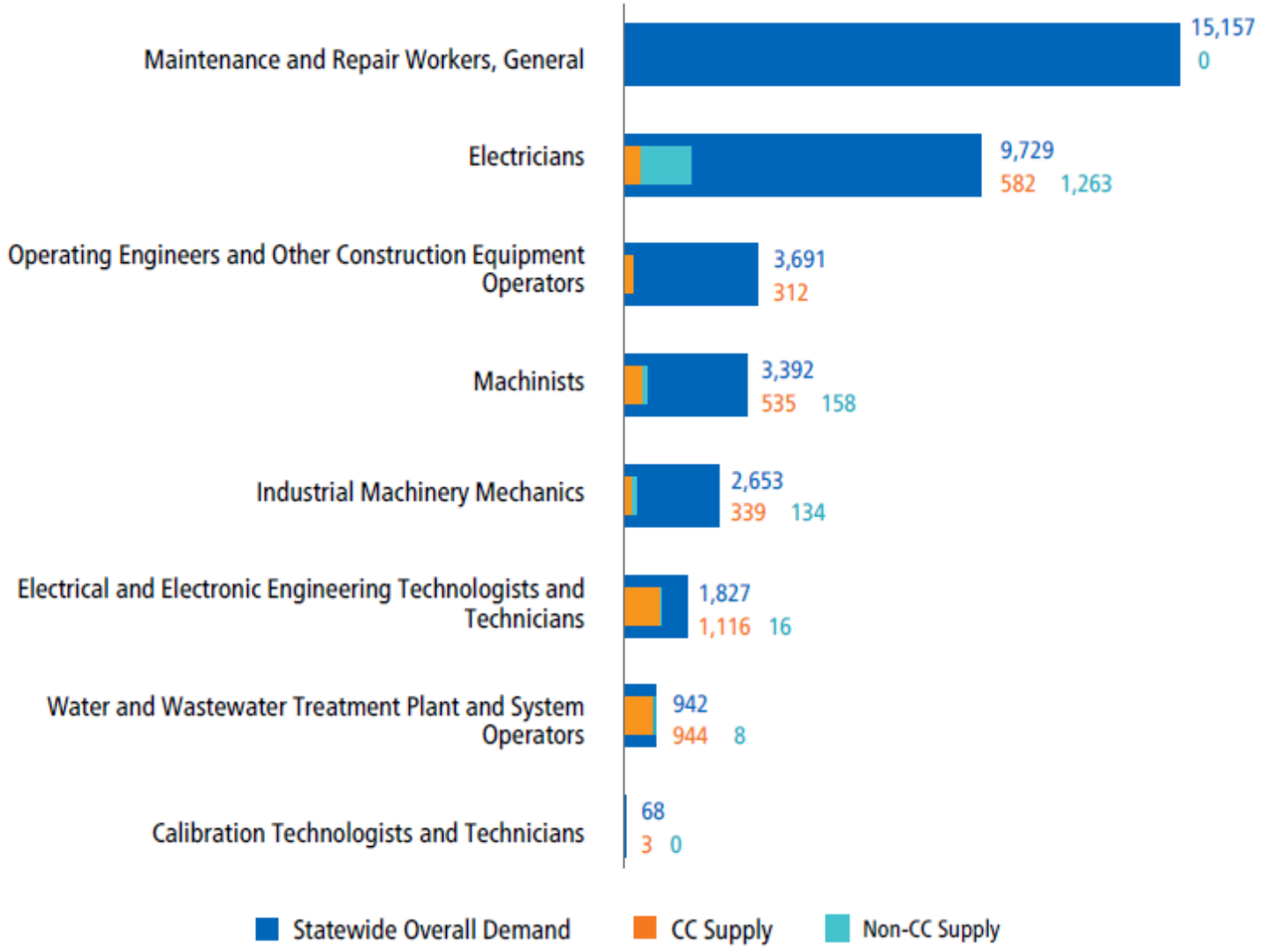
Wages for Mission-Critical Occupation Groups in CA



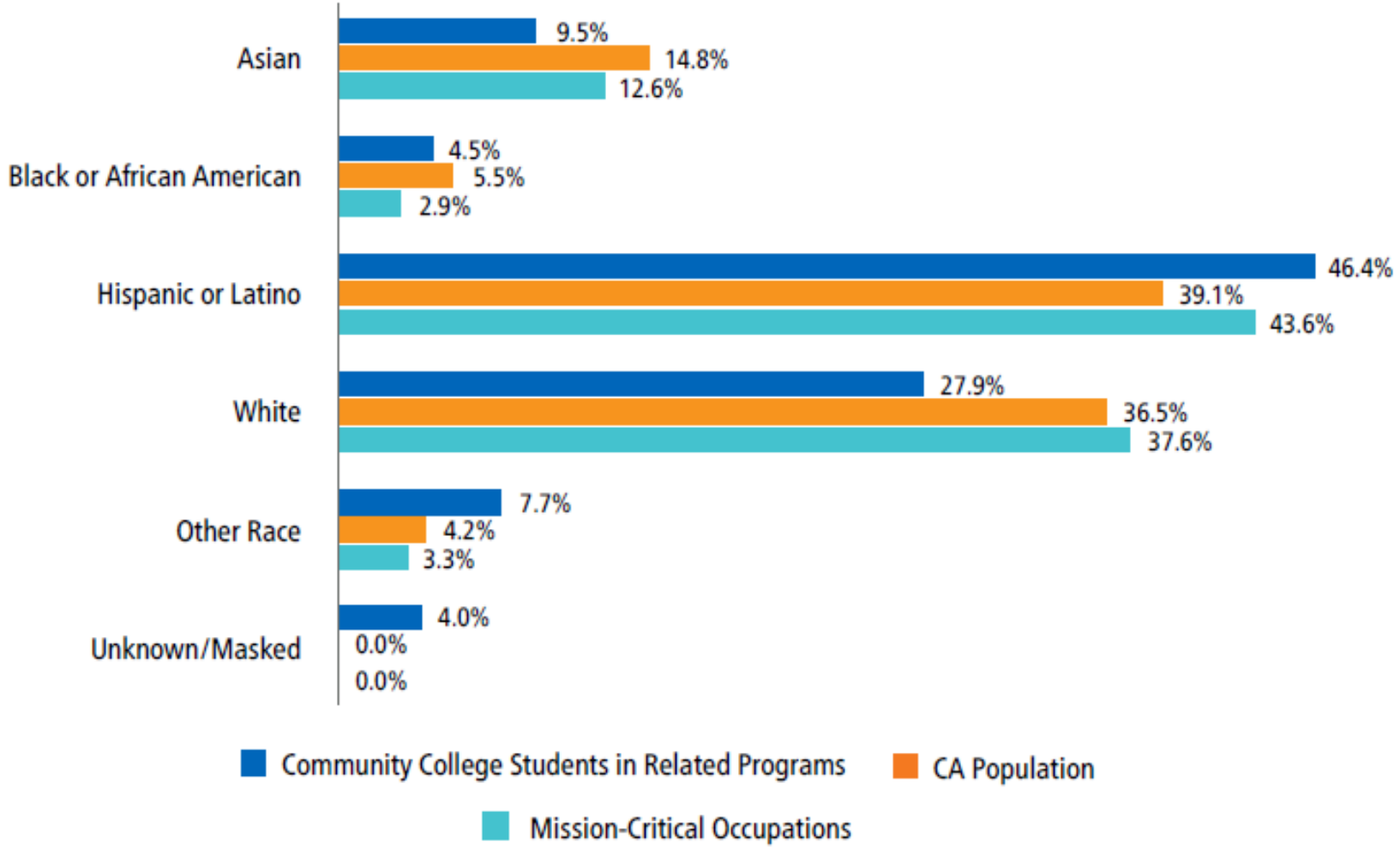
Online Job Postings for Mission Critical Occupations



Statewide Supply for Mission-Critical Occupations



Mission-Critical Demographics: *Race & Ethnicity*



Industry Survey

Contact List Key Words

- Water
- Water Utilities
- Wastewater
- Irrigation
- Water Testing
- Desalination
- Desalination Plant

7K+ → 2,216 → 1,635

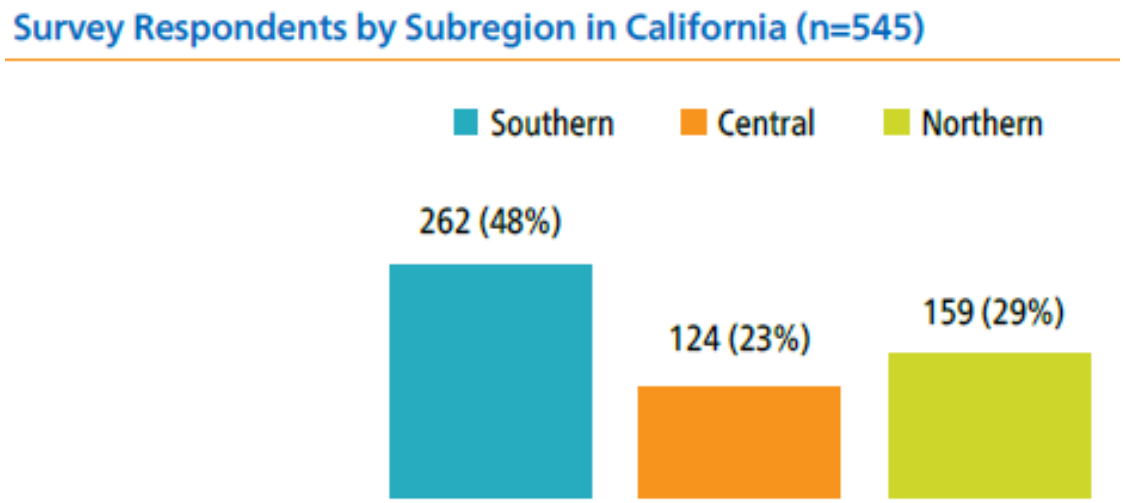
Industry Survey: *WEEA Contact Lists*

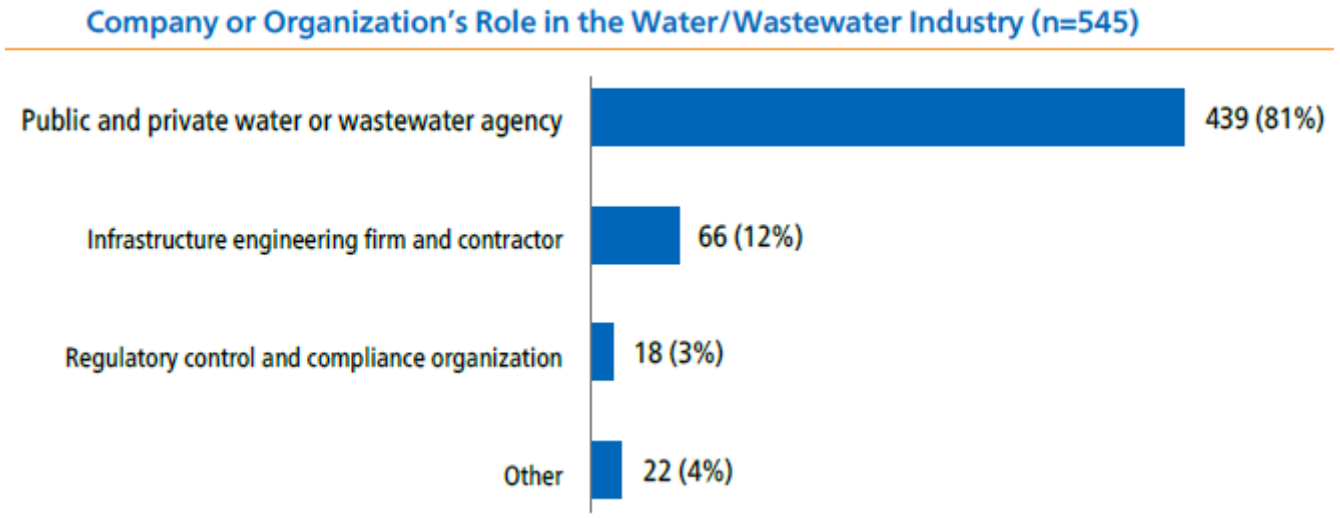
- ACWA
- BAYWORK Signatory Contacts
- IEWorks Agency Contact
- MET
- MWDOC
- UC Berkeley College of Agriculture
  - Agricultural Experiment Station, produced in the year 1938
  - 625 contacts, 294 still in existence (47 percent)

WEEA Water Energy Education Alliance

7K+ → 2,216 → 1,635 → 545

Industry Survey: *Results*





Community College Interviews re: Previous Recommendations

- Raise the public's awareness of the industry and its mission-critical occupations
- Keep up to date with technology (e.g., computer-based digital tools) and industry trends/changes
- Train more students for mission-critical occupations
- Work with industry to develop more entry-level job opportunities for students and increase their career readiness

What have you done to raise the public's awareness of the industry and its mission-critical occupations?

"From a marketing perspective, we have attempted what I would call 'college marketing.' You know, similar strategies as the college might take for other programs, right. Non-targeted, but then not surprisingly, those seem to not be very fruitful. We found more response when we engage with our industry partners and related technical firms."

Areas for Future W/WW Research

- Aging Workforce
- Emerging Occupations and Skills
- Student Enrollment and Employment Outcomes

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Access the full *California Workforce Needs in Water/Waster Industry* Report, Slidedeck, and Executive Summary Handout at this link: https://coeccc.net/collection/california-workforce-needs-in-the-water-wastewater-industry-study

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